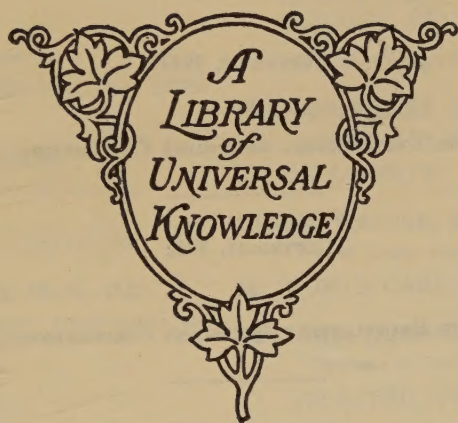






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ON THE SUBLIME

KEY TO PRONUNCIATION.

ā	far, father	ñ	Span. <i>ñ</i> , as in <i>cañon</i> (căn'yôn), <i>piñon</i> (pên'yôn)
â	fate, hate	ng	mingle, singing
a or ă	at, fat	nk	bank, ink
ā	air, care	ō	no, open
ạ	ado, sofa	o or ố	not, on
â	all, fall	ô	corn, nor
ch	choose, church	ó	atom, symbol
ē	eel, we	ơ	book, look
e or ě	bed, end	oi	oil, soil; also Ger. <i>eu</i> , as in <i>beutel</i>
é	her, over; also Fr. <i>e</i> , as in <i>de</i> ; <i>eu</i> , as in <i>neuf</i> ; and <i>oeu</i> , as in <i>boeuf</i> , <i>coeur</i> ; Ger. <i>ö</i> (or <i>oe</i>), as in <i>ökonomie</i> .	ö or oo	fool, rule
ẹ	befall, elope	ou or ow	allow, bowsprit
ě	agent, trident	s	satisfy, sauce
ff	off, trough	sh	show, sure
g	gas, get	th	thick, thin
gw	anguish, guava	th	father, thither
h	hat, hot	ũ	mute, use
h or H	Ger. <i>ch</i> , as in <i>nicht</i> , <i>wacht</i>	u or ũ	but, us
hw	what	ú	pull, put
ī	file, ice	ü	between u and e, as in Fr. <i>sur</i> , Ger. <i>Müller</i>
i or ĭ	him, it	v	of, very
i	between e and i, mostly in Oriental final syllables, as, Ferid-ud-din	y	(consonantal) yes, young
j	gem, genius	z	pleasant, rose
kw	quaint, quite	zh	azure, pleasure
ñ	Fr. nasal <i>m</i> or <i>n</i> , as in <i>embon-</i> <i>point</i> , <i>Jean</i> , <i>temps</i>	'(prime), "(secondary)	accents, to indicate syllabic stress



NAVAL OBSERVATORY, The United States. A government institution located on Georgetown Heights, Washington, D. C., and constituting a division of the Bureau of Navigation of the Navy Department. Its functions are to make and publish observations of the sun, moon, stars and planets for use in compiling the *American Ephemeris* and *Nautical Almanac* and the *American Nautical Almanac*; to make general astronomical observations; to furnish the country and adjacent oceans with correct time, enabling navigators within radio reach of the naval radio station at Radio, Virginia, to find their positions without dependence upon uncertain chronometer rates, and ocean survey parties to get daily longitude data; to purchase, inspect, repair (or supervise repairs to) and issue all navigational instruments, including gyro-compasses, chronometers and sounding apparatus, for the navy, the navy aero service, the coast guard and the light house service, and, during the Great War, for vessels constructed by the Shipping Board and transports taken over by the government; it serves as a longitude station. In the winter and spring of 1913-14 the Naval Observatory, by means of the naval radio station at Radio, Virginia, and in co-operation with the Paris Observatory and the Eiffel Tower radio station, made the first transatlantic radio longitude determination.

The observatory comprises a group of buildings erected on the present site in 1893, the main building containing the offices of the astronomical, nautical instrument, time service and *Nautical Almanac* departments. A national observatory was planned as early as 1810 but Congress always refused to appropriate for one. It was mainly due to the efforts of Capt. J. M. Gilliss, U.S.N., that the foundation of a Naval Observatory was finally laid. On 6 Dec. 1830 a bureau for the care of naval instruments and charts was established by the navy commissioners in the western part of Washington. Lieutenant Goldsborough, U.S.N., was the first officer in charge and in the small circular building built for the use of the depot he mounted the first instrument—a portable transit instrument of 30-inch focal length, made by Richard Patten of New York. In 1833 Goldsborough was succeeded by Lieutenant Wilkes, U.S.N., who removed the depot to a building on Capitol Hill on the west side of North Capitol street, between B and C streets north. This

building was 14 x 13 x 10 feet, and contained, besides the original instrument, a transit instrument of three and three-fourths-inches aperture and 63 inches focal length, a Borda's circle, a sidereal clock and a 3.5 foot achromatic portable telescope by Jones.

Systematic astronomical observations did not begin until 1838 when the Wilkes expedition started for the South Seas. In that year Wilkes resigned the superintendency to assume charge of the expedition and turned over the direction of the Naval Observatory to Gilliss. In the summer of 1838, by order of the Secretary of the Navy, Gilliss purchased a portable achromatic telescope of three and one-fourth inches aperture and 42 inches focal length, an Ertel meridian circle of four and five-tenths inches aperture, with circles 30 inches in diameter, one of which was graduated to three minutes, a sidereal clock and a mean time clock.

It was not, however, until 12 years after the founding of the Bureau of Charts and Naval Instruments (1830) that a suitable building was provided for use as a Naval Observatory. In 1842 an act was passed by Congress (approved 31 August) appropriating \$25,000 for such a building and as it had been mainly due to the efforts of Gilliss that the appropriation was made, he was directed to visit the principal observatories of America and Europe for information respecting plans. The building, occupying a site of 17.85 acres between 23d and 25th streets west, and from E street north to the Potomac, was completed in September, 1844, by Gilliss, and Lieutenant M. F. Maury, U.S.N., placed in charge. The instruments and clocks were removed from Capitol Hill and installed in the new buildings, and further equipment was purchased, consisting of a nine and six-tenths-inch achromatic equatorial, a meridian transit of five and one-third-inch aperture, a prime vertical transit instrument of four and nine-tenths-inch aperture, a mural circle with a telescope of four and one-tenth-inch aperture, and a circle five feet in diameter divided to five minutes and read by six micrometer microscopes, a comet seeker of four-inch aperture, magnetic and meteorological instruments and books. Berlin, Paris, Greenwich and Vienna observatories presented some 200 rare volumes as a nucleus for a library. This library has grown to one which now consists of 29,000 volumes and 5,800 pamphlets, and stands to-day second to Pulkowa only. The published observations comprise more than 50 large

quarto volumes. The *Nautical Almanac* Office was established in 1849 and in 1894 it became a department of the Naval Observatory and since then the *American Ephemeris* and *Nautical Almanac* has been issued as a part of the work of the observatory.

On 3 March 1849 Congress appropriated \$10,000 to pay Dr. Locke of Cincinnati for the construction and use of a magnetic clock, a fillet chronograph, and a cylinder chronograph, which at that time embraced the essential features of those now in use. On April 20, 1861, Maury resigned the superintendency, after having made hydrographic researches which have made his name famous. On the 23d Gilliss assumed charge of the Naval Observatory, instilling new life in the astronomical work and gradually raising the usefulness of the observatory as a national astronomical institution. Since August 1865, in accordance with the plan originated by Professor Harkness, the observatory has transmitted time signals daily except Sundays and holidays (since 1913, daily) over the telegraph lines running into the chronometer room. In 1865 a new Pistor and Martin's meridian circle of eight and fifty-two hundredths-inch aperture replaced the smaller Ertel circle and in 1873 the famous twenty-six-inch equatorial refractor by Alvan Clark and Sons was placed in position. At that time it was the largest refractor in existence, and with it Prof. Asaph Hall discovered the satellites of Mars in 1877.

In 1881 a new site on Georgetown Heights was purchased by Congress, appropriations for new buildings were made in 1886, and in the early part of 1893 the buildings were so far completed as to permit of the transfer of the instruments from the old building. The new buildings occupy a site of 67.78 acres on the heights about 275 feet above the Potomac River and comprise one office building and a number of detached buildings for the principal instruments. The main building has a tower for the smaller equatorial on its western end and still further west an adjoining meridian transit room, while on its eastern end is the library. The clockhouse with vault is 410 feet northwest of the main building and it is flanked on the east and west by connecting observers' rooms which contain the chronographs. Directly east of the east observer's room is the east transit house containing the 9-inch transit circle and directly west of the west observer's room is the west transit house containing the 6-inch transit circle. About 50 feet north of the clockroom is the prime vertical transit house and 175 feet south is the dome of the 26-inch equatorial with two rooms connecting for astronomers' use. Situated 275 feet northwest of the clockhouse is a sheet-iron building with movable roof for the alt-azimuth instrument and connected with it by a platform is another building of sheet-iron louvre work with removable roof for the photographic zenith tube. The horizontal photoheliograph is mounted 400 feet southeast of the clockhouse and about 200 feet southeast of photoheliograph is the photographic equatorial building. The main building, the 26-inch equatorial building, the clockhouse with the adjoining observers' rooms are of white marble, but the other buildings are largely of metal.

In regard to equipment, the 9.6-inch equatorial refractor has been replaced by a telescope having a 12-inch object glass made by Clark and mounted by Saegmüller and occupying a 26-foot dome on the tower at the west end of the main building. The 26-inch equatorial is provided with a mounting by Warner and Swasey and a filar micrometer of the highest grade furnished by the Repsolds. This micrometer is constructed of iron and steel and provided with a printing arrangement for registering the settings of the micrometer screw. The dome is 45 feet in diameter and the hydraulic elevating floor has a range of motion of 12 feet. The 4.5-inch Ertel transit is mounted in the meridian transit house at the west end of the main building. The 8.5-inch object glass of 12 feet focal length in the Pistor and Martin's meridian circle was replaced by a 9.14-inch Clark object glass of 107 inches focal length and the instrument was otherwise modified. Other instruments added to the equipment are; a steel meridian circle with a 6-inch object glass provided with two circles 26 inches in diameter graduated to two minutes; a steel alt-azimuth with a 5-inch object glass by Warner and Swasey, the diameter of its vertical and horizontal circles being 26 inches each, graduated to two minutes; a photographic equatorial with a pair of 10-inch photographic lenses which were figured at this observatory and placed in the central part of the old mounting of the 26-inch equatorial, the 9.6-inch telescope being used for guiding purposes; in 1915 the International Geodetic Association loaned the naval observatory their 8-inch photographic zenith tube which was used for the determination of variation of latitude. This instrument has been set up and continuous observations are being made with it.

The following continuous routine astronomical work is now being carried on at the naval observatory; the 6-inch and 9-inch transit circles are being used to determine the positions of the fundamental and intermediary stars suggested by the Permanent International Committee on the Photographic Chart of the Heavens; the series of observations 1893-1912 made with the prime vertical transit instrument for the determination of the nutation constant, the aberration constant and the variation of latitude are being discussed and prepared for publication; the equatorial telescopes are used principally for the observation of the satellites of the planets, comets, asteroids and the occultations of stars by the moon; the alt-azimuth is being used for the determination of the declinations of fundamental stars; the photographic zenith tube is used for the measurement of variation of latitude; the photographic equatorial is devoted to systematic observation of a zone of asteroids; and daily photographs of the sun are being taken with the photoheliograph. Consult Skinner, 'The United States Naval Observatory' in *Science* (Vol. IX, pp. 1-16, 6 Jan. 1899); Chester, 'Work of the Naval Observatory' (Proceedings of the United States Naval Institute, Vol. XXX, pp. 265-288, June 1904); Nourse, 'Memoir on the Founding and Progress of the U. S. Naval Observatory' (Washington Observations, 1871, Appendix IV).

NAVAL ORDER OF THE UNITED STATES, an association composed of a General Commandery and commanderies in the States of Massachusetts, Pennsylvania, New York and Illinois and in the District of Columbia. The General Commandery meets triennially on 5 October, and the State Commanderies meet annually in November. The parent commandery, that of Massachusetts, was organized at Boston on 4 July 1890. The General Commandery was established three years later, on 19 June 1893. The members of the order are officers and the descendants of officers who served in the navy and marine corps in any war or in any battle in which the said naval forces of the United States have participated. It has about 500 members.

NAVAL RESERVE. See **NAVAL MILITIA**.

NAVAL SCHOOLS, institutions for the training of naval officers. In the United States the Naval Academy at Annapolis, Md., is the most important school of this character. In Great Britain the chief naval school is the Royal Naval College at Greenwich. See **NAVAL ACADEMY, UNITED STATES**.

NAVAL SIGNALS. See **SIGNALS, NAVAL**.

NAVAL STORES, or SHIP STORES, a general term used in commerce and in the merchant marine, for certain products of the pine tree, including spirits of turpentine, resins, pitch, tar, etc. The term is a misnomer in these days of steel and iron ships, as nine-tenths of the product are used in other industries rather than in shipping. The name naval stores is derived from the consumption in early days of large quantities of pitch and tar in ship yards and on board of vessels. Nine-tenths of the naval stores used throughout the world come from the long-leaved pine belt of the Southern States. The pine belt includes a vast territory commencing in North Carolina, near the Virginia State line, and extending southward to Florida, along the Atlantic Coast line. The belt is from 5 to 100 miles wide and includes the States of North Carolina, South Carolina, Georgia, Alabama, Mississippi and Louisiana. The territory embraces about 130,000 square miles. The other tenth of the world's supply comes from France and Austria.

Turpentine.—Spirits of turpentine is derived from the sap of the long-leaved pine and in its crude state is of a fine white color. Upon exposure to the air it becomes dry, hard and brittle, thus forming resin. From 200 acres of pine trees there is obtained the first year about 280 barrels of crude turpentine, or dip; and 70 barrels of what is known as scrape. This distilled will give 2,000 gallons of spirits of turpentine and 260 barrels of resin. In the fourth and last year of the sap flow this output is reduced to 1,000 gallons of turpentine and 110 barrels of resin. By a later process of wood distillation the old dead tree-logs may be made to yield large quantities of resin, tar and turpentine. In the days of the Civil War turpentine sold at \$1.75 to \$1.90 a gallon, as against the normal price of 28 or 30 cents; and inferior resin sold as high as \$4 a barrel, the normal price being about \$1.90. These Civil War prices were largely duplicated in the time of the Great World War when the building of many wooden ships called for increased quantities of tar. See **TURPENTINE**.

Pitch.—The ordinary pitch of commerce is

derived from a dry distillation of resin, and is largely used in calking wooden ships. See **TAR**.

Tar.—The variety of tar known as wood tar which is made from the pine sap (see **TAR**) is produced almost entirely in North Carolina. A cord of pine wood will produce 40 gallons. Wilmington, N. C., is the headquarters for the world's supply of tar and crude turpentine.

Statistics.—The city of Savannah, Ga., is one of the largest markets in the world for naval stores. These form a large share of the foreign commerce of the city, which before the war totaled \$70,000,000 annually.

NAVAL TACTICS. Before hostile fleets are brought into contact (this word indicating the dividing line between tactics and strategy) there are a number of questions to be decided, covering the whole plan of operations throughout the theatre of war. Chief among these are the proper function of the navy in war; its true objective; the point or points upon which it may be concentrated; the establishment of supply and coal depots; the maintenance of communications between the home base and these depots; the military or naval value of commerce-destroying as a secondary operation of war and how it can be most efficiently conducted. All these are strategic questions and it is particularly in the field of naval strategy that the teachings of the past have a value as illustrative of principles and as precedents. This is less true as to tactics when the fleets come into collision at the point or points to which strategic considerations have brought them.

The fighting order of navies is a line, which is called more properly a column because the ships are ranged one behind the other. If the arrangement of the guns, from van to rear, is regarded it will be seen that they really are deployed on a line fronting the enemy. It is commonly known as an attack on van or rear, because of the columnar formation of the ships, but it is really a flank attack. Whichever flank is chosen, the attack on the other is essentially refused, because the numbers devoted to it are insufficient to press an attack home. The culmination of the sail era—Trafalgar—was fought on these lines. Nelson was a thoughtful and daring tactician and expressed reasons for attacking one flank rather than another, under different conditions in which the fleets presented themselves; but, speaking generally, the rear was the better to attack, because the van could not come as soon to help the rear as the rear could the van. There are two primary elements of naval strength, one purely defensive and the other equally offensive. The defensive element comprises well fortified bases sufficiently equipped for the service of the fleet and strategically located; an efficient home base of supplies; sufficient merchant tonnage to serve the needs of war; the protection of all lines of communication to strategical bases and the successful patrol of important trade routes; and the efficient control of all these activities by a system of quick and ready communication. The offensive element is the fleet which must be "well rounded out," comprising capital ships (battleships and battle cruisers), scouts, destroyers, mine layers, submarines, aeroplanes, airships and auxiliaries. It must be trained, adequately manned with trained men, have its

magazines well stocked with ammunition, its storerooms and fuel spaces filled for weeks or even months should it be necessary to wait upon the high seas for its opponent. The battleship of to-day is the lineal descendant of the "Triremes" of Actium and the "Ships-of-the-Line" of Trafalgar and is intended to play the principal rôle in naval warfare. It carries guns of the largest calibre, is protected by steel armor and is regarded as the embodiment of the sea power of a nation. In a modern fleet the following types of ships should exist in co-operation with the battleships: battle cruisers, armored cruisers, protected cruisers, scout cruisers, destroyers, submarines, repair ships, ammunition ships, supply ships, fuel ships, destroyer tenders, submarine tenders, hospital ships, mine depot ships, mine-laying ships, gunboats, tugs and miscellaneous craft. The battle line, composed of those vessels upon which the maximum calibre guns are mounted contains the concentrated fighting strength of the nation. By many naval strategists the true solution of the service of security and information for the fleet lies in utilizing only vessels that can lie in the battle line. This reduces scouting to a limited area about the fleet. This theory decides against scout cruisers unless their usefulness in the tactical battle line can be proved valuable. England and Germany have successfully employed scout cruisers for mine laying and to support destroyers in an attack upon the enemy battle line. The battle line must not be shorn of gun power. The solution is to sacrifice armor for speed in the types of ships to be used as scouts.

Naval operations, excepting raids against coast defenses, presuppose naval superiority by the attacker. Such operations may include one or more of the following: blockade, reconnaissance, demonstration, raid, bombardment and run-by. No matter how complete and detailed may be the information with which a naval commander is supplied when operations are projected, it must be verified and brought up to date by reconnaissance. The information usually desired is the location of batteries, searchlights, stations and mine fields, arcs of fire, range and dead angles of batteries, landing places for troops, and to locate and chart landmarks for aiming points and compass courses. Reconnaissances may be made by day or night, at close or long range, and may be preliminary or in force. The latter are made when the coast defense commander will not disclose information in any other way. Reconnaissances usually begin at long range, with the hope of getting the desired information at small cost. A demonstration has for its object, to harass and wear out the garrison, to force expenditure of ammunition, or to cover some other operation. Raids are attacks upon more or less exposed elements of the defenses, such as mine fields, obstructions, stations, searchlights and detached batteries. A bombardment is an attack upon the fortifications with intent to destroy or seriously cripple them, with a view to a run-by, wherein the fleet or a part of it forces its way past the fortifications and attacks the city, naval base or fleet they protect. The tactical grouping of armament is made to obtain its most prompt and powerful destructive effect in action. Tactical control begins with the fortress commander, and ex-

tends down through fire and battery commanders to the individuals. It depends to a large extent upon efficiency of communications, which fact is recognized by making the battery the basic tactical unit and providing a general defense plan for use when communications fail. The employment of the armament in defense against all forms of attack will depend upon many conditions, one of the chief being the state of the ammunition supply and the possibility of replenishing it. The fortress commander must be able to analyze quickly and accurately the intentions of the fleet commander, and must employ all the force necessary to defeat them, keeping the fleet at a respectful distance with his mortars, and disclosing the least possible information consistent with defeating the enemy's intentions. Unless he has an ample ammunition supply, he must conserve his ammunition and make each shot count. He must be able to determine quickly which is the main effort of the hostile fleet and concentrate all necessary armament upon it. He must know the power of his armament and the general character of the ships he is attacking in order to assign his armament most usefully.

There are two general methods by which battle control may be exercised: The general defense plan and the individual control. The general defense plan seems simple, and is easily and quickly put into operation. It is well thought out long in advance, and carries written instructions. But it is difficult to decide in advance just what the enemy will do, so although the general defense plan is valuable and important, it can be considered only as subsidiary to individual control, which is the proper and correct way to exercise battle tactics. The fortress commander estimates the situation, decides upon the intentions of the enemy, and gives appropriate orders to the fire commanders, and during the course of the action gives such additional orders as the changes in the situation warrant. Long-range actions are now the predominant feature of all naval engagements. During the Russo-Japanese War, the stronger party, as a rule, forced a decision at short range, while now the endeavor is made to strike the decisive blow at long ranges. To accomplish this, advantage is taken of superior speed and greater range of guns. Such tactics are based upon the experiences from the Japanese War, and have been confirmed during the European War. A ship can be put out of action solely by shell-fire, which ruins its power of navigation, destroys its fire-control apparatus, and ravages the whole ship with fire and explosions. The fight off the Falkland Islands illustrates this in a very distinct manner. Thus it would appear that the battle cruiser, which, with superior speed, is able to force the engagement at long range, has a good chance against the "dreadnought," whose heavier armor protection is of no added advantage at such ranges. Admiral Rojestvensky said, after the Russo-Japanese War, that the deadliest enemy of the battleship was the wall of fire created by the incessant bursting of projectiles. The European War has largely confirmed his opinion. In most reports expressions like "the vessel caught fire, later on followed by explosions," can be read. It must be borne in mind, however, that the

more important ships which were sunk by fire during this war were of an older date and have not benefited from the experiences obtained during the war as to the value of the fire-extinguishing apparatus. In spite of all technical progress and care in the manufacture of ammunition there seems to have been a considerable number of non-bursts, although the percentage is smaller than during the Japanese War, where it is reported to have been 65 per cent. As on land, a characteristic feature of war on sea is the huge consumption of ammunition, which far exceeds all calculations. The effect of high explosive shells bursting within 10 metres of the ship's bottom is said to be as dangerous as a direct hit below the water line. High water-columns around a vessel caused by bursts on impact make the gunlayer's task a difficult one. The indirect fire of the *Canopus* off the Falkland Islands, and of the *Queen Elizabeth* at the Dardanelles, shows that long-range fire, in connection with aeroplanes and balloon observation, is a great advantage. The lack of success in the naval operations on the coasts of the Adriatic and the Aegean resulted from the fact that ships of war are constructed and armed primarily to fight other ships and not to reduce permanent sea-coast defenses; their proper functions in the former operations are those of convoy, bombardment, disembarkation, blockade and the like. All military technical literature shows that ships cannot contend successfully with high shore batteries. Ships are not armed to execute high angle fire. Their armament is of three kinds: large calibre for use against heavy armor; medium calibre for use against light armor and superstructure; and small calibre for use against minor craft. The life of the large guns is very limited. No mortars or howitzers are carried. To bring curved fire to bear on coasts' forts it is necessary for ships either to fire from a long distance with their greatest permissible angles of elevation or to come in close to the shore, drop anchor and give the vessels a list sufficient to secure the required elevation of the guns. In the first case the fire will be inaccurate and in the second the ships will be exposed to the danger of very effective short range fire from the forts and also of going aground. The best way to resist an operation of disembarkation and bombardment is with a fleet acting offensively against the hostile fleet. If this is not possible recourse must be had to mobile forces sent to the threatened point.

After sufficient strategical and tactical scouting, the actual battle between the two battle lines will begin with a long range duel; first with battle cruiser, as in the recent Jutland engagement, and afterward battle line against battle line, the battle cruisers leading their battle lines and protecting its head from destroyer attack. Destroyers, supported by scout cruisers, dash in against the head of their enemy's column after it is under the gunfire of the opposing battle line. From this point on each force, without orders and often without signal, carry out a prearranged tactical battle plan, the part each type is to play having been studied during the years of peace before the war began. The object of battle is to seek position and strike. Tactics is used to seek position in order to strike. Gunnery does the striking. It is always difficult to define clearly naval strategy and tactics, yet these must be

clear in mind before the principles of naval war can be grasped. Strategy in distinction from tactics may be said to be the field of war from the point of view of one wishing to attain an object, while tactics is the field of war from the point of view of the executor. Strategy is the idea seeking materialization, a thought seeking its means of execution, while tactics gives the materialization of the idea and the means of carrying out the desires or wishes of the thought. Tactics is the servant of strategy in all naval operations, and a tactical problem without a strategical setting is like a quotation without the context.

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NAVAL VETERANS, National Association of, a patriotic society founded by delegates from the various associations of naval veterans throughout the Union at a meeting held in the city of New York, in January 1887.

Any officer, appointed or enlisted man who has served in the United States navy, United States Marine corps or United States Revenue Marine service during any portion of the time between 12 April 1861 and 25 Aug. 1865, who has not borne arms against the United States, or been convicted of any infamous crime, and who has been honorably discharged or resigned by an honorable acceptance of resignation, is eligible to membership in this association. There are local associations under the national charter, a paid membership of about 7,000, and 3,000 contributing members.

NAVAL WAR COLLEGE, United States. See NAVAL ACADEMY, UNITED STATES.

NAVARINO, nä-vä-rē'nō, or **PYLOS**, pī-lōs, Greece, a seaport town on Navarino Bay, on the southwest coast of the Morea. Its official name is Pylos (q.v.), ancient Pylos, the city of Nestor, now called Palæokastro and Palæo-Navarino, being at the north extremity of the bay. The Bay of Navarino was the scene of a great sea fight between the Athenians under Cleon and the Spartans, 425 B.C. From 1492 to 1821, the town was in the possession of the Turks, when it was taken by the Greeks. The Turks recaptured it in 1825, and retained it until on 20 Oct. 1827 in Navarino Bay the Turkish and Egyptian navy of 89 ships was annihilated by 24 ships of the combined British, French and Russian fleets under Sir Edward Codrington, the British admiral, and brought about Greek independence. Pop. (est.) 3,000. Consult 'Memoir of Sir Edward Codrington,' by his daughter (1873); Baedeker, K., 'Greece' (4th Eng. ed., Leipzig 1909).

NAVARRE, na-vär' (Sp. *Navarra*), Spain, a northern province, formerly, with a portion of the department of Basses-Pyrénées, France, constituting the ancient kingdom of Navarre. The province has an area of 4,055 square miles; the surface generally is mountainous and bleak, but in the valleys, and along the river banks, the soil is fertile, producing wheat, maize, barley and oats. The principal rivers are the Aragon, Argá, Ebro and Bidassoa. The mineral wealth comprises iron, copper and rock salt. The chief towns are Pamplona, the capital, Tudela, Olite and Estella. Pop. of province 316,914. Navarre was inhabited at an early period by the Vascones, the progenitors of the Basques and Gascons. The Vascones were expelled by

the Romans. It was seized by the Visigoths in 470, invaded by the Saracens early in the 8th century, and fell under the sway of Charlemagne in 778. It became an independent state in 855. In 1035 Navarre was divided into three kingdoms—Navarre, Aragon and Castile. The first two became united in 1076, and again separated in 1134. In 1285 it became an appanage of France, but recovered its independence in 1328. Ferdinand conquered it in 1512. The estates of Navarre took the oath of allegiance to him in 1513, and it was incorporated with Castile in 1515. After this act of spoliation, there remained nothing of the ancient kingdom of Navarre beyond a small territory on the north side of the Pyrenees, which was subsequently united to the crown of France by Henry IV of Bourbon, king of Navarre, whose mother, Jeanne d'Albret, was granddaughter of Queen Catherine; and hence the history of Navarre ends with his accession to the French throne, in 1589, the French monarchs, however, until Charles X, being called also King of Navarre. Consult Bordenave, Nicholas de, 'Histoire de Béarn et Navarre' (Paris 1873); Lagrèze, G. B. de, 'La Navarre française' (2 vols., ib. 1881-82); De Oloriz, Hermilio, 'Resumen historico del antiguo reino de Navarra' (Pamplona 1887); De Moret, José, 'Anales del reino de Navarra' (9 vols., Toulouse 1892); Jaurgain, Jean de, 'Etude historique et critique sur les origines du royaume de Navarre' (Paris 1897); id., 'La Vasconie' (ib. 1898).

NAVARRETE, nă-văr-ră'tă, **Juan Fernandez**, Spanish painter: b. Logroño, about 1526; d. Toledo, 1579. He was known as "El Mudo," the mute, being deaf and dumb. He imitated the monk painter of the Milanese school, Fra Vicente; he then devoted himself almost entirely to the study of Titian, whose style and coloring he reproduced so successfully that he became known as the "Spanish Titian." Philip II appointed him his court painter and much of this artist's best work was done in decorating the Escorial. Titian's influence is evident in a 'Birth of Christ'; a 'Holy Family'; and a 'Scourging of Christ' in the Escorial (1571-75), which have exercised a profound influence on the development of technique in Spanish painting.

NAVARRO, na-văr'ō, **Madame**. See ANDERSON, MARY ANTOINETTE.

NAVARRO, Nicolás Eugenio. Venezuelan educator: b. Margarita, Venezuela, 14 Nov. 1867. He was educated at the Episcopal School and the Central University of Caracas; was ordained to the Catholic priesthood in 1890 and for nine years was engaged in parochial duty in the archdiocese of Caracas. From 1902 to 1905 he was professor of dogmatic theology and Sacred Scripture and since the latter year has served as rector and professor at Central University, Caracas. He was sent abroad by the Venezuelan government to obtain a foundation of Capuchin friars for Venezuela. During the anti-religious manifestations of 1896 he was an able defender of the religious orders. In 1899 he accompanied Bishop Duran as secretary to the Plenary Council of Latin America, at Rome, and in 1912 accompanied Archbishop Castro to the Eucharistic Congress at Vienna. In 1911 he was nominated deputy to the Congress of Municipalities in celebration of the

centenary of the independence of Venezuela. He published 'Tres refutaciones con motivo de otras tantas conferencias patrocinadas por la Masonería de Caracas'; 'El incidente del Asilo de providencia'; 'Los conventos y las garantías constitucionales de los Venezuelanos'; 'Editoriales en La Religion'. He is director of *La Religion*, and is a contributor to *Anales de la Universidad Central*; the *Cojo Ilustrado*, and to 'The Catholic Encyclopedia.'

NAVARRO, Pedro, Spanish general: b. Spain, 1446; d. Naples, Italy, 1528. He was engaged with Gonsalvo de Cordova in the Naples campaign of 1500 and made such skilful use of mines as to influence largely the outcome of the war. For this service he was created Count of Alvetto and given command of a naval expedition against the Moors. He was taken prisoner by the French in 1512 and despairing of being ransomed he joined the French army. In an attack upon Naples he was again captured and died soon after. Consult 'Martín de los Heros' in 'Colección de documentos inéditos para la historia de España' (Vol. XXV, Madrid 1854).

NAVAS DE TOLOSA, Las, lās nă-vās dā tölō'sā, Spain, a village of Jaen province, 38 miles by rail north of Jaen, which owes its celebrity to the defeat near here of the Moorish army under Mohammed ibn Abdallah 16 July 1212, by the Spanish troops commanded by Alfonso VIII, assisted by an army of French and English crusaders. In the vicinity also, a battle was fought between the Spanish and French in 1812.

NAVASOTA, năv'a-sō'ta, Tex., city in Grimes County, on the Navasota River, near its outflow into the Brazos River and on the Houston and Texas Central and the Gulf, Colorado and Santa Fé railroads, 70 miles northwest of Houston and 29 miles south-southeast of Bryan. It has a substantial city hall and high school, the Atchison Institute, wagon factory, cooperage, creamery, oil-mill, etc. Pop. (1920) 5,060.

NAVASSA, nă-vă'sā, West Indies, a small island off the southwest coast of Haiti; about two miles long and one and one-half miles wide; altitude, 300 feet. High bold cliffs border nearly all the shore. In 1857, Peter Duncan, an American, discovered on this island a deposit of guano estimated to amount to 1,000,000 tons. According to an act of Congress, passed 18 Aug. 1856 relative to the discovery of guano deposits on unclaimed islands, it was decided that the island of Navassa should be considered "as appertaining to the United States." Consult D'Inwilliers, 'Phosphate Deposits of the Island of Navassa' in *Bulletin of the Geological Society of America* (Vol. II, pp. 75-84, 1891).

NAVE, in Gothic architecture, that part of an ecclesiastical edifice to the west of the choir, and in which the congregation assemble; the part of a church between the aisles.

NAVESINK (năv'ē-sink) **HIGHLANDS**, a low range of hills, in Monmouth County, New Jersey, south of Sandy Hook, and at the mouth of Navesink River. Mount Mitchell, the highest point, is nearly 300 feet above sea-level. On an elevation, 195 feet, stands a lighthouse with two towers 100 feet apart and 53 feet in height. In each tower is a fixed white light.

The Highlands are an important landmark to ships approaching "The Narrows," and the region in this part of New Jersey is a favorite resort for residents of New York.

NAVICULAR DISEASE. See HORSE, CARE AND DISEASES OF THE.

NAVIDAD, La, *lā nā-vē-dād'*, the name of a fort built by Columbus in 1493 on the coast of Haiti, and which was the first Spanish settlement in the New World. Here he left a company of between 30 and 40 men, but on his return in November of the same year found they had all been killed by the Indians and the fort destroyed. See COLUMBUS.

NAVIGABLE RIVERS. See RIVERS.

NAVIGATION. Navigation comprehends that branch of knowledge by means of which the geographical position of a ship is ascertained and kept account of throughout a voyage. It enables a mariner, come from the other side of the world, to steer his ship for the port of destination before ever it has hove in sight. The subject is usually discussed in two parts, called respectively Navigation and Nautical Astronomy.

Navigation, in the limited sense, treats of determining the position of the ship by means of measurements made with reference to the terrestrial surface. It comprises "piloting," the process of conducting a ship in channels and harbors and along coasts where landmarks and aids to navigation, like lighthouses, beacons and buoys, are available for fixing position and where the depth of water and the dangers to navigation are such as to require a constant watch to be kept upon the ship's course and frequent changes of heading to be made, and "dead reckoning," the art by which the geographical position at any moment is deduced from the direction and amount of the ship's progress from a point of departure whose latitude and longitude are known.

Nautical Astronomy is that part of navigation, in its comprehensive sense, which treats of determining the geographical position of the ship from observations of celestial bodies. As the method of piloting cannot be employed out of sight of land, the navigator at sea must find his geographical position either by dead reckoning or by the observation of the sun, moon, planets and stars; the latter method is the more exact, but, since it is not always available, the former must often be depended upon.

Of fundamental importance in navigation is the nautical chart—a miniature representation upon a plane surface, in accordance with some definite system of projection or development, of a portion of the navigable waters of the world. It generally includes the outlines of the adjacent land, together with the surface forms and artificial features that are useful as aids to navigation, and sets forth the depths of water, especially in the near approaches to the land, by soundings that are fixed in position by accurate determinations according to the methods of hydrography. Except in charts of harbors or other localities so limited that the curvature of the earth is inappreciable on the scale of construction, a nautical chart is always framed over with network of parallels of latitude and meridians of longitude, in relation to which the features to be depicted on the chart are located and drawn, and the mathematical

relation between the meridians and parallels of the chart and those of the terrestrial spheroid determines the method of measurement that is to be employed on the chart and the special uses to which it is adapted. A navigator, piloting his ship in sight of objects whose locations are shown upon the chart, may determine position by (a) corrected cross-bearings observed by compass upon two known objects, (b) the distance and corrected compass bearing of a known object, (c) the corrected compass bearing of a known object and the angle measured by sextant between two known objects, (d) two compass bearings of a known object separated by an interval of time together with the compass course and the distance passed over by the ship during that interval, (e) angles measured by sextant between pairs of three known objects. Although the choice of method is governed by circumstances, the resulting position is always found by plotting on the chart. Finally, in connection with the identification of the ship's position by means of the chart, the useful application may be mentioned of taking soundings by means of the lead and line and noticing the correspondence of the charted depths with the series of observed soundings. In some parts of the ocean, even many miles from land, quite serviceable locations result from this practice. Specimens of the materials of the ocean bottom can also be brought up by filling a recess in the end of the sounding lead with grease to which such materials will adhere, and, at times, these specimens also afford information of value, for the charts always specify the kind of bottom existing in various parts of the ocean.

Positions ascertained by dead reckoning are usually less exact than those determined by bearings or angles upon terrestrial objects, as well as those determined by observations of celestial bodies, because the accuracy of dead reckoning is affected by the imperfections arising in determining the precise direction and distance sailed. The deduced course and distance may differ from the course and distance actually made good by reason of bad steering, faulty estimates of the speed, unknown currents, and outstanding errors in the deviation of the compass caused by the ship's magnetism and in the variation of the compass caused by the earth's magnetism. Notwithstanding these recognized defects, dead reckoning is an invaluable aid to the mariner, affording him a means of plotting the position of the ship at any desired time in the interval between astronomical observations for finding geographical position; furnishing an approximate position at the moment of taking astronomical observations and thus proving to be a great convenience in computations based upon those observations; and finally, affording the only available means of determining the location of a ship at sea during those periods of clouded sky, often several days in duration, when the observation of celestial bodies is precluded. The beginning of dead reckoning, called "taking a departure," consists in finding the position of the ship before losing sight of the land and preferably while natural and artificial objects remain in good view, by the methods of piloting, and then using the latitude and longitude of this position, obtained from the plottings on the chart, as the origin for dead reckoning; or

else, as in cases where the bearing and distance of an object on land of known latitude and longitude has been chosen, using the position of this object as the origin of reckoning and the reversed direction of the bearing, with the distance, for the first course and distance, thus treating the proceeding as if the ship had started from the object on shore and sailed to the position where the bearing was taken. Each time that a new position is determined, the taking of the departure is performed anew.

A complete record of data appertaining to the navigation of the ship is kept in a journal called the logbook. The various compass courses along which the ship has advanced from the point of departure are set down in a column, and aside of each, in adjacent columns, are written the values of the deviation and the variation by which the compass course is corrected to find the true course of the passage, and, yet further, aside, of each true course, the distance which the vessel has advanced in that direction. With each true course enter the traverse table—a tabulation, for the values from degree to degree of the acute angles of a plane right-angled triangle, of the relative lengths of the hypotenuse (called distance), the side opposite the tabular angle (called departure), and the side adjacent to this angle (called difference of latitude)—and find in the distance column of the table, opposite to the value of the distance given by the dead reckoning, the corresponding values of the departure and the difference of latitude. These are written in four appropriate columns annexed to the dead reckoning form to the right of those above mentioned. These columns are headed Northing, Southing, Easting and Westing, in order to classify the differences of latitude according to whether the advance of the ship has been to the northward or to the southward upon the course considered, and the differences of departure according to whether the advance of the ship has been to the eastward or westward. When the position of the ship is required, add up all the northings and all the southings and subtract the lesser sum from the greater to obtain the resultant difference of latitude to the northward or the southward, and also add up all the eastings and all the

westings and subtract the lesser of these sums from the greater to obtain the resultant departure to the eastward or the westward, and hence the difference of longitude to the eastward or the westward. Since the number of nautical miles in the departure is equal to the product of the number of minutes of arc in the difference of longitude multiplied by the cosine of the middle latitude of the traverse, the conversion of departure into difference of longitude may be, and usually is, made by means of the traverse table—entering the table with the middle latitude in the place of the angle of the course and, opposite to that number in the latitude column which equals the number of miles of departure, finding the difference of longitude in the distance column.

Then the difference of latitude is applied to the latitude of the last determined position or point of departure, which will give the latitude by dead reckoning. With the middle latitude, find the difference of longitude corresponding to the departure, and, applying this to the longitude of the last determined position or point of departure, the result will be the longitude by dead reckoning. The process is illustrated by the following example:

On 3 April 1918, at 1 P.M., took departure, Cape Henry Lighthouse (lat. 36° 55' 35" N., long. 76° 00' 27" W.) bearing (per ship's compass) 293°, distant 10 miles, ship's head east (p. s. c.); deviation 3° E., variation from chart 6° W. Thence ran till 8 A.M. next day as follows. Required the course and distance by D. R. from the lighthouse, and the latitude and longitude of the position reached:

COURSES (p.s.c.)	Distance	Dev.	Leeway	Wind
73°	60	+3°	3°	Nly
118°	20	+6	3	Nly and Ely
160°	10	+3	3	Ely
319°	10	-6	3	Nly and Ely
26°	130	+3	3	Sly and Ely

To illustrate the application of the various corrections, each course will be considered separately, and corrections applied one at a time, though in practice the algebraic sum is applied mentally.

DEPARTURE COURSE					1st course	2d course
Bearing of Lt. (p. c.)	293°	Course (p. c.)	73°	118°	73°	118°
Deviation	+3	Leeway	+3	+3	+3	+3
Magnetic bearing	296	Course through water	76	121	76	121
Variation	-6	Deviation	+3	+6	+3	+6
True bearing of Lt.	290	Magnetic course	79	127	79	127
Departure course	110	Variation	-6	-6	-6	-6
		True course	73	121	73	121
		3d course	4th course	5th course		
Course (p. c.)		160°	319°	26°		
Leeway		+3	-3	-3		
Course through water		163	316	23		
Deviation		+3	-6	+3		
Magnetic course		166	310	26		
Variation		-6	-6	-6		
True course		160	304	20		

Having corrected the various courses, enter them in a traverse form and proceed with the solution.

The whole data should be in the tabulated form, and the above corrections would be made mentally, in ordinary practice.

or to have the means of measuring the distance she might sail, unless he should find methods independent of the dead reckoning for ascertaining his geographical position at sea. In this condition astronomy is ready to assist him and to afford him the means by which his latitude

WIND	Courses (p. s. c.)	Var. W.	Dev.	Leeway	True courses	Distances
Nly.....	73°	—6°	+3°	3°	110°	10
Nly and Ely.....	118	—6	+6	3	73	60
Ely.....	160	—6	+3	3	121	20
Nly and Ely.....	319	—6	—6	3	160	10
Sly and Ely.....	26	—6	+3	3	304	10
					20	130

Difference of latitude		Departure	
N.	S.	E.	W.
.....	3.4	9.4	.....
17.5	.....	57.4	.....
.....	10.3	17.1	.....
.....	9.4	3.4	.....
5.6	.....	.....	8.3
122.2	.....	44.5	.....
145.3	23.1	131.8	8.3
23.1	.....	8.3	.....
122.2	.....	123.5	.....
		D. Long.	
		156.6	

Lat. left = 36° 55' 35" N.
Difference in lat. = 2° 02' 12" N.

Lat. in = 38° 57' 47" N.

Long. left = 76° 00' 27" W.
Difference in long. = 2° 36' 36" E.

Long. in = 73° 23' 51" W.

The true course and distance made good may be found by entering the traverse table with the resultant departure, 123.5, and difference of latitude, 122.2, and finding the corresponding course, 45°.3, and distance, 173.7 nautical miles.

Supposing the voyage to be directed to Nantucket Lightship, in lat. 40° 37' 05" N. and long. 69° 36' 33" W., the true course and distance to that destination may now be determined:

Lat. of Nantucket Lightship.....	40°	37'	05" N.	Long. of Nantucket Lightship.....	69°	36'	33" W.
Lat. in.....	38°	57'	47" N.	Long. in.....	73°	23'	51" W.
Difference in lat..... =	1°	39'	18"	Difference in long..... =	3°	47'	18" E.
		99'.3		Middle long..... =		227'.3	
Middle lat.....	39°	47'	26"				

Converting this difference of longitude into departure, by entering the traverse tables with the middle latitude, 39° 47' 26", in place of a course, and the difference of longitude 227' .3, in the distance column, the number in the latitude column shows the departure to be 174.6 nautical miles.

The difference of latitude, 99.3', and the departure 174.6, found in juxtaposition in the traverse tables, indicate the true course to be 60½ degrees and the distance 201 nautical miles. Or, the same result may be found by measurement of the length, by the latitude scale, and the direction, with reference to the meridian lines, of the straight line drawn upon the nautical chart from the geographical position marked by the latitude and longitude by dead reckoning to the position of the representation of Nantucket Lightship.

But it would be of imperfect avail to the mariner to know the course which his vessel may make with respect to the sphere,

and longitude may be ascertained for the purpose of defining his position on the globe. The improvement of the instruments, the methods and the tables of nautical astronomy have been the constant solicitude of many generations. The altitude or angular distance above the visible horizon where the sea and sky meet may be accurately measured by means of the sextant, an instrument for measuring the angle between two objects by bringing into coincidence at the eye of the observer rays of light

received directly from the one and by reflection from the other, the measure being afforded by the inclination of the reflecting surfaces. By reason of its small dimensions, its accuracy, and, above all, the fact that it does not require a permanent or a stable mounting but is available for use under the conditions existing on shipboard, it is a most important instrument for the purposes of the navigator.

At the instant of taking an observation of altitude, the time at the meridian for which the ephemerides of the celestial bodies are tabulated must become known; and this is given by the chronometer, a portable timepiece of superior workmanship, differing from an ordinary watch

in having the force of its mainspring rendered uniform by means of a variable lever. Owing to the fact that on a sea voyage a chronometer is exposed to many changes of temperature, it is furnished with an expansion balance, formed of a combination of metals of different expansive qualities, which produces the required compensation. In order that its working may not be deranged by the motion of the ship in a seaway, the instrument is carried in gimbals. As the regularity of the chronometer is essential for the correct determination of a ship's position, it is of the greatest importance that every precaution be taken to ensure the accuracy of its indications. There is no more certain way of doing this than to provide a vessel with several of these instruments—preferably not less than three—in order that if an irregularity develop in one, the fact may be revealed by the others. The *American Ephemeris and Nautical Almanac* is divided into three parts as follows: Part I, Ephemeris for the meridian of Greenwich, gives the ephemerides of the sun and moon, the geocentric and heliocentric positions of the major planets, the sun's co-ordinates and other fundamental astronomical data for equidistant intervals of Greenwich mean time; Part II, Ephemeris for the meridian of Washington gives the ephemerides of the fixed stars, sun, moon and major planets for transit over the meridian of Washington, and Part III, Phenomena, contains predictions of phenomena to be observed with data for their computation. Tables are also appended for the interconversion of mean and sidereal time and for finding the latitude and azimuth by an altitude of Polaris.

The *American Nautical Almanac* is a smaller book made up of extracts from the "Ephemeris and Almanac" just described, and is designed especially for the use of navigators, being adapted to the meridian of Greenwich. It contains the position of the sun and moon, together with the ephemerides of the planets Venus, Mars, Jupiter and Saturn, and the apparent places of 55 stars for the first of each month and the Greenwich mean time of transit at Greenwich for each of these stars, also the mean places of 110 additional stars; solar and lunar eclipses are described, and the tables for the interconversion of mean and sidereal time and for finding the latitude by Polaris are included.

The elements dependent upon the sun and moon are placed in the first part of the book, arranged according to hours, days and months of the year. The right ascension of the mean sun for the entire year is given at one opening, also the mean time of sidereal noon at Greenwich; the declination of the sun, equation of time, the right ascension and declination of the moon and the moon's horizontal parallax and semi-diameter are given for every even hour throughout the year. They must be taken from the almanac for some definite instant of Greenwich mean time. In computations from observations that depend upon the time of the sun's meridian passage, at which instant the local apparent time is 0 hours, and the Greenwich apparent time is equal to the longitude, if west, or to 24 hours minus the longitude, if east, it becomes necessary to correct the equation of time for longitude, before it is applied to the Greenwich

apparent time to obtain a Greenwich mean time for use in taking out other desired data. This Greenwich mean time is sufficiently correct for all practical purposes as the equation of time never changes more than 1.3 seconds in an hour. The Ephemeris, being computed for the Greenwich meridian, contains the right ascension, declinations, equation of time, and other elements for given equidistant intervals of Greenwich time. Hence, before the value of any of these quantities can be found for a given local time it is necessary to determine the corresponding Greenwich time. Should that time be one for which the *Nautical Almanac* gives the value of the required element, nothing more is necessary than to employ that value. But if the time falls between the almanac times, the required quantity must be found by interpolation. The almanac contains the rate of change or difference of each of the principal quantities for some unit of time, and, unless great precision is required, the first differences only need be regarded. In order to use the difference columns to advantage, the Greenwich date should be expressed in the unit of time for which the difference is given. Thus, for using the hourly differences, the Greenwich time should be expressed in hours and decimal parts of an hour; when using the differences for one minute, the time should be in minutes and decimal parts of a minute.

Every celestial body is at a given instant of time in the zenith of some point on the earth's surface; this point is called the geographical position of the body; for the sun, it may be called the subsolar point, for any other heavenly body, the subastral point. The theory being the same for all bodies, the method, as applicable to the sun, will be described. The sun being in the zenith of a given place, one-half of the earth will be illuminated (neglecting refraction), and the other half will be in darkness; the dividing line, called the circle of illumination, will be everywhere 90 degrees from the subsolar point. To an observer anywhere on the circle of illumination, the sun will be in the horizon; at the subsolar point, the sun will be in the zenith, and therefore its altitude will be 90 degrees. If the observer is at any intermediate point between the circle of illumination and the subsolar point, he will have the sun above his horizon and at an altitude between 0 degree and 90 degrees. If a plane be passed through this intermediate position, parallel to the circle of illumination, its intersection with the earth's surface will trace out the circumference of a small circle, at every point of which, at the given instant, the sun will have the same altitude. This circle is called a circle of equal altitudes with respect to the sun, and the sun's zenith distance, at the given instant, is the same at all points of the circle. Since the distance of the observer's zenith from the celestial body, in minutes of arc, is the same as the observer's distance in sea miles from the body's geographical position, and in the case of the sun from the subsolar point, when an observer measures the altitude of the sun, the complement of which is its zenith distance, he actually finds his distance in sea miles from a known spot on the earth, and hence locates himself on a circle of position or circle of equal altitude. The geographical position of a celestial body is located by its lat-

itude and longitude like any terrestrial point; the latitude being the body's declination, the longitude the body's Greenwich hour angle, or number of hours elapsed since the body was on the meridian of Greenwich. In the case of the subsolar point, the latitude equals the sun's declination, and the longitude the Greenwich apparent time. If the subsolar point be located on a terrestrial globe and a circle, whose radius equals the observed zenith distance of the sun, is drawn on the globe, with the subsolar point as a centre, the observer will be somewhere on the circumference of this circle; since the subsolar point bears in a given direction from him, his position is approximately in the opposite direction from the subsolar point, so that the sun's azimuth at the time of the observation indicates the part of the circle on which the observer is situated; and his position would be fixed, if, having the above data, he should find a second circle of equal altitudes, projected from observations of a second celestial body, or from observations again of the sun after a lapse of sufficient interval of time, the observer's position remaining unchanged. However, this graphic method cannot be used for the reason that it is impracticable to carry a globe of such dimensions as to admit of accurate results.

The circles of equal altitude will appear on the Mercator chart as shown in the accompanying figure, being drawn out toward the north and south points on account of the expansion of the scale of latitude of the Mercator projection. These curves are called "Curves of equal altitudes." The right-hand side of the figure in which S_1 is the geographical position of the body observed shows the curves at intervals of 10 degrees. It will be noticed that all these curves cross the parallels of latitude and meridians of longitude at different angles. Near the north and south points the curves run about east and west with the parallels of latitude, and a large error in longitude makes but a slight error in latitude; near the east and west points the curves run with the meridians and a large error in latitude makes but a slight error in the resulting longitude.

Suppose that on an afternoon in April an observer at sea on the north Atlantic Ocean observes the true altitude of the sun's centre to be 50 degrees, the Greenwich mean time of observation being 1 hour, 15 minutes, 30 seconds. From the *Nautical Almanac* the sun's corrected declination is 10° N., the equation of time 0 minutes, 06 seconds, additive to mean time. The Greenwich apparent time is therefore 1 hour, 15 minutes, 36 seconds. Hence the latitude of the subsolar point S_1 is 10° N. and its longitude 1 hour, 15 minutes, 36 seconds west, or $18^\circ 54'$ W. From this point S_1 as a centre the curve of equal altitudes with radius of 40 degrees will be the right-hand curve NXS on the Mercator chart. This curve tells us the fact that the observer is somewhere on its circumference. However, if the bearing of the sun at the instant of sight is given, the quadrant containing the position is indicated. If, in the example, the sun bears southward and eastward, the ship is in the northwest quadrant. Again, suppose that after the lapse of 3 hours, 24 minutes, 24 seconds a second observation shows the sun's altitude to

be 40 degrees. During this interval the sun in its diurnal path will have passed to the westward at the rate of 15° of longitude per hour, carrying with it its system of curves of equal altitudes. The Greenwich apparent time becomes 4 hours, 40 minutes, or the longitude of the subsolar point S_2 is 70° . The declination is N. $10^\circ 03' 01''$, or the latitude of S_2 is N. $10^\circ 03' 01''$, the zenith distance is 50° , the curve on the Mercator chart is N'XS', and the ship is somewhere on this curve. We now know that at the first observation the ship was on the right-hand curve NXS and at the second observation she was on the left-hand curve N'XS', therefore if the ship did not change her

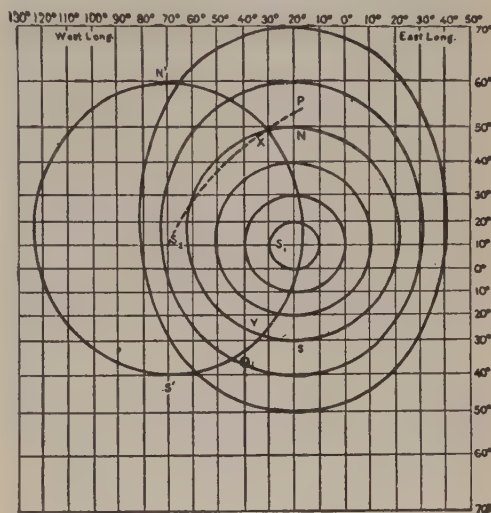


FIG. 1.

position in the interval between the observations, she was at one or the other of the two points (X or Y) in which the curves intersect, and the one which was the observer's position depends on the sun's bearings at the times of observation. If the observer, whose position is somewhere on the right-hand curve, can be supposed to make an instantaneous change of position through a distance of n sea miles directly toward or directly away from the geographical position S_1 , on a great circle passing through S_1 , the sun's altitude will be increased or diminished by n minutes of arc; if the course is kept at right angles to the bearing of the sun, he will keep on his original curve of altitude; if the course is at intermediate angles, the altitude will be changed proportionately to the product of the distance run in sea miles multiplied by the cosine of the difference between the azimuth of the celestial body and the course of the ship; and the observer will be on another circle of equal altitudes, belonging, however, to the same system of circles, that is, the system having S_1 as a centre.

In going then from a point on one circle of equal altitudes, which was the ship's position at the first altitude, on a certain course and distance made good, the observer arrives at a point on another circle of equal altitudes, of the same system, however. The altitude at this latter circle corresponds to what would

have been observed there at the instant of the first observation. The circle of position can then be found after a run to the place of a second observation, either by reducing the first altitude to what it would have been at the place of the second observation at the time of the first observation; or by taking a point in the first curve, representing the ship's approximate position, laying off the course and distance made good in the interval from it to a second point, and then drawing, through this second point, a curve parallel to the corresponding part of the first curve of altitude. The intersection of this transferred curve with the curve of altitude of the second observation will give the ship's position at the time of the second observation. This general method is known in modern navigation as "Sumner's double altitude method."

Ordinarily it is inconvenient to plot the representations of the circles of equal altitude on a Mercator chart on account of their oval form; but upon other projections, like the stereographic, in which angles remain true and in which the scale is uniform within the limits of tolerance, the circles of equal altitudes appear as circles upon the chart and may easily be described when the zenith distance of the observed body is not large. And this convenient and satisfactory method of finding the position of the ship may also be employed with the Mercator projection in low latitudes within the extent through which the scale remains practically uniform. In certain cases, as may happen in the tropics, the sun may be observed when close to the zenith, say within a degree or so; the subsolar point located by its latitude and longitude (the latitude being the sun's declination and longitude the Greenwich apparent time of observation); and that portion of the circle near the ship's dead reckoning position drawn with the true zenith distance as a radius. After the sun's azimuth has altered from 25 degrees to 30 degrees, and under such circumstances it will do so in a very short time, draw a second arc as the result of a second observation. Transfer the first arc for the run between sights and the intersection of the transferred arc with the arc corresponding to the second observation will give the ship's position with satisfactory accuracy. In using the method of double altitudes, there should be a change of bearing of the sun between observations of at least two points; of course, the nearer the change is to 90 degrees the more nearly the resulting lines of position run at right angles to each other and the more clearly will their intersection be indicated. The principles of the Sumner double altitude method, as explained in the case of the sun, apply as well to any other celestial body; but, as a general thing, when one star may be observed others are available, so that two may be observed at one time and the ship may be located at one of the two intersecting points of the resulting circles of position. Suppose two stars are observed at the same moment at a given place; that one, whose subastral point is S_1 (see Fig.), has an altitude of 50 degrees and bears southward and eastward, and that the other, whose subastral point is S_2 , has an altitude of 40 degrees and bears southward and westward. The result of the first observation locates the ship on the northwest arc of the circle of position

NXS, the result of the second on the northeast arc of the circle N'XS', and, therefore, at their northern intersection X. Such observations are known as simultaneous observations; for these observations bodies should be so selected that the resulting circles or lines of position will intersect at an angle not less than 30 degrees.

Simultaneous observations are preferred to double altitude observations, since from the former the position of the ship may be obtained at once without an interval of waiting and without the errors which arise from the uncertainties of the course and distance obtained when there is a change of position; besides, a third line may be obtained and the fix from two lines either verified or disproved, the fix being verified when the three lines have practically the same point of intersection. In the figure, the circumference of a circle of position is represented as having been laid down from S_2 , the geographical position of the observed body, as a centre with a radius S_2X equal to the zenith distance of the observed celestial body; but it is evident that a small arc of the circumference, not differing sensibly from a straight line within the limits of uncertainty in the ship's reckoning, may be determined in the following manner from a neighboring geographical position, as at P, inside or outside of the circumference and at or near the position of the ship as given by dead reckoning: (1) Find the great-circle distance (zenith distance) and bearing (azimuth) of the geographical position of the observed body S_2 from the observer's assumed position P; (2) take the difference, in minutes of arc (nautical miles), between this zenith distance S_2P due to the observer's assumed position, and the zenith distance S_2X found from the true altitude resulting from observation; (3) lay off this difference, which is called the altitude-difference, or intercept, from the assumed position P either away from or toward the observed celestial body according as the true altitude by observation is less or greater than the altitude at the assumed position, and through the point thus reached draw a line at right angles to the bearing. The line so drawn will evidently be a tangent to the circumference of the circle of position, and will be so nearly coincident with this circumference throughout such length as the Sumner line need have, in all those cases in which the zenith distance is as great as 10 degrees, that the tangent itself may be taken as the true line of position. Obviously the only trigonometrical computation that occurs under this method is in calculating the length and bearing of the great-circle arc joining the position P, which is assumed or known from the dead reckoning, with the geographical position, S_2 , which is always in a latitude equal to the declination of the observed celestial body at the instant of observation and in a longitude equal to the hour angle of the body from the prime meridian (Greenwich). In the case of the sun the Greenwich hour angle is expressed by Greenwich apparent time, and in the case of any other celestial body the Greenwich hour angle is found by adding together the Greenwich mean time and the right ascension of the mean sun, as ascertained from the *Nautical Almanac* for the instant of observation; and from this sum subtracting the right ascension of the observed celestial body.

Being strictly in the nature of calculating the great-circle distance and course between two points whose latitudes and longitudes are given, these computations may be made according to the rules of trigonometry; but in practice it is unnecessary to do so, since various altitude and azimuth tables give the distance and azimuth or true bearing, on the globe or on the celestial sphere, of any place from every other place, and consequently the altitude and azimuth or zenith distance and bearing that any celestial body would have at any given time to an observer situated in any given geographical position. So that an observer in a geographical position as yet unknown, about to measure the altitude of a celestial body for the purpose of deducing geographical position, may assume beforehand a geographical position in the region of his station and find from the tables the altitude and azimuth which the celestial body would have if observed from the assumed position; and then, comparing the altitude so taken from the tables with the true altitude obtained by measurement, may at once find the Sumner line by laying off from the assumed geographical position along the direction of the bearing an intercept, called the altitude-difference, and drawing through its extremity a line at right angles to the bearing. After finding the altitude-difference or intercept, the simplest procedure consists in laying it off on the chart from the assumed position and drawing the Sumner line through its extremity, but if, for any reason, this process is not desirable, the latitude and longitude of the extremity of the intercept, which is a point on the Sumner line, called the "computed point," may be found by the use of the Traverse Tables. The exact position of the observer on the Sumner line is, of course, indeterminate from one observation, unless either the latitude or longitude of the observer's position be known beforehand, but the computed point will always be nearer to the actual position of the observer than the dead reckoning or assumed position is. To obtain a fix, that is, to find the actual position, it is necessary to determine the intersection of the first Sumner line with another line of position, which may be another Sumner line or a line of bearing or any other line containing the ship's position at the same time.

Reverting to the example in which the position by dead reckoning was found to be in lat. $38^{\circ} 57' 47''$ N. and long. $73^{\circ} 23' 51''$ W., let it be supposed that an observation of the altitude of the lower limb of the sun, bearing eastward, was measured by sextant to be $32^{\circ} 52' 50''$, by an observer elevated 30 feet above the level of the sea, when the chronometer showed the Greenwich mean time to be 1 hour, 30 minutes, no seconds after noon on 4 April. The true altitude of a celestial body at any place on the earth's surface is the altitude of its centre, as it would be measured by observer at the centre of the earth, above the plane passed through the centre of the earth at right angles to the direction of the zenith. The observed altitude, as measured at sea, may be converted to the true altitude by the application of the following-named corrections: Index correction, dip, refraction, parallax and semi-diameter. The corrections for parallax and semi-diameter are of inappreciable magnitude in observations of the

fixed stars, and with planets are so small that they need only be regarded in refined calculations. Excepting the index correction, which appertains to the particular instrument with which the measurement has been made, the corrections named are found tabulated in nautical works for the convenience of navigators. Since the dead reckoning is uncertain, let it be assumed that the ship has arrived in lat. 39° N. and long. $73^{\circ} 30'$ or 4 hours, 54 minutes W., then the hour-angle of the sun eastward of this meridian would be the difference between the longitude and the Greenwich mean time, or 3 hours, 24 minutes.

Entering the table of simultaneous altitudes and azimuths of celestial bodies under lat. 39° and declination $5^{\circ} 30' \text{ N.}$, being the sun's declination as ascertained from the *Nautical Almanac* for Greenwich mean time, 1918, 4 April, 1 hour, 30 minutes, the altitude and azimuth that the sun's centre would present at the hour angle 3 hours, 24 minutes east of the meridian to an observer in lat. 39° N. and long. $73^{\circ} 30'$ are found to be $33^{\circ} - 10.2'$ in altitude and $\text{N. } 112.4^{\circ} \text{ E.}$ in azimuth. But the altitude of the sun's lower limb as measured by the sextant, being corrected by adding $9' 16''$, the amount of the combined corrections taken from the tables, shows the true altitude of the sun's centre at the instant of observation, in the actual position of the ship, to be $30^{\circ} 2.1'$. Consequently the ship is located on a line running $112.4^{\circ} \pm 90^{\circ}$ or N. 22.4° E. and S. 22.4° W. through a point distant from the assumed position ($39^{\circ} \text{ N. } 73^{\circ} 30' \text{ W.}$) by the amount of the altitude-difference ($33^{\circ} 10.2' - 30^{\circ} 02.1'$), 8.1 nautical miles, laid off in the direction of the azimuth, N. 112.4° E.

Or, the Sumner line may be defined by its direction, N. 22.4° E. and S. 22.4° W. , and the geographical position of the "computed point" found by applying to the assumed position the difference of latitude and difference of longitude due to the length and direction of the intercept or altitude-difference, treated as a distance and course by the traverse table, thus:

Course, $112^{\circ}.4$	Distance, 8.1	Difference latitude S. 3.08	Departure E. 7.49	Difference longitude E. 9.64
Lat. of assumed position.....		39°	$00'$	$00'' \text{ N.}$
Difference in lat.			$3'$	$05'' \text{ S.}$
Lat. of computed point.....		38°	$56'$	$55'' \text{ N.}$
Long. of assumed position.....		73°	$30'$	$00'' \text{ W.}$
Difference in long.			$9'$	$38'' \text{ E.}$
Long. of computed point.....		73°	$20''$	$22'' \text{ W.}$

To conclude the illustration of the proceedings leading to the definite determination of the geographical position of the ship from observations of celestial bodies another observation must be chosen, giving a second Sumner line whose intersection with the first line, after the first line has been transferred parallel to its original direction by an amount in direction and distance represented by the true course and distance of the ship's advance during the interval between the observations, will denote the

required position. Let a meridian altitude of the sun be chosen for this purpose, showing the true altitude of the sun's centre, bearing south, to be $56^{\circ} 10' 00''$ at the instant of its culmination in transit over the meridian of the observer on 4 April after the ship had proceeded 40 nautical miles on the true course $N. 60^{\circ} E.$ from the position at 8 A.M. The Sumner line given by the noon observation of the sun will coincide for a short length with a parallel of latitude, since its direction must be at right angles to the bearing of the sun, which, being to the southward of the observer on his meridian, would have an azimuth of 180 degrees from the north point at the time of observation. The declination of the sun at the instant of observation, as ascertained from the *Nautical Almanac*, at Greenwich mean time, 1918, 4 April, 4 hours, 50 minutes, is $5^{\circ} 34'$ north of the equator, and since the sun is $33^{\circ} 50'$ south of the zenith of the observer, as shown by the remainder found by subtracting the sun's true altitude from 90 degrees, the declination of the zenith of the observer must have been $5^{\circ} 34' + 33^{\circ} 50'$ or $39^{\circ} 24'$ north of the equator. The declination of the zenith being equal to the latitude of the place, the parallel of latitude on which the ship was located at the time of the noon observation must have been $39^{\circ} 24' N.$

Transferring the computed point of the Sumner line determined from the morning observation by the amount of the ship's run to noon:

Course, 60°	Distance, 40	Difference latitude N. 20	Departure E. 34.6	Difference longitude E. 44.6
Lat. of computed point.....		$38^{\circ} 56'$	$55'' N.$	
Transfer in lat.....		$20'$	$00'' N.$	
Transferred computed point.....		$39^{\circ} 16'$	$55'' N.$	
Long. of computed point.....		$73^{\circ} 20'$	$22'' W.$	
Transfer in long.....		$44'$	$36'' E.$	
Transferred computed point.....		$72^{\circ} 35'$	$46'' W.$	

The first Sumner line transferred to the time of the second observation is therefore a line passing through a position in lat. $39^{\circ} 16' 55'' N.$ and long. $72^{\circ} 35' 46'' W.$ in a direction $N. 22.4^{\circ} E.$ and $S. 22.4^{\circ} W.$ The change of longitude for each minute of change in latitude in passing along a Sumner line, called the longitude factor of the line, is tabulated in works on navigation; and it is by consulting such a table that the longitude factor of this line is ascertained to be 0.53. The difference of latitude between the latitude at noon and the latitude of the transferred computed point ($39^{\circ} 24' 00'' - 39^{\circ} 16' 55''$) is $7' 55''$ or $7.9'$, and this, being multiplied by 0.53, gives the product $4.2'$, which is the difference of longitude to be subtracted from the longitude of the transferred computed point in order to find the longitude of the noon position of the ship. Hence, the longitude at noon is $72^{\circ} 35' 46'' - 4' 12''$ or $72^{\circ} 31' 34''$; and the noon position from the astronomical observations is:

$39^{\circ} 24' 00'' N.$ and $72^{\circ} 31' 34'' W.$

From this position the course to the destination should be determined anew. The routine of a day's work at sea consists in working the dead reckoning, an A.M. Sumner line and azimuth taken when the sun is in its most favorable position for the purpose, a meridian altitude of the sun (or, when clouds interfere at noon, a sight for latitude as near the meridian as possible), and a P.M. Sumner line and azimuth. This represents the minimum of work, and it may be amplified as circumstances render expedient; but no part of it should ever be omitted unless cloudy weather renders its performance impossible. The current may be found by comparing the noon positions as obtained by observations and by dead reckoning; and the day's run is calculated from the difference between the day's noon position by observation and that of the preceding day. To "current" is usually attributed all discrepancies between the dead reckoning and observations; but it is evident that this is not entirely due to motion of the waters, as it includes errors due to faulty steering, improper allowance for the compass error, and inaccurate estimate of the vessel's speed through the water.

The compass error is obtained in connection with the morning and afternoon observations by ascertaining the sun's true bearing from the azimuth tables and comparing it with the bearing observed by compass. The variation indicated by the chart is taken away from the total error and the remainder is the deviation of the compass for the ship's heading at the time of the observation.

By performing the work that has just been described a good position is obtained at noon each day, which, in a slow-moving ship with plenty of sea room, may be considered sufficient; but conditions are such at times as to render it almost imperatively necessary that a more frequent determination of the latitude and longitude be made. If the ship is near the land or in the vicinity of off-lying dangers, if she is running a great circle course requiring frequent changes, if she has just come through a period of foggy or cloudy weather or if the indications are that she is about to enter upon such a period, or if she is running at high speed, it is obviously inexpedient to await the coming of the next noon for a fix. The responsibilities resting upon the navigator require that he shall earlier find his ship's position; and generally speaking, the greater the speed made by the ship the more absolute is this requirement. The key to all such determinations will lie in the Sumner line. The mariner must keep in mind two facts: First, that a single observation of a celestial body can never, by itself, give the *point* occupied by an observer on the earth's surface; and, second, that whenever any celestial body is visible, together with enough of the horizon to permit the measuring of its altitude, an observer may thereby determine a line which passes through his own position on the earth's surface in a direction at right angles to the bearing of the body. See ASTRONOMY; COMPASSES; HYDRAULIC ENGINEERING; LATITUDE; LONGITUDE; LOG; METEOROLOGY; SEXTANT; SOUNDING.

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NAVIGATION, Freedom of. See SEAS, FREEDOM OF THE.

NAVIGATION ACT, an important act passed by the British Parliament in 1651 for the protection of British shipping and commerce. In relation to early American conditions the act provided that all colonial trade should be carried on in ships built and owned in England in the colonies (a provision which stimulated colonial shipbuilding), and that, in the case of many specified goods, trade should be with England only. The act was largely rendered inoperative by colonial smuggling. The efforts at last made to enforce the rule were among the chief causes of the Revolution.

NAVIGATION LAWS, as adopted by the United States in 1792-93, have been in operation since that date with few changes or revisions. The laws contain the following provisions: No vessel, unless entirely built in this country and wholly owned and officered by Americans, is considered an American vessel having the right to be protected by the American flag. No foreign vessel is permitted to engage in the American coasting trade, the same extending from Atlantic to Pacific ports. American vessels are no longer considered as such if even a partowner (with a few exceptions) resides abroad for a short time. Transfer of an American vessel to foreigners prohibits it from ever again sailing under the American flag. If an American vessel makes any repairs in a foreign port, duty must be paid on the value of all such repairs on her return to this country. The repairing of foreign vessels in our ports, with foreign materials, is placed under restriction. A tax of six cents per ton of their burden, called a tonnage tax, is imposed on all vessels (except fishing and pleasure vessels) engaged in trade to ports not in North or Central America and a few other specified places, the maximum aggregate tax in any one year not exceeding 30 cents. Foreign vessels pay the same tax, but if one of the officers of an American vessel is a foreigner, it is forced to pay an additional tax of 50 cents. Materials for the construction of vessels for foreign trade may be imported free of duty, but the duty must be paid if the vessel engages for more than two months a year in the coasting trade. American vessels may unload at any port of delivery in the customs district, but foreign vessels can only discharge their cargoes at a port of entry, which is a certain designated port in each customs district in the United States. Exceptions are made when they are laden with coal, salt or similar merchandise in bulk. See ADMIRALTY AND MARI-

TIME JURISDICTION; MARITIME LAW; MERCHANT MARINE IN THE UNITED STATES.

NAVIGATOR ISLANDS. See SAMOAN ISLANDS.

NAVILLE, nă-vêl, Edouard Henri, Swiss Egyptologist: b. Geneva, 14 June 1844. He was educated at the University of Geneva, at King's College, London, at Bonn and at Paris; went to Egypt in 1869, and there made important discoveries; was appointed editor of the 'Book of the Dead' by the London Congress of Orientalists in 1875, and in 1886 published 'Das Aegyptische Todtenbuch der 18. bis 20. Dynastie'; and in 1891 became professor of Egyptology at Geneva. He wrote volumes on the store city of Pithom (1885), on Goshen (1887), on Osorkou II's festival hall (1892), 'Deir el Bahari'; 'Les amis de la paix dans l'Afrique du Sud' (1901); 'La Religion des anciens Egyptiens' (1906; Eng. trans., 'The Old Egyptian Faith,' 1909); 'Papyrus funéraires de la XXIIe dynastie' (1912).

NAVY, History of the. From a period earlier than authentic history, the Greeks began to exhibit a spirit of naval enterprise, and as long as their independence remained the various states into which both the mainland and the islands of Greece, as well as their Asiatic colonies were divided, rivaled each other in planting colonies and pushing their commerce in all directions. These states had also their armaments, and fought fiercely with one another, as well as with their foreign foes. The Athenians, Corinthians, Rhodians, even single cities like Chalcis and Megara, became renowned for their naval strength, and naval battles play a conspicuous part in the history of Greece. In the Persian invasions of Greece the size and power of the Persian fleets also forms a notable circumstance, and the great battle of Salamis (480 B.C.), in which Themistocles defeated the fleet of Xerxes, was the turning-point of the last Persian invasion. The smallness of the Greek galleys, and the superior size and number of those of the enemy, render this battle remarkable. The details of the tactics employed in it, and even the position of the rival fleets, are still matters of critical disputation.

But centuries before the rise of any naval power in Greece, Phœnicia (q.v.) had, certainly as early as 1100 B.C., a powerful fleet to protect its commerce and colonies through the Mediterranean from the attacks of pirates.

Among the Phœnician colonies arose one which in enterprise, ambition and power eclipsed the parent state. Carthage, the rival of Rome, rose to her high rank among the nations of antiquity purely in virtue of her naval commerce. In her long struggle with Rome it was mainly the wealth acquired by commerce which enabled her to maintain the conflict. The Carthaginians also stimulated the Romans to enter upon naval enterprise. A Carthaginian vessel which had been cast on the coast of Italy furnished the model for their first fleet, which consisted of 100 quinqueremes and 20 triremes. This fleet is said to have been built in 60 days. Duilius, who commanded it, wisely distrusting the seamanship of his improvised sailors, contrived a means of approximating his first contest with the Carthaginians as nearly as possible to a land fight. By the use of grappling irons peculiarly contrived the Roman vessels

were firmly attached to those of the enemy, and a struggle ensued, in which superior force and determination alone could influence the result. Thus the first great naval battle of Rome, fought off the Lipari Islands, 260 B.C., by the fleet of Duilius against a Carthaginian fleet of superior size under a leader named Hannibal, resulted in a complete victory, which was celebrated by a triumph at Rome.

The Ancient Galley, the war-ship of the Greeks, was a narrow vessel about 100 feet in length. It was admirably fitted to move rapidly in smooth water, and the numerous rowers gave great impetus to the attack of the beak, which was its principal means of aggression. The bow curved inward, forming a circular beak, which was faced with iron; or else it receded suddenly, having a single sharp point like a ploughshare, projecting at the surface of the water, and intended to open the side of an antagonist. Frequently the beak was formed to represent a lion, tiger or other ravenous beast calculated to inspire terror. It was always surmounted by the national emblem; thus an owl stood on the prow of an Athenian galley; a cock on a Phœnician or Carthaginian; and the eagle on a Roman. Here or at the stern were also placed the ensigns and standards, and trumpeters standing beside them sounding their shrill blasts to inspire courage at the moment of onset. From the bow to the stern there extended a flooring or deck, which served as a battle-field for the mailed and heavy-armed soldiers. The stern was covered with a circular shed or pavilion, richly carved and decorated with streamers and trophies. Under this was placed the *tutela*, representing some patron deity, to which sacrifices and prayers were offered, and which was held so sacred as to furnish a sanctuary to whoever took refuge there. From this elevated station, too, the commander surveyed the fight and directed the efforts of his followers. There were two distinct classes of officers and men in each galley. The commander of the soldiers was supreme, and under him the pilot, who took his station abaft, at the side of the steersman, directed all necessary evolutions and manœuvres. The pilot was assisted in the command of the sailors by his mate, and by the boatswain or encourager of the rowers; while a musician marked the measure of the stroke, and by the harmony of his voice and instrument inspirited the rowers when weary with toil. The rowers were frequently, as in more modern times, malefactors chained to the oar. Javelins and arrows were discharged in showers from the deck, or from turrets at the bow and stern. As a protection from these a curtain of hides was used, from behind which the soldiers discharged their missiles in return, and thrust with long spears used only at sea. In the centre were engines from which rocks were projected of size sufficient to sink a ship; and masses of iron called dolphins were projected from the mast-heads to break the bottom of the enemy's vessel. But the chief means of offense was the attack of the beak, and to make it with advantage it was generally desired to gain the wind. Combustibles were also cast from ship to ship, and peculiar devices due to the ingenuity of the particular commanders adopted on special occasions. The line of battle was usually triangular, the admiral's ship being at the angle in advance, and the line of

storeships forming the base. Before encountering it was usual for the admiral to pass in a small boat throughout his fleet, haranguing his followers, and urging them to do their duty. Thus inspirited a shout of anticipated triumph would pass from ship to ship, and when the gilded shield was at length displayed as a signal for battle, the shrill trumpets sent forth their blasts, and the combatants rushed to the encounter, rending the air with shouts and war songs. The battle won, the victors returned to port, towing their prizes, their ships being decorated with fragments of the wrecks, themselves crowned with laurel, and singing pœans to Apollo. The richest of the spoils was reserved as an oblation to the gods, and broken or sometimes entire galleys were placed in the precincts of the temples. Little change was made by the Romans in their mode of warfare down to the time of the fall of the empire. The emperors of Constantinople had still a fleet of galleys propelled by rowers.

Navies of the Middle Ages.—On the fall of the Roman Empire naval enterprise declined, but only for a brief period. The honor of reviving it is disputed by the French and the Italians. To the latter chiefly belongs the honor of leading the way in the development of modern European commerce, but for the growth of naval armaments we must look also to the north of Europe. Charlemagne had a considerable fleet both on the Mediterranean and the ocean; but already in his time, and even in that of his predecessors, the settled states of Europe had begun to become subject to the piratical excursions of Northmen and Danes, which were afterward directed so persistently against England, and continued for several centuries to disturb its government. In the meantime the Italian republics of Venice and Genoa began to restore the commerce of the Mediterranean, and to open up communications with India by the Red Sea and the Persian Gulf. The Pisans and Florentines followed, and in the time of the Crusades the chief naval armaments of the Christians were supplied by the Italian cities. The successors of Charlemagne did not follow his example in maintaining a regular fleet, yet Saint Louis was able to transport his own army to Africa and to defend his coast against the English, but Philip le Bel had recourse to the Genoese against the English. The great naval battles of these times were fought among the Italian republics, or by them against the Turks, with whom they alternately traded and made war. After the epoch of the Crusades we have a period which in one aspect of its development might be called the epoch of commerce and especially of mercantile navigation. The honor of leading the way in this new epoch belongs to the Portuguese. They were followed by the Spanish, the English, the Dutch, the French and ultimately by all the other nations of Europe, according to their means and opportunities. The Spanish navy reached its highest power in the time of Charles V and Philip II. Francis I attempted the revival of the French marine and it was vigorously undertaken by Richelieu. The administration of Colbert revived both the mercantile and national navy, and the latter attained its chief strength and highest glory in the reign of Louis XIV, when it opposed, and sometimes not unsuccessfully, the united navies

of England and Holland. The navy of Holland became powerful almost from the time of the national independence, and contended with success alternately against the fleets of England and France. Some of the most hotly contested naval battles on record have been fought between the English and Dutch fleets.

Cannon are said to have been first used in naval warfare by the Venetians against the Genoese in 1370, a considerable time after their invention.

The Battle of Lepanto.—The famous battle of Lepanto, which was fought between the Christian powers and the Turks 7 Oct. 1571, may be considered as representative of the first stage of the transition from the earlier mode of warfare. The Christian fleet was collected in the port of Messina in September 1571. It was contributed by the powers who had joined in the Holy League. The Spanish fleet consisted of 77 Spanish, 6 Maltese and 3 Savoyard galleys under Don John of Austria, who commanded the joint fleet; there were 12 papal galleys, under Marc Antonio Colonna; and 108 Venetian galleys and 6 galeazzi under Sebastian Veniero. The Turkish fleet, consisting of 300 vessels, under Capudan-pasha, Musinsade Ali, lay in the Gulf of Lepanto. Though the Turks were more numerous, the Christians were better armed and equipped. Their soldiers wore coats of mail and helmets, and were provided with firearms. The Turks defended themselves with leathern shields and had bows and arrows in place of guns. The prows of the Christian galleys were less open and better defended than those of the Turks. The admirals, according to ancient custom, led the van. Both parties moved to the assault, but the wind changing at the moment favored the Christians. The admiral's galleys closed after a brief cannonade, and grappled each other. The Spaniards boarded three times and were thrice driven back. A reinforcement of 200 men enabled them to return again to the assault with decisive effect and an indiscriminate slaughter of the Turks took place. The head of Ali was exhibited on a pole to his followers. The battle after this only waxed fiercer, and the Turks fought with the courage of despair. So intense did the struggle become that the galley slaves in both fleets joined in the contest; but while the galley slaves of the Christians, who consisted of criminals, fought on their own side in hope of earning a pardon, those of the Turks, who were Christian slaves, rose against their masters. Over 15,000 Christians are said to have been relieved from servitude by the victory. The Turks lost besides 224 ships and 30,000 men.

Modern Navies.—The improvements determined by the use of artillery were chiefly an increase in the size and offensive strength of the ships, and a relative diminution in the number of men. Oars were abandoned for sails. Battles were fought and ships manœuvred by the sailors, and the marines or organized body of soldiers became a mere auxiliary force, available as sharpshooters and for land engagements. Two leading qualities now stood forth as the most important object to be attained in the construction and equipment of vessels for war—strength of offensive armament and speed and facilities of manœuvring. These qualities did

not now first acquire importance, but they gained in relative importance at the expense of a previously preponderating element of equipment, namely, the number of fighting men available for assault at close quarters. Two classes of vessels, according to the preponderance of one or other of these qualities, thus came to constitute the chief strength of modern fleets. The ship of the line, or first-class war-vessel, carried the strength of offensive equipment to the utmost limit practicable without sacrificing seagoing qualities. The frigate, only excelled in strength by a line-of-battle ship, was built and rigged with every artistic appliance to secure speed. Even line-of-battle ships were sometimes made too heavy for effective service, and facility of movement could not be altogether neglected with impunity; but the great point in a first-class vessel was the weight of broadside and a hundred or more guns on three decks were commonly carried. In a pitched battle it was the line-of-battle ships that bore the brunt of the fight and decided the day. The frigates scoured the seas on special missions, escaped from the enemy's line-of-battle ships by speed, destroyed his privateers and protected the commerce of their own state. During all the great European wars these were the leading types of vessels employed. The tactics of naval warfare during this period, allowance being made for the different means of offensive, did not differ materially from the ancient methods. To gain the wind of an adversary, to break his line and to engage him at close quarters with superior force, were still the main objects to be pursued. But a change took place when steam was introduced as a means of propulsion and iron as a material for the construction of vessels. Vessels clad in iron and steel armor superseded the oak-built ship of the former epoch. Improvements in the size, range and destructive power of projectiles effected a new revolution, or succession of revolutions, in the science of naval armaments, and the broadside gave way to a small number of powerful guns. The struggle between these new developments of offensive and defensive force still goes on, and the introduction of gunboats, torpedo boats, submarines, torpedo destroyers, scout and battle hydroplanes and other craft have made naval warfare a new and peculiar science, totally different from the naval warfare of the past.

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NAVY BOUNTY. See BOUNTIES.

NAVY DEPARTMENT, an executive department of the government of the United States, created by Congress 30 April 1798, charged with the administration of the navy, with a cabinet officer at its head who is styled Secretary of the Navy. He is nominated by the President from civil life, with the advice and consent of the Senate. Previous to the passage of the Act of 1798 naval affairs were administered by the War Department. The assistant secretary is also appointed by the President from civil life. Naval officers without executive authority assist the Secretary and keep him informed as to details of the department. Certain specific duties devolve upon the Secretary by law and in regard to these he is not subject to the direction of the President, as is the case generally, since the Constitution makes the President the commander-in-chief of the navy. An annual report is made to the President by the Secretary. The assistant secretary is charged with the supervision of docks, navy yards and the marine corps. Since 1880 the department has had a judge-advocate-general, whose duty is to receive, revise and record courts-martial proceedings, examination board findings, inquiries, etc. There is also a general board, composed of the admiral and 13 other officers, by whom plans are formulated for naval construction and operation. In 1862 eight bureaus were established within the department, with a chief at the head of each appointed by the President from among the naval officers. These are the bureaus of Naval Operations; Yards and Docks; Navigation; Ordnance; Construction and Repair; Steam Engineering; Supplies and Accounts; Medicine and Surgery. The first named is charged with the formulation and preparation of plans of operations of the fleet; the Bureau of Yards and Docks, the chiefs of which must be civil engineers, has charge of all public works at naval yards or elsewhere, and furnishes estimates for construction and supplies; the Bureau of Navigation issues orders to individual commanders in the navy, whom it holds responsible for their fulfilment. It also has charge of education at the Annapolis Academy, at the various naval stations and on board naval vessels, the War College, etc., and keeps records of service and issues the *Annual Register*. The Bureau of Ordnance has charge of torpedo stations, proving grounds and naval magazines. It supplies explosives and ammunition and supervises the manufacture of armor-plate for all naval vessels. All ships of the navy are designed, built or repaired by the Bureau of Construction and Repair in co-operation with the Bureau of Ordnance. The Bureau of Steam Engineering designs and has constructed all propulsion engines and auxiliary mechanism for naval vessels, all signal apparatus, v.g., wireless equipment, etc., coaling stations and oil tank reserve supplies. The Bureau of Supplies and Accounts has charge of the purchase of supplies, their storage and care, preparation of contracts, interpretation of new laws relating to naval affairs, etc. Hospitals, hospital ships, laboratories, technical schools for medical and nurse corps, are under the Bureau of Medicine and Surgery. An office of Naval Intelligence is also maintained by the department with six officers and an officer of marines

whose duty it is to prepare and publish information regarding naval affairs abroad and at home. A naval observatory is maintained at Washington, D. C., whence issues regularly the *Nautical Almanac*. The marine corps is in charge of an officer who is responsible directly to the Secretary of the Navy. See CABINET; NAVAL EDUCATION; NAVAL MILITIA; NAVY, HISTORY OF THE; UNITED STATES—NAVY, and consult 'Annual Reports of the Secretary of the Navy' (Washington, D. C.); 'Encyclopedia of American Government' (Vol. II, New York 1912); Fairlie, 'National Administration of the United States' (1905); Learned, H. B., 'The President's Cabinet' (1911); Paullin, C. O., 'Naval Administration in the United States' (in Naval Institute *Proceedings*, Vols. XXII, XXIII, 1906-07).

NAVY LEAGUE OF THE UNITED STATES, The, an organization formed in 1902 for the purpose of upbuilding the American navy and issuing in its interests a monthly bulletin, *The Navy League Journal*. The League has a membership of 10,000; its headquarters are in Washington, D. C.; of similar organizations in Europe the German Navy League built up a considerable membership of nearly a million. The British Navy League, with sections in all the British colonies, has nearly as many members, and is a great power in Great Britain. The French Navy League, with a former President of the republic as its president, has the support of the most influential people of France.

NAVY MANŒUVRES. See ARMY AND NAVY MANŒUVRES.

NAVY REGISTER, a government publication issued annually by the United States Navy Department. It gives a complete list of the officers of the navy and the marine corps in order of their rank, lists of retired officers, resignations, dismissals, deaths, ships in service and other important naval information. Other governments issue somewhat similar registers.

NAVY OF THE UNITED STATES. See UNITED STATES, NAVY OF THE.

NAVY YARD, a water-frontage usually including large storehouses, machine shops, wharves, piers and dry docks used by the government for building and repairing warships, keeping naval stores, etc., under the control of the Navy Department of the government. In Great Britain the term dockyard is generally used, and on the Continent the word arsenal. In England the royal dockyards are at Chatham, Sheerness, Portsmouth, Devonport and Pembroke, besides the Deptford and the Woolwich storeyards. There are also royal dockyards at Haulbowline in Cork Harbor, at the Cape of Good Hope, Gibraltar, Malta, Halifax, Bermuda, Antigua, Jamaica, Sierra Leone, Trincomalee, Singapore, Hongkong, Esquimalt (Vancouver's Island), Fernando Po, Sydney and Shanghai. The greatest naval centres of France are Cherbourg, Brest, Lorient, Rochefort, Toulon and Bizerta in Tunis. Germany has three ports of war, Kiel, Dantzig and Wilhelmshafen. Trieste and Pola are the Austrian naval harbors. Russia has Cronstadt and Sebastopol at home and Vladivostok in the Amur territory. In the United States the principal

navy yards are located as follows: New York (Brooklyn, N. Y.); Mare Island, Cal.; Norfolk (Portsmouth, Va.); Portsmouth, N. H. (Kittery, Me.); Boston (Charlestown, Mass.); League Island (Philadelphia); Washington, D. C.; Puget Sound and Pensacola, Fla. Besides the navy yards there are several naval stations, the important ones being at Boston, Mass.; Newport, R. I.; Indian Head, Md.; Norfolk, Va.; Key West, Fla.; New Orleans, La.; Bremerton, Wash.; Port Royal, S. C.; Portsmouth, N. H.; Philadelphia, Pa.; Cavite, Philippines; San Juan, Porto Rico; Tutuila, Samoa; Guam, Ladrones; Guantanamo, Cuba, Pearl Harbor, Hawaii; Sitka, Alaska, and Yokohama, Japan. At most of these stations high power radio stations have been erected. In the early history of the United States navy, nearly all the vessels were built and equipped at the navy yards. The six wooden frigates used in the Civil War were thus constructed, but the modern steel warships have been built chiefly by contract, by private builders. The Brooklyn navy yard has been long the most prominent, having four very commodious dry docks, where the largest size of battleships can be accommodated. The important departments are for manufacturing and repairs, including the hull and machinery divisions, public works, storekeepers, yards and docks, inspection, accounting and pay, and medical and surgery. The number of employees before the war averaged about 6,000.

NAWA, nā'wā, or **NABA**, Japan, seaport at the southern end of the island Okinawa one of the Liukiu group. It is enclosed in a coral reef and was opened to trade with China in 1894. A Japanese line of steamers trades between here and Kobe, the principal exports being sugar, cotton, silks, etc. Pop. 47,600.

NAWANAGAR, capital of state of same name in India. See **NOWANAGAR**.

NAXOS, nāk'sōs, or **NAXIA**, nāk-sē'ā, Greece, an island of the Ægean Archipelago, the largest of the Cyclades, lying east of Paros; length, 18 miles; breadth, 12; area, 170 square miles. It is hilly, beautiful and extremely productive, yielding fruit, wine, oil, silk, wheat and barley, while the higher grounds afford pasturage for cattle. Cheese, honey and wax are exported, as well as wine, oil, fruit and grain. There are prehistoric quarries of granite, marble and serpentine; and emery exists in abundance, being exported in large quantities. The chief town or village is Naxos (pop. 2,000), near the northwestern part of the island, on a small bay with a harbor and insecure roadstead. In ancient times Naxos was celebrated for its wine, and played a prominent part in the legends of Dionysus or Bacchus, who is said to have found Ariadne here after she was deserted by Theseus. It was anciently inhabited by Ionians who had emigrated from Athens. In 490 B.C. it was ravaged by the Persians. Having joined the Delian League, it revolted in 469 B.C. In 1207 it became the seat of a Venetian dukedom, and was captured in 1579 by the Turks. As a result of the war with Turkey in 1912-13 Naxos was occupied by Greece, and, by the treaties of London and Athens it was given to her permanently by the Powers. Pop. about 20,000.

NAZARENE, nāz-a-rēn', a designation of Jesus Christ. It appears in two forms in the Greek, *Nazarenos* and *Nazoraïos*, both derived from Nazareth. Though this designation occurs 19 times in the New Testament the authorized version only twice renders it "Nazarene" (Matt. ii, 24; Acts xxiv, 5), elsewhere by the words "of Nazareth." The demoniac uses it in addressing Jesus in the synagogue at Capernaum (Mark i, 24; Luke iv, 34); the people to Bartimæus (Mark x, 47; Luke xviii, 37); the soldiers who apprehended Jesus (John xviii, 5-7); the servants at his trial (Matt. xxvi, 71; Mark xiv, 67); Pilate in the superscription (John xix, 19); the disciples on their way to Emmaus (Luke xxiv, 19); Saint Peter (Acts ii, 22; iii, 6; iv, 10); the false witness against Stephen (Acts iv, 14); the ascended Jesus (Acts xxii, 8), and Saint Paul (Acts xxvi, 9). At first it was applied to Jesus as naturally indicating his birthplace. The Galileans were not highly esteemed; their dialect was not pure, being faulty in pronunciation; the population had blended with the heathen; they were seditious, hence the accusation against Saint Paul as "ring-leader of the Nazarenes." Nazareth was a small, obscure town of Galilee, hence Nazarene became a term of reproach and is still used by Arabs as a general designation for Christians. See **NAZARETH**.

NAZARENES, a primitive sect, called also **NAZARĒANS**, originally regarded as Christians, but classed by Epiphanius ('Hæres,' xxix) as heretic and as judaizing. In those times there were so many Judaizing Christians that it is difficult, if not impossible, to distinguish the Nazarenes from the other sects. Jerome (Ep. lxxxix ad Augustinum) applies to them the term "Minæans," a word which recalls "Min" often used in rabbinical literature to designate heretics, mostly Christians who still followed Jewish customs—the two special sects being either Ebionites or Nazarenes. In the Koran, Christians are called Al-Nasara, from Nazareth. The Mandæans still term themselves "Nasoraya." The last of the Church Fathers to refer to the Nazarenes was Theodoret, who also confuses them with the Ebionites. Consult Hilgenfeld, 'Die Ketzergeschichte des Ur Christentums' (pp. 441-445, Leipzig 1884); Krauss, 'Das Leben Jesu nach Jüdischen Quellen' (pp. 254 et seq., Berlin 1902).

NAZARENES, nickname of a certain school of German painters who, not only in coloring and technique, but in representation of ideas, professed to reproduce the method and style of Italian painters of the 14th and 15th centuries, Giotto, Fiesole, Perugino. The leaders in this movement were Overbeck, Schadow, Veit, Schnorr and Carolsfeld, who founded at Rome "The Congregation of the Brothers of Saint Isidore." Schnorr and Schadow later on left the brotherhood. A similar movement in England was initiated by the Pre-Raphaelites (q.v.). Consult Janson, 'Deutsche Präraphaeliten' (in *Zeitschrift für bildene Kunst*, Leipzig 1901).

NAZARENES. See **EBIONITES**.

NAZARETH, nāz'a-rēth (ancient **NASSRA**, that is, "flower"; modern **EN-NASIRAH**, ʿen nāsē'ra), Palestine, a city noted for being the home of Jesus Christ. It is about 20 miles in direct line from the Mediterranean Sea, 15

miles from the Sea of Galilee and 70 miles north of Bethlehem (q.v.). The distance to Bethlehem by the usual route is 110 miles. The city is built in the form of an amphitheatre, in a valley which is 1,115 feet above the level of the sea and surrounded by hills. On the south is the plain on which the Nazarenes threshed their wheat, and farther away is the plain of Esdraelon. From the summit of the hills which surround the city a fine view of the surrounding country may be obtained.

The Nazareth of the time of Jesus extended farther up toward the summit of the hills (Luke iv). The place was the home of Mary, the mother of Jesus, and of Joseph, the husband of Mary. The city is not mentioned in the Old Testament; but it is referred to several times in the New Testament (Luke i, 26; John i, 46, and other places). The streets are narrow, but well paved; the houses are principally of stone. The house in which Jesus lived was held in esteem in the early ages of Christianity, but when the place came into possession of the Moslems, Christians who approached the village were in great danger. At the time of the Crusades (q.v.) the place was ornamented and kept in good order, but again in 1291 the Moslems gained possession and the village declined. The Franciscan Fathers erected a church and monastery in Nazareth in 1300, but they were expelled in 1362. They returned in 1468, but were obliged to leave in 1542, and returned in 1620. They are now in Nazareth and under their auspices the Church of the Annunciation and several other churches and chapels have been built. The Fathers give hospitality to all travelers who visit the place. The pilgrim house is called "Our Lady of America," as it was erected by the contributions of Roman Catholic Americans. The house in which the Holy Family lived is said to be now in Loretto (q.v.), in Italy. Some of the points of interest are the church of the Annunciation, the fountain of the Virgin, the workshop of Saint Joseph, the church of the schismatic Greeks, church of the United Greeks and the *mensa Christi* (table of Christ). Tradition relates of the last mentioned, that it is the rock upon which Jesus Christ took a repast with his disciples. Saint Francis of Assisi visited Nazareth in 1219; and Saint Louis, king of France, and his wife, visited it on 25 May 1251. The Franciscan Fathers have a school for boys and the Ladies of Nazareth a school for girls. There is one hospital in charge of Brothers of Saint John of God, a school for boys under the Brothers of the Christian Schools and a free dispensary and home for the aged in charge of Sisters. The population is estimated to be about 11,000, of whom 2,400 were Roman Catholics (including three rites), 4,000 schismatic Greeks, 250 Protestants and 4,000 Moslems. Strange as it may seem, there are no Jews in Nazareth. The city was taken by Australian cavalry on 20 Sept. 1918. Consult Baedeker, K., 'Palestine and Syria' (Leipzig 1906); Conder, C. R., 'Tent Work in Palestine' (London 1887); Buhl, Franz, 'Geographie Palästinas' (Freiburg 1896); Sanday, W., 'Sacred Sites of the Gospels' (Oxford 1903); Scrimgeour, F. J., 'Nazareth of To-day' (Edinburgh 1910); Ramsay, Sir W. M., 'Education of Christ' (new ed., New York 1911); De Hamme (translated by Rothier), 'Ancient and Modern Pales-

tine'; De Vogue, 'Les églises de la Terre-Sainte'; Roger, 'La Terre-Sainte'; De Hamme, 'Guide-Indicateur des sanctuaires et lieux historiques de la Terre-Sainte'; Stanley, A. P., 'Sinai and Palestine' (new ed., New York 1903); Smith, G. A., 'Historical Geography of the Holy Land' (ib. 1904); Guérin, V., 'Galilee' (Paris 1880).

NAZARETH, Pa., borough in Northampton County, on the Delaware, Lackawanna and Western and the Lehigh and New England railroads, about five miles north by west of Easton and 100 miles northeast of Harrisburg. It is near large anthracite coal fields and has considerable manufacturing. The chief industrial establishments are cigar factories, cement works, paper and hosiery mills, lumber and planing mills, carriage works, foundry, machine shops, lace factory, guitar factory, creamery and large brick and coal yards. There is considerable trade in manufactures and coal. It is the seat of the Nazareth Hall Military Academy and has Gray Cottage and the historic Whitefield House. There is an Indian monument about 180 years old and the borough exhibits what is believed to be the oldest piece of fire apparatus in the United States—a fire-engine imported from England in 1791. Pop. (1920) 4,288.

NAZARETH, Sisters of Charity of. See ORDERS, RELIGIOUS.

NAZARITE, an Israelite who bound himself or herself to the service of Jehovah by a special vow, the obligations of which are stated in Numbers vi, 1-21. The word is derived from a Hebrew root meaning separation and is sometimes translated in the Greek version of the Septuagint by a word that means sanctified or consecrated. The principal stipulations of the vow bound the Nazarite to abstinence from wine or strong drink and from eating of grapes, and forbade him to cut or shave off the hair of his head, or to touch a dead body. The duration of this vow according to Jewish canons could not be less than 30 days; though some took the vow for life. Samson, Samuel and John Baptist are mentioned in Scripture as perpetual Nazarites, of which there were two classes, those who were permitted to diminish their hair when it became too heavy, if they were willing to bring the three appointed sacrifices (Num. vi, 10-12); and those who were forbidden to diminish their hair, but could touch a dead body, as Samson did the jaw-bone of an ass, without being defiled.

The institution of Naziritism was intended to typify the separation and restraint of a holy life. The growth of the hair indicated the virility of heroic virtue; the flowing locks symbolized childlike simplicity, power, beauty, liberty and the unchecked employment of human faculties in the service of God. Maimonides speaks of the dignity of the Nazarites as being equal to that of the high-priest; according to Eusebius the historian (Hist. Eccles. ii, 23), Nazarites were the only Israelites, excepting the high-priests, who were permitted to enter the Holy of Holies. Parents could dedicate their prospective children to the life of a Nazarite. No community life or separation from the engagements and enjoyments of domestic or social life was entailed by the vow, whose special object appears to have been to

set forth symbolically among the people, in the person of separated devotees, useful and impressive lessons of submission to the law of holiness. The Nazarite law was closely developed in post-Biblical times. A Mishna treatise, *Nazir*, is devoted chiefly to the laws in Num. vi, 1-4. Consult Michaelis, 'Law of Moses'; Bähr, 'Symbolik des Mosaici Cultus'; Driver, 'The Books of Joel and Amos' (in the Cambridge Bible for Schools and Colleges, 1897); Gray, 'The Nazarite' (in *Journal of Theological Studies*, 1900, I, 201 et seq.).

NAZARITES, a sect of Christians in Hungary, numbering about 80,000. They profess to go back to the New Testament for their belief and practice; reject Sunday as a holy day of rest, though for convenience adopt it as the day of public worship, which any man of good standing in the church can hold, as they have no separated and ordained ministry. They observe Baptism and the Lord's Supper as sacraments, but refuse to take an oath or to serve in war. They believe in the Trinity, but reject transubstantiation and infant baptism. When a Nazarite is drawn in the conscription a substitute is provided either by his relations or the parish to which he belongs. The sect found an entrance into Hungary through two journeyman locksmiths, Denkel and Kropacek of Szegedin in 1839; the locksmith Heneszi became its apostle and it rapidly grew from 50,000 members to its present number. The simple social life, charity and peacefulness of this sect puts them on a level with the followers of George Fox in English-speaking countries.

NE TEMERE DECREE, a decree issued 2 Aug. 1907 by the Congregation of the Council of the Roman Catholic Church, and which went into effect at Easter (19 April) 1908. This decree, binding on all Catholics throughout the world, pronounces marriages of Catholics null unless celebrated before a duly qualified priest, or the bishop of the diocese, and at least *two* witnesses. The law binds also in the case of marriages in which either of the parties is or has been a Catholic. Its aim primarily is to prevent more efficiently hasty and clandestine unions and to render it easier for ecclesiastical courts to decide as to the existence or non-existence of a promise to marry. In Germany parties to mixed marriages do not come under the decree.

NEÆRA, ne-é'rá, in Greek mythology, a name given to various nymphs; also a maiden mentioned by Horace, Virgil and Tibullus, as well as in Milton's 'Lycidas.'

NEAGH, nā (local, nā'äh), **Lough**, Ireland, in the province of Ulster, is the largest lake of the United Kingdom. It is situated about 12 miles west of Belfast, is 48 feet above sea-level, 18 miles long, has an average breadth of 10 miles, a maximum depth of 102 feet and an area of 153 square miles. It is well stocked with trout, char, pellen and other lake fish. It receives the waters of the Upper Bann, Blackwater and Callan, and is drained into the North Channel by the Lower Bann. The lough is connected by canals with Belfast, Newry and the Tyrone coal-field.

NEAGLE, nā'gl, **John**, American painter: b. Boston, Mass., 4 Nov. 1796; d. 1865. He was practically a self-taught artist although after

his marriage with the daughter of Thomas Sully he received instruction and encouragement from that painter. Applying himself to portrait painting he rapidly grew in favor with connoisseurs and was made director of the Pennsylvania Academy (1830), and in 1835 first president of the Artists' Fund Society of Philadelphia. Many of his most important works are at Philadelphia, where his parents had settled shortly after his birth. The full-length of 'Patrick Lyon at the Forge' (1826), and the portraits of Rev. Joseph Pilmore, Henry Clay and George Washington are strong in drawing, harmonious in coloring and strikingly characteristic.

NEAL, nēl, **Daniel**, English Non-Conformist clergyman and historian of the Puritans: b. London, 14 Dec. 1678; d. Bath, 4 April 1743. He studied at the Merchant Taylors' School, at a Dissenters' theological school in Little Britain, in Utrecht for two years and in Leyden for one; was assistant and then pastor of a congregation which met first in Aldersgate street and later in Jewin street; and wrote 'History of New England' (1720), which won him the honorary degree of M.A. from Harvard, and the great 'History of the Puritans' begun by John Evans but practically the work throughout of Neal (1732-38). The latter book won him a high reputation with the Non-Conformists, but is not free from bias. It brings the history of English Dissent down to 1689. Consult the 'Life of Neal' by Toulmin (1793).

NEAL, David Dalhoff, American painter: b. Lowell, Mass., 20 Oct. 1838; d. 2 May 1915. He began his studies at the Munich Royal Academy, where he gained the Great Medal. There he studied under Wagner. In 1869-76 he studied under Piloty. After 1879 he practised chiefly portrait painting. He painted many historical-romantic pictures and among them 'Mary Stuart and Rizzio'; 'Oliver Cromwell Visits John Milton,' in the Cleveland Public Library; 'Nuns at Prayer'; 'In the Crypt'; 'Retour du Chasse,' etc. Among his portraits may be mentioned those of Adolph Sutro, Rev. Mark Hopkins, Judge Hoffman of California, D. O. Mills, Whitelaw Reid and Teackle Wallis, in the Athenæum Club, Baltimore. There is little in his work that is distinctly American, his ideals and technique being of the Munich school.

NEAL, **John**, American author: b. Portland, Me., 25 Aug. 1793; d. there, 21 June 1876. He had little schooling; was a clerk in Boston; removed to Baltimore in 1816, began to practise law and write fiction. He contributed largely to British periodicals, lived in England 1823-27, being secretary to Bentham part of that time, and was the first successful American author abroad. He was (1838) one of the earliest speakers in behalf of woman's suffrage, was attracted successively by phrenology, mesmerism and spiritualism, and probably introduced gymnastics into America. Neal was the patron and guide of several younger writers, notably Edgar Allan Poe. Under the name Jehu O'Cataraht he wrote a bombastic poem 'Battle of Niagara' (1818). His novels include 'Randolph' (1823), in which he drew the portrait of William Pinckney so freely as to rouse Edward C. Pinckney to challenge the author;

'Brother Jonathan' (1825), and 'Rachel Dyer' (1828). He wrote the most of 'Paul Allen's American Revolution,' and much else with "marvelous rapidity." Consult his 'Wandering Recollections of a Somewhat Busy Life' (1869).

NEALE, Edward Vansittart, English reformer: b. Bath, England, 1810; d. 1892. He was educated at Oxford and became a Christian Socialist. He founded the first co-operative store in London and was instrumental in the establishment of numerous co-operative societies, mills, etc., and visited America in 1875 in the interests of his work and collected his observations in a paper called the 'Cooperative News.' He published 'The Characteristic Features of Some of the Principal Systems of Socialism' (1851); 'The Mythical Element in Christianity' (1873); 'A Manual for Cooperators' (1881), in collaboration with Thomas Hughes.

NEALE, John Mason, English clergyman and hymn-writer: b. London, 24 Jan. 1818; d. East Grinstead, Sussex, 1866. He was graduated from Trinity College, Cambridge, in 1840; became Fellow and tutor of Downing College in that year, and from 1846 until his death was warden of Sackville College, East Grinstead. His ecclesiastical views were those of the most advanced wing of the High Church party. In 1839 he was a founder of the Cambridge Camden Society, later the Ecclesiological Society, and in 1854 established at Rotherford the sisterhood of Saint Margaret, transferred in 1856 to East Grinstead. In rebuilding Sackville College chapel in 1850 he added ornaments denounced by Gilbert, bishop of Chichester, who inhibited him from officiating in the diocese, but the inhibition was removed in 1863. Neale is said to have known 20 languages. His greatest work was in hymnology. A translator of Latin and Greek Christian hymns he has perhaps never been equaled. Fully one-eighth of 'Hymns Ancient and Modern' (1878) is by him. Chief among his renderings are 'Mediæval Hymns and Sequences' (1851); 'The Rhythm of Bernard of Morlaix' (1858), and 'Hymns of the East Church' (1863). From the 'Rhythm' have been adapted the familiar 'The World is Very Evil,' 'Brief Life is here our Portion,' 'For thee, or dear, dear Country,' and 'Jerusalem the Golden.' He wrote also an important 'History of the Holy Eastern Church' (1847-51); 'History of the Jews' (1841); 'Stories for Children from Church History' (1850); 'Theodore Phranza, or the Fall of Constantinople' (1857), and others. In 1884 a selection from his writings was published. Consult Julian, 'Dictionary of Hymnology' (pp. 785-790, 1892).

NEANDER, nā-än'dër, Johann August Wilhelm, German theologian and church historian: b. Göttingen, 17 Jan. 1789; d. Berlin, 14 July 1850. A Jew, whose name was originally David Mendel. Upon his profession of Christianity in 1806 he assumed the name Neander ("new man"). After studying at Halle under Schleiermacher and at Göttingen, he became professor at Heidelberg in 1812, and in 1813 at Berlin. At Berlin he lectured until his death, largely on church history, but also on ethics, New Testament exegesis and systematic theology. His lectures were notable and his literary

activity great. He was the founder of modern church history, and beyond doubt the chief in that field in the 19th century. He viewed Christianity, not like either Supernaturalists or Rationalists, as a scheme of doctrine, but as a divine force; and its history as the study of human history in terms of that force. His principal work is the 'General History of the Christian Religion and Church' ('Allgemeine Geschichte der christlichen Religion und Kirche') (1825-52), translated by Joseph Torrey (12th ed., 1881), and more widely circulated in England and the United States than in Germany. This survey is based on a most careful use of the sources, and is marked by rigorous analysis. Neander's style here, as elsewhere, is somewhat involved at times, but free from pretentiousness. Schaff terms Neander "a giant in learning and a saint in piety." He wrote further 'Julian the Apostate' (1812; Eng. trans., 1850); 'Saint Bernard' (1813); 'Memoirs of the Christian Life in the Early and Middle Ages' (1822; Eng. trans. by Ryland, 1852); 'History of the Planting and Training of the Christian Church' (1832; Eng. trans. by Ryland, 1842); 'The Life of Jesus Christ' (1837; Eng. trans. by McClintock and Blumenthal, 1848), and other works. Consult Schaff 'Saint Augustin, Melancthon and Neander' (1886); Wiegand, 'Life' (1890); Harnack, A., 'Rede auf August Neander' (Berlin 1889).

NEANDERTHAL, Prussia, a valley or ravine near the village of Hochdal, between Düsseldorf and Elberfeld, which came into prominence in 1857 by the discovery in a limestone cave, at a depth of 60 feet, of the remains of a prehistoric man, of a hitherto unknown type. The peculiar dolichocephalic formation of the skull induced several anthropologists to regard it as typical of a separate race of cave dwellers, while others explained the abnormality as caused by disease during the lifetime of the individual; it is now regarded as a representative of the most ancient of European dolichocephalous people, of whom various remains have been found subsequently in Bohemia, France and England. See ANTHROPOLOGY.

NEAP-TIDES, from the Anglo-Saxon "nepfloed," low tide, are those which happen when the moon is nearly at the second and fourth quarters. The neap-tides are the lowest in the month as compared with their opposites, the spring tides. See TIDES.

NEAPOLIS, ne-äp'ō-lis, Macedonia, the town where Saint Paul, as mentioned Acts xvi, 9-11, commenced his evangelizing work in Europe. It was the port of Philippi eight miles to the west, and was situated on Kavala Bay, near the site of modern Kavala in Turkey.

NEARCHUS, ne-är'kūs, officer of Alexander the Great. He was a native of Crete and went to Amphipolis in the reign of Philip at whose court he formed a friendship with Alexander. Under the latter he was made governor of Lycia and other provinces in Asia Minor in 330 B.C. and about 329 B.C. accompanied Alexander in the Indian campaigns. In 326-5 he commanded the great fleet built by Alexander at Hydraspes and conducted it from the Indus to the Persian Gulf, discovering on his way the mouths of the Euphrates and the

Tigris. Upon the division of the empire which followed Alexander's death, Nearchus was made governor of Lycia and Pamphilia by Antigonus. He wrote an account of his voyage, which has been preserved in Arrian's 'Indica.' Consult Plutarch, 'Vita Alexandri'; Vincent, 'Voyage of Nearchus to the Euphrates'; McCrindle, J. W., 'Invasion of India by Alexander the Great' (new ed., London 1896).

NEARCTIC REGION, one of the primary faunistic divisions of the earth (see ZOOGEOGRAPHY) according to the widely accepted scheme of Schlater and Wallace. It embraces all North America; as far south as the highlands of Mexico carry northern climatic conditions. The differences between its fauna and that of the northern parts of the Old World (Palearctic Province) are, however, not sufficient, in the view of many students, to justify so primal a distinction; and the later tendency is toward uniting the Nearctic and Palearctic "regions" into one under the name Holarctic region, or Arctogæa. It is distinguished from the Palearctic province by the absence of the true mole, the scarcity of goats and sheep and the absence of flycatchers and the true starling.

NEARING, Scott, American sociologist: b. Morris Run, Pa., 6 Aug. 1883. He studied (1901-02) at the University of Pennsylvania Law School, took (1905) the degree B.S. and (1909) Ph.D. He was (1906-14) instructor of economics, then (1914-15) assistant professor at the University of Pennsylvania and instructor of economics at Swarthmore (Pa.) College. From 1915-17 he was professor of social science and dean of the College of Arts and Sciences at Toledo University. He was made chairman (1917-18) of the People's Council of America. After expressing strong views on the attitude of certain university trustees, he was dismissed by the University of Pennsylvania. Much newspaper and public discussion arose from the event. In 1918 he was defeated in the New York elections as Socialist candidate for Congress for the borough of Manhattan. He has written 'Economics' (1908), in collaboration with F. D. Watson; 'Social Adjustment' (1911); 'Solution of the Child Labor Problem' (1911); 'Wages in the United States,' 'Woman and Social Progress' (1912), with his wife; 'Special Religion' (1913); 'Social Sanity' (1913); 'Financing the Wage Earner's Family,' 'Income' (1915); 'Poverty and Riches' (1916). He has also written many articles to the journals and magazines.

NEARSIGHTEDNESS. See VISION, DEFECTS OF.

NEATH, nêth, South Wales, municipal borough and shipping port in Glamorganshire at the mouth of the Neath, seven miles northeast of Swansea, and on the Great Western and the Rhondda and Swansea Bay railways. It contains among its chief buildings eight churches, technical schools, the Gwyn Hall, town-hall, corn exchange and a busy market. The ruins of a castle and abbey dating from the 12th century exist on the east bank of the river. Its industries consist chiefly of copper smelting, tin-plate, galvanized iron and steel works, steam-engine works, iron and brass foundries,

brick and tile works, textile and chemical manufacturing. It has municipal water and gas works, slaughter-houses, traction lines, cemetery, library, etc. The park known as Victoria Gardens also belongs to the city. The town is said to be built on the site of ancient Nidum. Pop. 17,600.

NEAT'S-FOOT OIL, an oil obtained from the feet of the common ox.

NEBENIUS, nā-bā'nē-ūs, Karl Friedrich, German statesman: b. near Landau, Rhenish Palatinate, 1784; d. 1857. After studying law at Tübingen, he made himself acquainted with the Napoleonic methods of administration as a volunteer assistant to the prefect at Besançon, but would not accept a place in the French service. He became in 1807 private secretary in the Baden Ministry of Finance, in 1823 first councillor and in 1838 first president of the Ministry of the Interior. He supported a liberal policy, but the Absolutist party under Blittersdorf gained the ascendancy and he resigned office in 1839. He declined an offer from Frederick William IV of a high position in the Prussian service. On the fall of Blittersdorf he became again in 1845 Minister President. He retired in July 1849 and suffered in his last years from failing eyesight. Nebenius was the leader of reform in Baden for nearly 40 years, constructing the new constitution of the state in 1818, creating its railways, remodeling its taxation, introducing the metric system of weights and measures, organizing the system of popular instruction and regenerating the higher teaching, especially in the University of Heidelberg, of which he was curator. But his name is chiefly associated with his energetic and successful efforts for the establishment of the Zollverein. He studied its conditions, conciliated its opponents and devised a tariff for the general adoption of its component states so that he has been justly called its intellectual founder. He wrote 'Der öffentliche Kredit' (1820; 2d ed., 1829) and 'Der Deutsche Zollverein, sein System und seine Zukunft' (1835).

NEBO, nē'bō, Palestine, the biblical name of Jebel Neba, 2,643 feet high, a few miles east of the north end of the Dead Sea, the mountain of ancient Moab whence Moses viewed the Promised Land, and where he died (Deut. xxxii, 49; xxxiv, 1). The name seems to be the same as that of the Babylonian god. See NEBO.

NEBO, the patron deity of the city of Borsippa in Babylonia. The word *Nebo* is related to the Hebrew Nabhi, "Prophet." Nebo seems to have been the principal god of Babylon before the reign of Hammurabi (q.v.) about 2200 B.C. He was considered a chthonic deity and the regulator of procreation and the life of the newborn. He was worshiped as the god of wisdom, largely on account of the dominance of the priestly school at Borsippa. This wisdom had to do with astrological matters and with writing, and in the capacity of the god of writing Nebo was considered as lord of the tables of fate. As Nebo was regarded as the son of Marduk, who was considered as the true arbiter of human fate, Nebo became the scribe of his father. The homage of Nebo to Marduk was symbolized in the New Year celebration. The temple of Nebo in Borsippa was known as E-Zida, and a similarly named

sanctuary existed in the temple of Marduk at Babylon. Nebo was identified with the planet Mercury. Tashmit was the name of his consort. The Assyrians worshiped Nebo rather than Marduk as the representative of Babylonia. Traces of Nebo worship are found in Arabia, as in the name of the Nabatæans (q.v.), and especially among the Mandæans, where Enba is Jesus, the false Messiah. The name Nebo is a component of many biblical names, such as Nebuchadnezzar, Nebushar-adan, Nebushashban and Abednego. Consult an article by Condamin in Huby, J., 'Christus' (Paris 1912); Jastrow, M., 'Religion of Babylonia and Assyria' (Boston 1898); id., 'Die Religion Babyloniens und Assyriens' (Giessen 1902-12); Jeremias, A., 'Das Alte Testament im Lichte des alten Orients' (Leipzig 1906); Zimmern, in Schrader, E., 'Die Keilinschriften und das alte Testament' (3d ed., Berlin 1902).

NEBRASKA, nē-brās'ka (by act of its legislature, 4 April 1895, styled "Tree Planters' State"), a north central State admitted to the American Union 1 March 1867, is bounded on the north by South Dakota, on the west by Wyoming and Colorado, on the south by Colorado and Kansas, on the east by Missouri and Iowa. The Missouri River separates it from Missouri, Iowa and South Dakota on the east and northeast. Capital, Lincoln. Area, 77,510 square miles, of which 702 are water. Pop. (1920) 1,296,372.

Topography.—Nebraska is in the centre of the great grassy plain stretching from Hudson Bay to the Gulf of Mexico. Its dominant surface characteristic is an undulating prairie sloping upward from the Missouri River to the foothills of the Rocky Mountains with an average rise of about eight feet to the mile. About three-fourths of its area is a rich prairie including all the central and southern part of the State. "Mountain Nebraska" is comprised in an area about 100 miles square in the northwest corner. Here the Pine Ridge and the Wild Cat Range rise to altitudes of 4,000 to 5,000 feet, partly covered with pine and cedar and deeply divided by canyons and mountain valleys. Below the higher peaks lie table-lands interspersed with groves of pine, forming the "park country." The highest point in the State, 5,300 feet, is near the Wild Cat Range in Banner County. In the extreme northwest corner is a section of "Bad Lands," fantastic hills and terraces nearly destitute of vegetation, exhibiting great variety of colored earths and rocks. These regions of northwest Nebraska are picturesque and scenic to a high degree. Nearly level elevated plains with altitude of about 4,000 feet, whose principal areas are called Box Butte plains and Cheyenne plains, lie east and south of the mountain foothills. East of these high plains a sandhill region of 15,000 square miles extends like an open fan diagonally, the handle in the southwest corner of the State and the open fan in the central northern part. These sandhills are covered with grass and include many rich, well-watered valleys. The typical prairie slopes gently from the sandhills toward the Missouri River broken by a range of low hills running parallel to the river.

River Systems.—Three river systems, the Niobrara, the Platte and the Republican, all flowing southeast into the Missouri River, dom-

inate the drainage system of the State. The Platte is the central and principal one. Its valley is the leading feature of Nebraska's geography and topography. From five to 20 miles in width, it is a natural route with easy grades and undulating landscape from the Missouri River to the Rocky Mountains. The overland trails, the Union Pacific Railway and the Lincoln Highway have each made use of the natural advantages of this valley for a great central route across the continent. The sources of the Platte are in the continental divide of the Rocky Mountains in Wyoming and Colorado, and its extreme length is about 700 miles. The channel of the Platte for a large part of its course is from half a mile to a mile in width, with water ranging from a few inches to several feet in depth and with thousands of islands of all sizes giving beauty and variety to its course. The Niobrara River rises in the plains of eastern Wyoming and flows for about 450 miles east to its junction with the Missouri. Its upper course is through gently sloping plains, its middle section through a wild and picturesque canyon bordered by rugged pine-clad hills abounding in rapids and cascades; its lower part through a widening valley. The Republican River rises in the high plains of eastern Colorado and runs for about 200 miles east through the southern tier of Nebraska counties until, turning south into Kansas, it unites with other streams to form the Kansas River. Besides these principal rivers there are the Loup and Elkhorn, with their tributaries, rising in the central sandhills region and flowing southeast to unite with the Platte. They are remarkable for the clearness and purity of their waters, for the regularity of their volume throughout the year and for their undeveloped water power. The Great and Little Nemaha rivers drain the southeastern corner of the State, uniting with the Missouri very near the State line. The Big Blue, Little Blue and the West Blue rivers are part of the Republican system draining the south central counties. The White River is a beautiful mountain stream in the extreme northwest for about 40 miles through Nebraska before it turns north into South Dakota. Scattered over the sandhill section is a multitude of small lakes, which have been the homes and breeding-places of waterfowl for centuries.

Water Supply.—The State has an abundant supply of pure water found in the valleys at depths ranging from 10 to 50 feet and upon the table-lands at from 50 to 250 feet. The great majority of wells are less than 100 feet in depth. The underground waters are found in beds of sand or gravel which underlie nearly the entire State and through which the water moves slowly in a volume so great that pumping does not exhaust the wells. This water supply is partly from the melting snows of the mountains, partly from the seepage of the rivers and partly from the rainfall which is rapidly absorbed by the porous subsoil. Breaking the prairie and irrigation have increased this absorption so that the water-table is in many places nearer the surface than it was before white settlement. Artesian wells are found in 40 counties. The deepest artesian well is at Nebraska City, 3,000 feet, while the best known, the test well, is the salt basin near

NEBRASKA

Abie, (H3).....	132	Brainard, (G3)....	468	Danbury, (D4) ...	293	Giltner, (F4).....	300
Adams, (H4).....	574	Brewster, (E3)....	230	Dannebrog, (F3) ..	436	Gladstone, (G4)...	100
Ainsworth, (E2)...	1,508	Bridgeport, (A3) ..	1,235	Darr, (E4).....	28	Glenville, (F4)....	400
Albion, (F3).....	1,978	Bristow, (F2)....	255	Davenport, (G4) ..	495	Goehner, (G4).....	150
Alda, (F4).....	100	Broadwater, (B3) ..	364	Davey, (H4).....	123	Gordon, (B2).....	1,581
Alexandria, (G4) ..	432	Brock, (J4).....	274	David City, (G3) ..	2,216	Gothenburg, (D4) ..	1,754
Allen, (H2).....	485	Broken Bow, (E3) ..	2,567	Dawson, (J4).....	351	Grafton, (G4).....	324
Alliance, (A2).....	4,591	Brownville, (J4) ..	463	Daykin, (G4).....	204	Grand Island, (F4)13	947
Alma, (E4).....	1,058	Brule, (C3).....	400	Decatur, (H3).....	657	Grant (C4).....	585
Alvo, (H4).....	208	Bruning, (G4).....	326	Denton, (H4).....	145	Greely, (F3).....	919
Amherst, (E4).....	259	Bruno, (H3).....	245	Deshler, (G4).....	944	Greenwood, (H4) ..	347
Angus, (F4).....	78	Brunswick, (F2) ..	359	Deweese, (F4)....	144	Gresham, (G3)....	492
Anoka, (F2).....	129	Burchard, (H4) ..	265	De Witt, (H4)....	675	Gretna, (H3).....	491
Anselmo, (E3)....	457	Burkett, (F4)....	150	Diller, (H4).....	418	Gross, (F2).....	84
Ansley, (E3).....	775	Burr, (H4).....	133	Dix, (A3).....	248	Guide Rock, (F4) ..	611
Antioch, (B2).....	764	Burton, (E2).....	98	Dixon, (H2).....	241	Gurley, (B3).....	291
Arapahoe, (E4) ..	894	Burwell, (E3)....	1,214	Dodge, (H3).....	648	Hadar, (G2).....	140
Arcadia, (E3).....	745	Bushnell, (A3) ..	321	Doniphan, (F4) ..	482	Haigler, (C4).....	450
Arlington, (H3) ..	695	Butte, (F2).....	593	Dorchester, (G4) ..	522	Hallam, (H4).....	212
Armour, (H4).....	100	Byron, (G4).....	137	Douglas, (H4) ..	242	Hampton, (G4) ..	457
Arnold, (D3).....	933	Cairo, (F3).....	427	Du Bois, (H4) ..	332	Harbine, (H4).....	107
Arthur, (C3).....	50	Callaway, (E3) ..	833	Dunbar, (H4)....	312	Hardy, (G4).....	445
Asbby, (C2).....	100	Cambridge, (D4) ..	1,042	Duncan, (G3) ..	182	Harrisburg, (A3) ..	140
Ashland, (H3) ..	1,725	Campbell, (F4) ..	561	Dundee, (J3).....	1,023	Harrison, (A2)....	401
Ashton, (F3).....	397	Carleton, (G4) ..	350	Dunning, (D3)....	289	Hartington, (G2) ..	1,469
Asylum, (G4) ..	600	Carroll, (G2).....	448	Dwight, (G3)....	309	Harvard, (F4).....	991
Atkinson, (F2) ..	1,300	Cedar Bluffs, (H3) ..	516	Eagle, (H4).....	368	Hastings, (F4)....	11,647
Atlanta, (E4).....	258	Cedar Creek, (H3) ..	180	Eddyville, (E3) ..	227	Havelock, (H4) ..	3,602
Auburn, (J4).....	2,863	Cedar Rapids, (F3) ..	766	Edgar, (G4).....	996	Hayes Center, (C3) ..	330
Aurora, (F4).....	2,962	Center, (G2).....	198	Edison, (E4).....	315	Hay Springs, (B2) ..	577
Avoca, (H3).....	231	Central City, (F3) ..	2,410	Elba, (F3).....	276	Hazard, (E3).....	167
Axtell, (E4).....	385	Ceresco, (H3) ..	398	Elgin, (F3).....	854	Heartwell, (F4) ..	140
Ayr, (F6).....	164	Chadron, (B2) ..	4,412	Elk Creek, (H4) ..	218	Hebron, (G4).....	1,513
Bancroft, (H2) ..	763	Chambers, (F2) ..	256	Elkhorn, (H3) ..	333	Hemingford, (A2) ..	708
Barada, (J4).....	118	Chapman, (F3) ..	224	Elm Creek, (H4) ..	600	Henderson, (G4) ..	485
Barnston, (J4) ..	258	Chappel, (B3) ..	1,131	Elmwood, (H4) ..	558	Hendley, (E4).....	200
Bartlett, (F3) ..	132	Cheney, (H4).....	100	Elsie, (C4).....	201	Henry, (A3).....	129
Bartley, (D4) ..	251	Chester, (G4) ..	529	Elwood, (E4) ..	473	Herman, (H3) ..	385
Bassett, (E2).....	664	Clarks, (G3).....	540	Emerson, (H2) ..	864	Hershey, (D3) ..	482
Battle Creek, (G3) ..	743	Clarkson, (G3) ..	884	Emmet, (F2).....	130	Hickman, (H4) ..	380
Bayard, (A3).....	2,127	Clatonia, (H4) ..	239	Endicott, (G4) ..	197	Hildreth, (E4) ..	453
Bazile Mills, (G2) ..	91	Clay Center, (G4) ..	965	Ericson, (F3) ..	192	Hoffland, (B2) ..	150
Beatrice, (H4) ..	9,664	Clearwater, (F2) ..	479	Eustis, (D4).....	434	Holbrook, (D4) ..	455
Beaver City, (E4) ..	1,103	Clinton, (B2) ..	120	Ewing, (F2).....	543	Holdrege, (E4) ..	3,108
Beaver Crossing, (G4).....	543	Cody, (C2).....	428	Exeter, (G4).....	910	Holmesville, (H4) ..	170
Bee, (G3).....	228	Coleridge, (G2) ..	674	Fairbury, (G4) ..	5,454	Holstien, (F4) ..	227
Beemer, (H3).....	548	Collegeview, (H4) ..	2,249	Fairfield, (F4) ..	784	Homer, (H2).....	491
Belden, (G2).....	285	Colon, (H3).....	146	Fairmont, (G4) ..	785	Hooper, (H3).....	1,014
Belgrade, (F2) ..	493	Columbus, (G3) ..	5,410	Falls City, (J4) ..	4,930	Hordville, (G3) ..	191
Bellevue, (J3) ..	695	Comstock, (E3) ..	450	Farnam, (D4) ..	408	Hoskins, (G2) ..	274
Bellwood, (G3) ..	369	Concord, (H2) ..	261	Farwell, (F3) ..	246	Howe, (J4).....	160
Belvidere, (G4) ..	424	Cook, (H4).....	360	Filley, (H4).....	169	Howell, (G3) ..	904
Benedict, (G4) ..	313	Cordova, (G4) ..	205	Firth, (H4).....	332	Hubbard, (H2) ..	152
Benkelman, (C4) ..	1,009	Cornlea, (G3) ..	95	Fontanelle, (H3) ..	100	Hubbell, (G4) ..	231
Bennet, (H4).....	473	Cortland, (H4) ..	322	Fordyce, (G2) ..	150	Humboldt, (J4) ..	1,277
Bennington, (H3) ..	314	Cotesfield, (F3) ..	214	Fort Calhoun, (H3) ..	309	Humphrey, (G3) ..	835
Bertrand, (E4) ..	697	Cowles, (F4).....	220	Fort Crook, (J3) ..	203	Huntington, (F4) ..	387
Berwyn, (E3).....	205	Cozad, (E4).....	1,293	Fort Robinson, (A2) ..	500	Huntley, (E4) ..	170
Bethany, (H4) ..	1,078	Crab Orchard, (H4) ..	278	Foster, (G2).....	140	Hyannis, (C3) ..	384
Bigspring, (B3) ..	408	Craig, (H3).....	418	Franklin, (F4) ..	1,055	Imperial, (G4) ..	723
Bladen, (F4).....	445	Crawford, (A2) ..	1,646	Fremont, (H3) ..	9,605	Inavale, (F4) ..	130
Blair, (H3).....	2,702	Creighton, (G2) ..	1,446	Friend, (G4).....	1,263	Indianola, (D4) ..	742
Bloomfield, (G2) ..	1,431	Creston, (G3) ..	381	Fullerton, (G3) ..	1,595	Inland, (F4).....	100
Bloomington, (E4) ..	503	Crete, (G4).....	2,445	Gandy, (D3).....	191	Inman, (F2).....	315
Blue Hill, (F4) ..	726	Crofton, (G2) ..	811	Garland, (G4) ..	279	Itasca, (H3).....	156
Blue Springs, (H4) ..	742	Crookston, (D2) ..	100	Garrison, (G3) ..	138	Jackson, (H2) ..	274
Boelus, (F3).....	259	Culbertson, (D4) ..	686	Geneva, (G4).....	1,768	Jansen, (G4).....	258
Bostwick, (F4) ..	150	Cushing, (F3) ..	1,017	Genoa, (G3).....	1,069	Johnson, (J4) ..	255
Bradshaw, (G4) ..	391	Dakota City, (H2) ..	399	Gering, (A3).....	2,508	Johnstown, (E2) ..	290
Brady, (D3).....	400	Dalton, (B3).....	295	Gibbon, (F4).....	883	Julian, (J4).....	181
				Gilead, (G4).....	155	Juniata, (F4).....	329

NEBRASKA - Cont'd.

Kearney, (E4)....	7,702	Naper, (E2).....	199	Prosser, (F4).....	156	Sutton, (G4).....	1,603
Kenesaw, (F4)....	646	Naponee, (E4)....	263	Ragan, (E4).....	222	Swanton, (G4)....	276
Kennard, (H3)....	363	Nebraska City, (J4)6,279		Ralston, (H3)....	455	Syracuse, (H4)....	889
Keystone, (C3)...	160	Nehawka, (H4)...	200	Randolph, (G2)...	1,338	Table Rock, (H4) .	750
Kilgore, (D2)....	274	Neligh, (F2).....	1,724	Ravenna, (F3)....	1,703	Talmage, (J4).....	525
Kimball, (A3)....	1,620	Nelson, (F4).....	955	Raymond, (H4)...	249	Tamora, (G4).....	205
Lakeside, (B2)...	150	Nemaha, (J4)....	351	Red Cloud, (F4)...	1,856	Tamov, (G3).....	128
Laurel, (G2).....	830	Newcastle, (H2)...	500	Republican City, (E4).....	424	Taylor, (E3).....	251
Lawrence, (F4)...	538	Newman Grove, (G3).....	1,260	Reynolds, (G4)...	208	Tecumseh, (H4)...	1,688
Lebanon, (D4)....	245	Newport, (E2)....	430	Richland, (G3)...	133	Tekamah, (H3)...	1,811
Leigh, (G3).....	516	Nickerson, (H3)...	141	Rising City, (G3)...	460	Thayer, (G4).....	168
Leshara, (H3)....	102	Niobrara, (G2)...	736	Riverton, (F4)...	399	Thedford, (D3)...	260
Lewellen, (B3)...	120	Nora, (E4).....	130	Roca, (H4).....	133	Thurston, (H2)...	204
Lewiston, (H4)...	167	Northfolk, (G2)...	8,634	Rockville, (F3)...	208	Tilden, (G2).....	1,101
Lexington, (E4)...	2,327	Norman, (F4)....	127	Rogers, (H3)....	128	Tobias, (G4).....	357
Liberty, (H4)....	375	North Bend, (H3)...	1,087	Rosalie, (H2)....	321	Trenton, (C4)....	592
LINCOLN, (H4) .54,948		North Loup, (F3)...	637	Roseland, (F4)....	243	Trumbull, (F4)...	236
Lindsay, (G3)....	490	North Platte, (D3) 10,466		Royal, (F2).....	202	Tryon, (D3).....	100
Linwood, (H3)....	297	Oak, (G4).....	201	Rulo, (J4).....	744	Uehling, (H3)....	267
Litchfield, (E3)...	428	Oakdale, (C2)...	707	Rushville, (B2)...	955	Ulysses, (G3)....	460
Lodgepole, (B3)...	451	Oakland, (H3)...	1,356	Ruskin, (G4)....	360	Unadilla, (H4)...	227
Long Pine, (E2)...	1,200	Obert, (C2).....	116	Saint Edward, (G3) 1,002		Union, (J4).....	292
Loomis, (H4)....	238	Oconto, (G3)....	272	Saint Helena, (G2) 124		University Place, (H4).....	4,112
Loretto, (G3)....	190	Octavia, (E3)....	150	Saint Paul, (F3)...	1,615	Upland, (F4)....	433
Lorton, (H4)....	102	Odell, (H4).....	403	Salem, (J4).....	373	Utica, (G4).....	571
Louisville, (H4)...	645	Ogallala, (C3)...	1,062	Sargent, (E3)....	1,078	Valentine, (D2)...	1,596
Loup City, (E3)...	1,364	Ohioa, (G4).....	433	Saronville, (G4)...	141	Valley, (H3).....	764
Lushton, (G4)....	186	Omaha, (J3)....	191,601	Schuyler, (G3)...	2,636	Valperaiso, (H3)...	599
Lynch, (F2).....	589	O'Neill, (F2)....	2,107	Scotia, (F3)....	559	Venango, (C4)....	285
Lyons, (H2).....	1,025	Ong, (G4).....	265	Scottsbluff, (A3)...	6,912	Verdel, (F2)....	162
McCook, (D4)....	4,303	Orchard, (F2)....	444	Scribner, (H3)...	1,021	Verdigris, (G2)...	528
McCool Junction, (G4).....	338	Ord, (F3).....	2,143	Seneca, (D2)....	476	Verdon, (J4)....	347
McGrew, (A3)....	128	Orleans, (E4)....	954	Seward, (G4)....	2,368	Vesta, (H4).....	140
McLean, (G2)....	81	Osceola, (G3)...	1,209	Shelby, (G3)....	559	Virginia, (H4)...	116
Madison, (G3)...	1,735	Oshkosh, (B3)...	707	Shelton, (F4)....	1,037	Wabash, (H4)...	120
Madrid, (C4)....	218	Osmond, (G2)...	642	Shickley, (G4)...	396	Waco, (H4).....	297
Magnet, (G2)....	153	Otoe, (H4).....	261	Sholes, (G2)....	50	Wahoo, (H3)....	2,338
Malcolm, (H4)...	125	Overton, (E4)...	515	Shubert, (J4)....	397	Wakefield, (H2)...	1,114
Malmö, (H3)....	189	Oxford, (E4)....	739	Sidney, (B3)....	2,852	Wallace, (C4)....	327
Manley, (H4)....	180	Page, (F2).....	608	Silver Creek, (G3)...	583	Walthill, (H2)...	1,145
Marion, (D4)....	180	Palisade, (C4)...	527	Smartville, (H4)...	100	Warnerville, (G3)...	100
Marquette, (G4)...	305	Palmer, (F3)....	577	Smithfield, (E4)...	229	Washington, (H3)...	117
Marsland, (A2)...	165	Palmyra, (H4)...	317	Snyder, (H3)....	359	Waterbury, (H2)...	190
Martinsburg, (H2) 303		Panama, (H4)...	210	South Auburn, (J4) 800		Waterloo, (H3)...	431
Maskell, (G2)....	165	Papillion, (H3)...	666	South Bend, (H3)...	143	Wauneta, (C4)....	572
Mason City, (E3) 487		Pauline, (F4)....	150	South Sioux City, (H2).....	2,402	Wausa, (G2).....	688
Maxwell, (D3)....	410	Pawnee City, (H4) 1,595		Spalding, (F3)....	878	Waverly, (H4)....	334
Maywood, (D4)...	533	Paxton, (C3)....	430	Spencer, (F2)....	728	Wayne, (G2)....	2,115
Mead, (H3).....	329	Pender, (H2)....	992	Sprague, (H4)....	112	Weeping Water, (H4).....	1,084
Meadow Grove, (G2) 449		Peru, (J4).....	783	Springfield, (H3)...	413	Wellfleet, (D4)...	100
Melbeta, (A3)....	129	Petersburg, (G3)...	501	Springview, (E2)...	354	Western, (G4)....	427
Memphis, (H3)...	186	Phillips, (F4)....	274	Stamford, (E4)...	302	West Lincoln, (H4) 162	
Merna, (E3)....	553	Pickrell, (H4)...	160	Stanton, (G3)....	1,487	Weston, (H3)....	372
Merriman, (C2)...	346	Pierce, (G2)....	1,105	Staplehurst, (G3)...	235	Westpoint, (H3)...	2,002
Milford, (G4)....	793	Pilger, (G2)....	563	Stapleton, (D3)...	401	Wilber, (G4)....	1,255
Millard, (H3)....	300	Plainview, (G2)...	1,199	Steele City, (H4)...	300	Wilcox, (E4)....	358
Miller, (E4)....	223	Platte Center, (G3) 464		Steinauer, (H4)...	213	Wilsonville, (D4) .	470
Milligan, (G4)...	418	Plattsmouth, (H4) 4,190		Stella, (J4).....	449	Winnebago, (H2)...	648
Minatare, (A3)...	660	Pleasant Dale, (H4) 221		Sterling, (H4)....	804	Winnetoon, (F2)...	208
Minden, (F4)....	1,527	Pleasanton, (E4)...	262	Stockham, (G4)...	239	Winside, (G2)....	488
Mitchell, (A3)...	1,298	Plymouth, (G4)...	453	Stockville, (D4)...	196	Winslow, (G3)...	154
Mono, (F2).....	100	Polk, (G3).....	561	Strang, (G4).....	175	Wisner, (H3)....	1,210
Monroe, (G3)....	309	Ponca, (H2)....	1,014	Stratton, (C4)....	509	Wolbach, (F3)...	589
Moorefield, (D4)...	151	Poole, (E4).....	105	Stromsburg, (G3)...	1,361	Wood Lake, (D2)...	323
Morrill, (A3)....	772	Posen, (F3)....	337	Stuart, (E2).....	739	Wood River, (F4)...	820
Morse Bluff, (H3)...	216	Potter, (A3)....	486	Sumner, (E4)....	345	Wymore, (H4)....	2,592
Mount Clare, (F4)...	130	Powel, (G4)....	150	Superior, (G4)...	2,719	Wynot, (G2)....	368
Mullen, (C2)....	499	Prague, (H3)....	353	Surprise, (G3)...	279	York, (G4).....	5,388
Murdock, (H4)...	206	Preston, (J4)....	113	Sutherland, (C3)...	651	Yutan, (H3).....	300
Murray, (J4)....	210	Primrose, (F3)...	155				

Lincoln, 2,463 feet in depth. There are two principal areas of deep artesian wells, one in the southeast, the other in the northeast. In the southeast a strong flow of water is found at depths ranging from 1,000 to 1,800 feet, in the carboniferous rock, sometimes impregnated with salt. Both Lincoln and Omaha have flowing wells from this formation. In the northeast, artesian water is found at depths ranging from 200 to 800 feet in the Dakota sandstone accompanied with high pressure. Such wells in Boyd and Knox counties furnish power for flouring mills and electric-light plants. The areas of shallow artesian water are widely scattered. Flowing wells are found at depths ranging from 30 to 100 feet below hard beds of clay and furnish water for irrigation, for artificial lakes and for power and domestic purposes.

Climate and Rainfall.—The climate is characterized by mild, dry atmosphere, clear skies and perennial breezes. The chief factors in its climate are its middle latitude in the north temperate zone, its middle altitude between sea-level and mountain height, the wall of the Rocky Mountains on the west and the open plains stretching to the Gulf of Mexico and Arctic Ocean, from which is borne upon winds the greater volume of moisture which falls in the form of rain upon the State. The average temperature of the entire State through the year is 48.5°. At the altitude of 900 feet in southeast Nebraska the average is 52°, while at the altitude of 3,000 feet in northwest Nebraska the average of 45°. The fall in average temperature is at the rate of about 1° for each 38 miles north in most of the State. As a rule there are but two cold months in the year, January and February, with a mean average temperature of about 20°. Occasional cold waves carry the mercury to 10 and 20° below zero with rare cases of 40° below. In the main, the winters are dry and bright, with little snowfall. July, August and the first 10 days of September constitute the heated term with a mean temperature of 70° to 78° and with almost continual breezes. Killing frosts occur in the average year from 25 September to 10 May in the northwestern part of the State and from 5 October to 25 April in the southeastern part of the State. The growing season for farm and garden crops is thus about 160 days in the southeast and 130 days in the northwest. Records of rainfall in the Nebraska region began at the United States military posts, Fort Laramie and Fort Kearney, in 1849 and are the oldest records in the plains and mountain region of the West. About 1866 systematic rainfall records began in eastern Nebraska and the Platte Valley. Allowance being made for the limited extent of the earlier observations the record of nearly 70 years indicates an average annual precipitation for the State as a whole of 23.67 inches. At the Missouri River the average annual rainfall is 30 inches, decreasing at an average of 1 inch for each 30 miles west until an average of 15 inches is reached at the Wyoming border. The snowfall averages about 25 inches, equal to about 2½ inches of water, leaving a little over 21 inches average rainfall. Compared with an annual precipitation of 35 to 40 inches in the eastern part of the Mississippi Basin this seems inadequate for agriculture. An important dif-

ference exists in the fact that in Nebraska 46 per cent of the annual rainfall occurs in the growing months of May, June and July, enabling crops to be raised with a far less precipitation than in States farther east where a great part of the moisture falls in the winter months. This important discovery with reference to precipitation and growing-crops was first published by Robert W. Furnas, secretary of the Nebraska Board of Agriculture, in 1873. The four winter months, November, December, January and February are dry months having only 11 per cent of the total annual precipitation. The rainfall for the crop season, April to August, inclusive, averages 16.18 inches for the entire State. Before the advent of the plow a large part of the summer rainfall ran off from the compact, thick sod which covered the greater part of Nebraska. Ploughed fields now absorb a large part of this run-off so that while the records show no material increase in the rainfall a far larger per cent remains in the soil. The average number of clear days in Nebraska is 193. Records kept for a number of years show that in the bright months of July and August the sun shines on an average three-fourths of the 15 hours it is above the horizon each day. A study of rainfall diagrams from 1850 to the present time shows, in that period, two groups of years with scanty rainfall, the first covering the years 1860-64, the second the period 1890-94. Throughout the remainder of these 68 years the rainfall is close to normal with eight years of large excess above normal. Prevailing winds are from the northwest from October to April; from the south and southwest during the remainder of the year. Average hourly wind movement is nine miles per hour.

Farming and Stock-Raising.—Nebraska is one of the great agricultural States of the Union. Corn is the leading crop, the average production thereof during the 12-year period, 1910-21 inclusive, having amounted to 186,968,166 bushels per year. Hay and forage, oats, wheat, barley and rye are also grown in large quantities. The acreage, production and value of the principal crops grown in 1922 are shown in the following table:

CROPS	Acreage	Bushels	Value
Corn.....	7,296,000	182,400,000	\$105,792,000
Winter wheat....	3,942,000	57,159,000	54,873,000
Spring wheat....	235,000	2,679,000	2,572,000
Oats.....	2,408,000	56,106,000	14,711,000
Barley.....	242,000	4,356,000	2,047,000
Clover seed.....	8,000	22,000	220,000
Buckwheat.....	1,000	16,000	14,000
Rye.....	188,000	2,106,000	1,369,000
Sorghum syrup..	2,000	(Gals.) 166,000	158,000
Potatoes.....	139,000	11,676,000	5,488,000
Flaxseed.....	3,000	24,000	46,000
Hay, tame.....	1,533,000 (Tons)	3,323,000	37,218,000
Hay, wild.....	2,208,000 (Tons)	1,877,000	15,954,000
Grain sorghums..	19,000	342,000	253,000

The figures above given are the estimates of the United States Department of Agriculture. The Census Bureau's report for the year 1919 gave the production of the important crops as follows: Corn, 160,391,314 bushels valued at \$216,528,274; oats, 59,819,545 bushels valued at \$44,864,671; wheat, 57,843,598 bushels valued at \$124,363,735; barley, 4,405,323 bushels valued at \$4,845,864; rye, 3,259,390 bushels valued at \$4,563,143; hay and forage, 6,619,001 tons valued at \$96,965,224; potatoes, 4,452,497 bushels valued at \$10,685,998. The value of all farm crops in the census year was \$519,729,771.

The livestock on the farms of the State on 1 Jan. 1923, according to the United States Department of Agriculture, was as follows:

ANIMALS	Number	Value
Horses.....	901,000	\$52,258,000
Mules.....	114,000	7,980,000
Cattle:		
Milch cows.....	570,000	32,490,000
Other cattle.....	2,700,000	85,860,000
Sheep.....	733,000	5,337,000
Swine.....	4,232,000	50,784,000

The native grasses of Nebraska comprise 113 species and constitute one of the peculiar assets of the State, attractive to the botanist and valuable to stockmen. One of the principal pop-corn areas in the United States is in Valley County. The number of farms in the State in 1920 was 124,417 of which 69,672 were farmed by owners and 53,430 by tenants. The increase in tenant farming is largest in the region of highest priced lands. Out of a total area of 49,157,120 acres, 42,225,475 acres are in farms and of these 23,109,624 are improved. The total value of farm property by the United States Census of 1920 was \$4,201,655,992, of which \$3,330,222,340 was land value. The average number of acres per farm was 339.4 and the average value of land per acre \$78.87. The value of land per acre nearly trebled in the 10 years between 1900 and 1910, and has nearly doubled again since 1910. The economic unit for maximum profit in food production in Nebraska agriculture increases in size with the introduction of improved machinery. At present it is about 160 acres in eastern Nebraska, 320 acres in the mixed farming regions of western Nebraska and 3,000 acres in the livestock region.

Fruit-Growing and Forestry.—Nineteen-twentieths of Nebraska was originally treeless prairie. Tree planting and cultivation is the first step in making a desirable home. It is estimated that over 500,000 acres have been planted to forest trees and about 100,000 acres to fruit trees and small fruit. The total area now covered by trees is between 1,000,000 and 2,000,000 acres. In 1922 the United States Department of Agriculture estimated Nebraska's apple crop at 1,620,000 bushels. Commercial orcharding is developing rapidly in the southeastern quarter of the State, while cherries, apples, plums and small fruits flourish in every county.

Irrigation and Water Power.—The flowing waters of Nebraska are applied in two ways to production—the irrigation of land and the development of power. Irrigation is applied chiefly in the western third of the State where the rainfall is between 15 and 20 inches. Irrigating ditches were constructed as far back as 1856 but the development of the system followed the drought of 1890. The broad valleys of the Platte and the Republican are the principal irrigated areas. There are about 2,700 miles of canal with 1,100,000 acres under them, of which about one-third is cultivated. Alfalfa, sugar beets and potatoes are leading crops in the irrigated region. The largest irrigation projects are in the valley of the North Platte under canals constructed by the United States, deriving their waters from an immense reservoir called the Pathfinder, which stores the waters from the melting snows of Colorado and Wyoming to the amount of about one million acre feet. It is estimated that

about 300,000 horse power may be developed from the flowing waters of Nebraska streams. About nine-tenths of this power, which includes the most important sites, is now undeveloped. The conversion of water power into electricity for light and power purposes is making progress in the more thickly populated portions of the State.

Dry Farming.—In the same region where irrigation is most largely practised the new methods and machinery known as the dry farming system are applied to land which cannot be irrigated. These methods include summer fallowing and surface cultivation to impound the rainfall in the soil for growing crops. Experiments at North Platte have shown that crops draw moisture from a depth of six feet during the growing season. Phenomenal results have followed these new methods during the past decade and over a large part of the high plains production of cereals and alfalfa has been generally successful while land values have risen from \$1 per acre to \$50 and over.

Geology and Soil.—The geological structure is of simple type. Nearly the entire surface of the State is covered with a mantle of soil, in many places over 100 feet in thickness. The upper section of this mantle is a black or brown alluvium from three to six feet deep. Beneath the alluvium, over the greater part of the State, lies a subsoil of loess clay varying in thickness from a few feet up to 100. This loess subsoil, porous, fertile and spongy, is one of the chief assets of agricultural Nebraska, absorbing rainfall readily and giving it up to growing crops. Beneath the loess subsoil of the eastern part of the State lies a heavier clay and broken rock derived from the ice sheet which once covered this region and known as till or glacial drift. In the sand hill region the mantle soil is composed of sand and silt derived from Tertiary rocks broken down by action of water, heat and cold and blown by the winds into their present form and location. The rock formations which lie beneath this mantle of soil extend from the Rocky Mountains eastward. They are exposed in the west by the uplift of the mountains and in the east at a few places where water courses have cut valleys through them. Over the greater part of the State they are buried beneath the mantle of soil and subsoil. The principal sedimentary rock formations underlying the State, considered in the order of the oldest and deepest upward, are as follows: Carboniferous limestone and shale are exposed in many places in southeastern Nebraska. In the adjoining States, Iowa, Missouri and Kansas, thick beds of coal are found in this formation. Nebraska is at the western edge of coal-bearing strata with unimportant coal workings at two or three places. Limestone, rubble and clay are the chief products of the carboniferous here and their use for concrete, brick, road-building, smelting and sugar refining is rapidly increasing. Cretaceous sandstones and shales lie next above the carboniferous and outcrop at a number of points in northeast and southeast Nebraska. The Dakota sandstone, the principal member of this group, is commonly rusty-red in color and carries a large water supply in which are found some of the most notable artesian wells. It

furnishes superior clay for brick-making and important sand and gravel pits. The Benton shales and chalk rock are above the Dakota sandstone. Fine exposures of such rock are found along the Niobrara and Republican rivers. The chalk rock is soft when first cut but hardens on exposure to the air and is used to a limited extent for building. It is now being developed in the manufacture of hydraulic cement. The Pierre shales are above Niobrara chalk rock and cover a large part of the State, in many places to a depth of 1,000 feet. They are alkaline and where exposed produce the soil called gumbo. In western Nebraska three distinct formations later than the cretaceous appear. These are the Oligocene clays and shales, the Arikaree Butte sands and clays and the Ogallala magnesia or mortar beds. The first is about 1,000 feet thick and appears exposed in the bad lands of the extreme northwest corner. The second is five or six hundred feet thick and gives rise to the remarkable buttes or isolated precipitous peaks which are such conspicuous and picturesque features of the western plains. The third gives a rugged variation to the line where the high valleys pierce the table-lands and furnishes stone for building purposes and road work. The fossil deposits of northwest Nebraska are among the most remarkable in the world. The principal museums of the world have here secured some of their most valuable skeletons of the ancient rhinoceros, tapir, sabre-toothed tiger and dinosaurus.

Manufactures.—The abundant supply of free farming land determined both labor and capital to agriculture until after 1890. By that time the best farming land to the furthest border had been taken by settlers. The great drought and hard times which followed drove thousands to the cities for temporary employment. Since then manufacturing industries have steadily grown. The leading manufactures are those which rest directly upon agriculture. The principal industry is slaughtering and meat packing. Milling grain products ranks next, butter and cheese-making third. The beet sugar industry has made remarkable progress in recent years. Since 1920 five factories have been in operation in the State. In 1921 they turned out 57,000 short tons of sugar; in 1922, 41,000 tons. In 1909 the sugar beet crop of the State amounted to but 39,756 tons grown on 4,182 acres. In 1921 the crop was 773,000 tons from 72,000 acres, and in 1922, 688,000 tons from 55,000 acres. Returns from all lines of manufacturing for 1919 are:

Number of manufacturing establishments.....	2,884
Proprietors and firm members.....	2,916
Salaries employees.....	9,639
Wage earners.....	36,521
Primary horse power.....	125,814
Capital.....	\$245,256,684
Salaries.....	\$15,741,937
Wages.....	\$46,066,755
Cost of materials.....	\$480,774,122
Value of products.....	\$596,042,498
Values added by manufacturing.....	\$115,268,376
Per cent of increase of value of products....	169.0

The manufacture of potash and other salts from the waters of alkali lakes in the sand hills section of northwestern Nebraska began in an experimental way in 1912. The Great War cut off the supply from the Stassfurt

mines of Germany, the world's greatest potash source. The price of potash rose about 1,000 per cent. Nebraska's alkali lakes became the largest producers of potash for the American market. Several millions of dollars have been invested and the production for 1918 is estimated at 150,000 tons. About 2,000 men are employed in the industry and several towns have sprung up in the sand hills supported thereby.

Transportation, Communication, Etc.—

The first transcontinental railway in the world, the Union Pacific, has headquarters in Omaha, Neb.

Five great railway systems now traverse the State—Chicago and Northwestern, through the north; the Union Pacific through the centre; the Burlington extending into 76 of the 93 counties; the Rock Island and the Missouri Pacific in the southeast; only three counties in the State are without railroads within their borders. Outside the sand hills, railroad stations are rarely more than 10 miles distant from any farm. Omaha and Lincoln are the chief railroad centres. The mileage of the principal railroads in 1916 was as follows:

Chicago, Burlington and Quincy.....	3,601.16
Union Pacific.....	2,104.60
Chicago, Rock Island and Pacific.....	308.30
Chicago and Northwestern.....	1,306.29
Missouri Pacific.....	483.93
Chicago, Saint Paul, Minneapolis and Omaha....	375.66
Saint Joseph and Grand Island.....	131.62
Omaha Bridge and Terminal Railway.....	17.57
Missouri Valley and Blair Railway and Bridge....	2.86
Total.....	8,331.99

In 1916 there were 389,991 miles of telephone wire in the State; 204,042 telephone instruments installed; 33,390 city subscribers and 42,221 farm subscribers. The total book cost of telephone systems shows \$21,135,314; the gross earnings for the year were \$5,003,209 and operating expenses \$3,382,054.

The use of motor vehicles and good roads movements are transforming the transportation business. The smooth prairies and moderate rainfall secure smooth highways at small cost. Nebraska is among the leading States in the Union in the number of motor vehicles per capita of population, having over 256,650 or one to each five in population in the year 1922. There are about 300,000 miles of public highways. Three principal transcontinental motor highways cross Nebraska—the Lincoln Highway up the Platte Valley, the Omaha-Lincoln-Denver Highway across the prairies of southern Nebraska, the Meridian road running north and south from Winnipeg to the Gulf of Mexico. Numerous other motor highways are now chartered and marked upon posts and telephone poles. In 1911 the legislature made the first levy for a State aid bridge fund. This produces about \$100,000 per year to defray half the cost of important bridges, the other half being borne by the counties where they are located. The legislature of 1917 appropriated \$640,000 for the biennium to be expended in connection with the Federal appropriation for road construction in the State. This is in addition to the usual expenditures by counties, cities and road districts.

Revenue and Finance.—Under the Nebraska constitution, adopted in 1875, the gen-

eral property tax is the principal source of State revenue. From 1875 to 1913 total appropriations for State expenses were about \$70,000,000, of which \$3,100,000 was collected as fees. The balance on hand 1 July 1921 was \$2,228,523; receipts in 1921-22 were \$15,345,536; total, \$17,574,059. Disbursements were \$13,564,191. Balance 30 June 1922, \$4,009,868. Under the Nebraska Revenue Law property is assessed at one-fifth its actual value. This valuation for 1922 was \$3,171,747,870, of which \$862,116,791 was personal and \$2,329,631,079 was real property. The State has no bonded indebtedness.

Banks.—There are two systems of banks, State and national. Since the passage of the State Bank Guaranty Law in 1909 the number and the deposits of State banks have increased more rapidly than the national banks. The data for national banks in September 1922 was as follows:

Number of banks.....	182
Capital.....	\$17,245,000
Total deposits.....	\$200,008,000

STATISTICS OF STATE BANKS 30 JUNE 1922

Number of banks.....	970
Capital.....	\$25,255,000
Total deposits.....	\$225,647,000

Education.—Since 1880 Nebraska has been one of the three States with lowest percentage of illiteracy in the Union. In 1890 Nebraska was lowest with a percentage of 3.1; in 1900 Nebraska tied with Iowa with a percentage of 3.3; in 1910, Nebraska was 1.9 to Iowa's 1.7; in 1920, 1.4 to Iowa's 1.1. For the school year (1919-20) there were in the State of school age (5-20 years), 414,822 children; enrolled in school, 292,747; average daily attendance, 232,515. Average duration of school, 164 days.

According to the 'Statistical Abstract,' published by the United States Department of Commerce, the number of teachers employed in the public schools of Nebraska in 1919-20 was 14,873, of whom 1,084 were males and 13,789 were females. Salaries paid teachers totaled \$10,907,631 or an average of about \$765 per teacher.

The total expenditure of all kinds for support of grade and high schools was \$20,452,569. There were 91 city schools and 368 high schools accredited to prepare students for the State University. Pursuing higher courses of study in colleges and technical schools were 4,402 men and 3,037 women (1915). College students in law, 400; in medicine, 274; in engineering, 308; in agriculture, 255. There are four State normal schools—at Peru, Kearney, Wayne and Chadron, having a total of 172 teachers and 3,652 students.

The State University comprises the colleges of Literature, Science and Arts; Agriculture; Medicine; Law; Teachers; Graduate and Engineering, located at the city of Lincoln except the College of Medicine located at Omaha. The College of Agriculture, a school of agriculture and an experiment station are located on the university farm campus with outlying experiment stations at North Platte, Scottsbluff and Valentine and a school of agriculture at Curtis; all under government of board of six regents elected by the voters of the whole State. Statistics of the University

for the fall of 1922-23 are as follows: students, 3,331 men, 2,114 women; instructors numbered 368; library, 155,000 titles. The income of the University for the year including extension work and experiment stations was \$2,966,271. The University received from the United States government an endowment of 45,426.08 acres of land and the agricultural college a similar endowment of 89,148.60 acres. Of these endowments there remain unsold 24,859.70 acres, valued at \$175,000. The cash endowment arising from the sale of this land amounts to \$840,127.79. Under the present law no more of the land may be sold. The university farm campus consists of 320 acres, distant about three miles from the university city campus of about 40 acres in the heart of Lincoln. There were 1,007 students enrolled in the military cadet battalion (1918). Nebraska's school land policy differs from that of other States in the Union. Under the act of 1897 no further sales of either common school, university or agricultural college endowment lands may be made, except for certain minor purposes. The common school lands granted to Nebraska amount to 2,978,095 acres. Of this there remain unsold 1,650,990 acres. From the lands already sold there is an endowment of \$9,034,308, which is being constantly increased by payments on land sale contracts. The total common school endowment is estimated at about \$12,000,000 from lands sold and the value of the remaining land is at least \$20,000,000 more. It is the belief of those who champion the permanent leasing system that the increase in school land values arising from increased population should properly be appropriated for the education of school children.

There are about 30 denominational colleges, academies and about 200 parochial schools in the State. College degrees are granted by the following:

NAME	Denomination	Location
Bellevue College....	Presbyterian.....	Bellevue
Cotner University....	Disciple.....	Bethany
Creighton.....	Roman Catholic.....	Omaha
Doane College.....	Congregational.....	Crete
Fremont Normal College.....	Private management.	Fremont
Grand Island College.....	Baptist.....	Grand Island
Hastings College....	Presbyterian.....	Hastings
Luther College.....	Lutheran.....	Wahoo
Nebraska Wesleyan University.....	Methodist Episcopal.	University Place
Union College.....	Adventist.....	College View
York College.....	United Brethren.....	York

Religion.—The latest United States census figures on religious affiliation are those of 1916. Considerable changes have occurred since then but not greatly altering the relative denominational strength. The total number of church members was 440,791; total number of church buildings and of ministers each, about 3,500. The strength of the principal denominations was as follows: Roman Catholics, 135,537; Methodists, 81,879; Lutheran, 66,906; Presbyterian, 26,333; Disciples of Christ, 19,613; Baptist, 19,643; Congregationalists, 19,423; Protestant Episcopal, 7,931; United Brethren, 6,086; Latter Day Saints, 1,568. There is a difference in the basis of these membership figures as compiled by the denominations, the Roman Catholics counting as members all children baptized in the church while Protestant denominations do not.

Charitable and Penal Institutions.—In May 1918 the population of State institutions was as follows:

Hospitals for insane:	
Hastings.....	1,152
Lincoln.....	782
Norfolk.....	634
Penitentiary (Lincoln).....	311
Industrial schools:	
Boys (Kearney).....	219
Girls (Geneva).....	100
Industrial Home for Women (Milford).....	103
Soldiers' and Sailors' Home:	
Grand Island.....	445
Milford.....	109
Feeble-minded institute (Beatrice).....	572
School for deaf (Omaha).....	173
School for blind (Nebraska City).....	55
Hospital for tuberculosis (Kearney).....	84
Home for dependent children (Lincoln).....	42
Orthopedic hospital (Lincoln).....	63
Total.....	4,844

The total appropriations for their maintenance during the biennium ending 31 March 1917, approximately \$2,800,000. All these institutions are under the government of a board of control consisting of three members appointed by the governor and confirmed by a two-thirds vote of the senate. Besides the board of control there is a State board of charities and corrections consisting of the governor, the State superintendent, and the State land commissioner with a chief secretary. This board has general power to investigate and report upon the condition of all penal and charitable institutions, public and private, State and municipal. There are 54 county poorhouses in the State with about 450 inmates. Under a Mothers' Pension Law enacted in 1913 about 3,500 cases of relief were cared for between July 1915 and January 1917, at an estimated cost of \$200,000.

Libraries.—In the State are 117 public libraries with 739,476 volumes. The first public library act was passed in 1875. In 1911 an act was passed providing for township and county libraries; also an act appropriating \$5,000 for libraries in the charitable and penal institutions of the State, except the school for the blind, and a trained librarian placed in charge.

The total number of persons upon the State's payroll is 2,568 of whom 825 are in State institutions, 351 in State departments and 1,743 in the State courts, normal schools, university and extension departments.

State and County Government.—The present constitution, adopted in 1875, is sometimes styled the "Grasshopper Constitution," because the grasshoppers and hard times of that period resulted in a very economical and restricted form of constitution. It is one of the few State constitutions requiring a majority of all the votes cast to adopt an amendment proposed by the legislature. A constitutional convention to revise and amend the constitution convenes 2 Dec. 1919. It will consist of 100 members elected on a non-partisan ticket by the representative districts. The legislative body consists of a senate of 33 and a house of 100 members. Regular sessions convene in January of odd-numbered years. Members are elected for a period of two years and receive \$600. The executive departments and salaries are as follows:

Governor.....	\$2,500
Lieutenant-governor (for two-year term).....	1,200
Secretary of state.....	2,000
Auditor of public accounts.....	2,500
Treasurer.....	2,500
Superintendent of public instruction.....	2,000
Attorney-General.....	2,000
Commissioner of public lands.....	2,000

Each of the above is elected for a two-year term. The State treasurer is eligible to succeed himself after two consecutive terms. The constitution forbids the creation of any other executive offices, with the result that the provision has been avoided by the creation of numerous boards composed of some of the foregoing executive officers, with provision for the employment of secretaries who perform the new duties arising from social changes. In 1907 a railway commission consisting of three members elected by the people for a three-year term with a salary of \$3,000 per year was added by constitutional amendment to the above list. The judicial department consists of seven judges elected by the people, holding office for six years at a salary of \$4,500 per year. In addition there are three Supreme Court commissioners at \$3,000 per year appointed by the Supreme Court to assist it in preparing opinions. There are 18 districts in which are elected 32 district judges, each for a four-year term at a salary of \$3,000 per year. There is besides in each county a county judge elected for a two-year term at a salary varying with the population of the county. County government may be under the township or the commissioner system as the voters choose. There are now 28 counties under township and 65 under commissioner system.

COUNTIES AND COUNTY SEATS.

Adams, Hastings.	Jefferson, Fairbury.
Antelope, Neligh.	Johnson, Tecumseh.
Arthur, Arthur.	Kearney, Minden.
Banner, Harrisburg.	Keith, Ogallala.
Blaine, Brewster.	Keyapaha, Springview.
Boone, Albion.	Kimball, Kimball.
Box Butte, Alliance.	Knox, Center.
Boyd, Butte.	Lancaster, Lincoln.
Brown, Ainsworth.	Lincoln, North Platte.
Buffalo, Kearney.	Logan, Gandy.
Burt, Tekamah.	Loup, Taylor.
Butler, David City.	Madison, Madison.
Cass, Plattsmouth.	McPherson, Tryon.
Cedar, Hartington.	Merrick, Central City.
Chase, Imperial.	Morrill, Bridgeport.
Cherry, Valentine.	Nance, Fullerton.
Cheyenne, Sidney.	Nemaha, Auburn.
Clay, Clay Center.	Nuckolls, Nelson.
Colfax, Schuyler.	Otoe, Nebraska City.
Cuming, West Point.	Pawnee, Pawnee City.
Custer, Broken Bow.	Perkins, Grant.
Dakota, Dakota City.	Phelps, Holdrege.
Dawes, Chadron.	Pierce, Pierce.
Dawson, Lexington.	Platte, Columbus.
Deuel, Chappell.	Polk, Osceola.
Dixon, Ponca.	Red Willow, McCook.
Dodge, Fremont.	Richardson, Falls City.
Douglass, Omaha.	Rock, Bassett.
Dundy, Benkelman.	Saline, Wilber.
Fillmore, Geneva.	Sarpy, Papillion.
Franklin, Bloomington.	Saunders, Wahoo.
Frontier, Stockville.	Scott's Bluff, Gering.
Furnas, Beaver City.	Seward, Seward.
Gage, Beatrice.	Sheridan, Rushville.
Garden, Oshkosh.	Sherman, Loup City.
Garfield, Burwell.	Sioux, Harrison.
Gosper, Elwood.	Stanton, Stanton.
Grant, Hyannis.	Thayer, Hebron.
Greeley, Greeley Center.	Thomas, Thedford.
Hall, Grand Island.	Thurston, Pender.
Hamilton, Aurora.	Valley, Ord.
Harlan, Alma.	Washington, Blair.
Hayes, Hayes Center.	Wayne, Wayne.
Hitchcock, Trenton.	Webster, Red Cloud.
Holt, O'Neill.	Wheeler, Bartlett.
Hooker, Mullen.	York, York.
Howard, Saint Paul.	

Cities and Municipalities.—The first incorporated city or village was Nebraska City, incorporated by special act of the Territorial legislature 2 March 1855. Until 1864 each incorporated municipality secured its charter by a separate act of the legislature. The commission plan of government was provided by act of 7 April 1911, known as the Banning Act. The "Home Rule" amendment to the State constitution of 1912 provided that any city of more than 5,000 may frame and adopt its own charter consistent with the laws and constitution of the State. There are 460 incorporated cities and villages in Nebraska. Of these 169 own waterworks systems and nine have corporation-owned systems; 51 own electric-light systems, while 77 have corporate-owned systems; eight own their own gas plants and 26 have corporate systems. The population of the principal cities at the census of 1920 is as follows:

Omaha (including South Omaha).....	191,601
Lincoln.....	54,934
Grand Island.....	13,960
Beatrice.....	9,664
Hastings.....	16,647
North Platte.....	10,466
Fremont.....	9,605

Politics.—The struggle over the Nebraska-Kansas bill gave birth to the Republican party in 1854, but there was no Republican party organized in Nebraska until 1858. The Territory was strongly Democratic until 1860 when the veto of the Free Homestead bill by President Buchanan and the pro-slavery attitude of the Democratic party gave the Republicans control which they held without interruption down to 1890. The fundamental political issue in the State from 1870 was railroad control. Failure to furnish a solution of the problem brought about factionalism in the Republican party. The Farmers' Alliance, beginning in 1881 as a social and educational organization, became in 1890 the leader of new economic issues and drove the Republican party from its position of supremacy in the State. The Farmers' Alliance movement became the People's Independent, or Populist, party, which for the next five years was the chief rival of the Republican party in the State, the Democratic party being faction torn between its conservative elements following the leadership of President Grover Cleveland and J. Sterling Morton, and the Progressive or Free Silver element under the leadership of William J. Bryan, who was elected to Congress in 1890 and in 1892. The triumph of the free silver wing of the Democratic party in 1896, accompanied by the nomination of W. J. Bryan for President, was followed in Nebraska by a fusion of Populists and Free Silver Democrats which elected an entire State ticket and both houses of the legislature that year, and continued in power until 1900 when the Republicans again carried the State. Continued fusion of the Populists with the Democrats aided in the gradual disintegration of the former party. The nomination of a conservative Democrat for President in 1904 and the progressive policies of President Roosevelt drew a considerable portion of the Populists into support of the Republican party. Between the competition of the Bryan Democracy and Roosevelt Republicanism in the adoption of Populist principles and bidding for Populist votes the party rapidly went to pieces and disappeared about 1912. The split of the Repub-

lican party in that year between Roosevelt and Taft gave the Democratic party a new lease of power in Nebraska as elsewhere which it held until 1918.

LIST OF GOVERNORS.

TERRITORIAL		
Francis Burt.....		1854
T. B. Cuming (acting).....		1854-55
Mark W. Izard.....	Republican	1855-57
T. B. Cuming (acting).....		1857-58
William A. Richardson.....		1858
J. S. Morton (acting).....	Republican	1858-59
S. W. Black.....		1859-61
J. S. Morton (acting).....		1861
A. S. Paddock (acting).....		1861
Alvin Saunders.....		1861-67
STATE		
David Butler.....	Republican	1867-71
W. H. James (acting).....		1871-73
Robert W. Furnas.....	Republican	1873-75
Silas Carber.....	"	1875-79
Albinus Nance.....	"	1879-83
James W. Dawes.....	"	1883-87
John M. Thayer.....	"	1887-91
James E. Boyd.....	Democrat	1891*
John M. Thayer.....	Republican	1891-92
James E. Boyd.....	Democrat	1892-93
Lorenzo Crounse.....	Republican	1893-95
Silas A. Holcomb.....	Populist	1895-99
William A. Poynter.....	"	1899-1901
Charles H. Dietrich.....	Republican	1901†
Ezra P. Savage.....	"	1901-03
John H. Mickey.....	"	1903-07
George L. Sheldon.....	"	1907-09
Ashton C. Shallenberger.....	Democrat	1909-11
Chester H. Aldrich.....	Republican	1911-13
J. H. Morehead.....	Democrat	1913-17
Keith Neville.....	"	1917-19
S. R. McKelvie.....	Republican	1919-23
Charles W. Bryan.....	Democrat	1923-

* Election contested and final seating delayed.

† Elected United States Senator.

Population.—The population of State and Territory as shown by the various censuses is as follows: 1856, 10,716; 1860, 28,841; 1870, 122,993; 1880, 452,402; 1885, 740,645; 1890, 1,062,656; 1900, 1,066,300; 1910, 1,192,214; 1920, 1,296,372. The census of 1880 was notoriously a

	Number	Per cent
Native whites of native parents.....	757,064	55.7
Foreign born, foreign parentage and mixed parentage.....	522,155	40.2
Indian, Asiatic, African, etc.....	17,153	4.1

FOREIGN-BORN POPULATION

COUNTRY OF BIRTH	Number	Per cent
Austria.....	4,551	3.0
Belgium.....	551	0.4
Canada.....	5,758	3.8
Czechoslovakia.....	15,818	10.6
Denmark.....	12,338	8.2
England.....	6,000	4.0
France.....	858	0.6
Germany.....	40,969	27.4
Greece.....	1,504	1.0
Hungary.....	810	0.5
Ireland.....	5,422	3.6
Italy.....	3,547	2.4
Jugoslavia.....	738	0.5
Mexico.....	2,452	1.6
Netherlands.....	846	0.6
Norway.....	2,165	1.4
Poland.....	4,615	3.1
Russia.....	15,718	10.5
Scotland.....	1,695	1.1
Sweden.....	18,821	12.6
Switzerland.....	1,808	1.2
Wales.....	547	0.4
All other countries.....	2,121	1.4
	149,652	100.0

"stuffed" census. A great real estate boom and a pending prohibition amendment each demanded a large showing of increased population from the Federal supervisors of the census, one as a basis for inflated real estate



NEW STATE CAPITOL, LINCOLN, NEB.

The foundation was begun 15 April 1922 and the contract for the first section of the superstructure was awarded July following. The building is to be four-square, approximately 400 x 400 feet. From the centre will rise a tower over 400 feet high on top of which will be a 22 foot figure of "The Sower", typifying the spirit of the State. The exterior will be of buff Indiana limestone. Five million dollars has been appropriated for its construction, exclusive of power plant, grounds and furnishings. All sculpture will be by Lee Lawrie

THE TOWER OF THE
OF NEBRASKA AT LINCOLN
BERTRAM G. DAVIS, ARCHT.
TWO WEST PORTLAND ST.

values, the other as a basis for an inflated anti-prohibition vote. It is a conservative estimate that this census added 100,000 to the actual population of Nebraska under pressure from these influences. A present tendency is toward an increase in population of the cities and a decline in the population of the country precincts. Fourteen counties in eastern Nebraska show an actual falling off in population between 1900 and 1910, due chiefly to consolidation of farms made possible by improved machinery, to the migration of younger people to the cities and older people to the towns where they form the class known as retired farmers living upon the rental of their farms.

A study of the elements of the present population is shown in table on preceding page.

History.—Prehistoric.—In the Missouri River region and in the Bad Lands of the northwest are ancient aboriginal remains consisting of mounds, buried fire-places, flint workings and lodge circles. In 1804 Lewis and Clark described ancient earthworks found on Bonhomme Island in the Missouri River. Since 1900 excavations have disclosed skeletons, pottery, bone and flint implements at depths of from 5 to 10 feet in many places. Articles found are of different type from those used by Nebraska Indians since the coming of white men. The discovery in 1906 at Long's Hill, eight miles north of Omaha, of human skulls with low cranial development in position indicating possible burial in pre-glacial time, raised the question of man in Nebraska before the ice sheet.

Indian Tribes.—The first white explorers found Nebraska occupied by the following tribes: Otoe, Omaha and Ponca along the Missouri River. The Otoe numbered about 3,000, the Omahas about 3,000, the Ponca about 2,000. All three were Siouan tribes speaking dialects of the same language. The Pawnee nation numbered about 10,000 and occupied the central part from the Loup rivers to the Republican. They were divided into four bands, the Skidi, Panimaha or Loups, the Chaui or Grand Pawnee, the Kitkehako or Republican and the Pitahauerat or Noisy. The Pawnee spoke an entirely different language from their Siouan neighbors. They were more advanced in the cultural arts and their folklore and music are among the most valuable contributions to American ethnology. The Cheyenne and Arapahoe tribes claimed the hunting grounds in southwestern Nebraska and eastern Colorado. They numbered about 3,000 and their language (Algonquin) indicates their relationship to the New England Indian tribes. The Brule and Oglala Sioux, numbering about 15,000, ranged over western Nebraska from the Black Hills to the Republican. Their language shows their kinship to the Otoe, Omaha and Ponca tribes of eastern Nebraska with whom they were frequently at war. Traditions, folklore and language indicate that the Siouan tribes of Nebraska migrated from the Atlantic seacoast, arriving in the Nebraska region between 1600 and 1700; that the Pawnee came from the south and southwest, reaching Nebraska about the time of Columbus' voyage, and that the Cheyenne and Arapahoe migrated from Canada to the buffalo plains in the 17th century. The total Indian population of Nebraska was about 40,000. The Pawnee, Otoe, Omaha and Ponca

tribes cultivated the soil and made permanent villages of earth lodges, subsisting partly by hunting and partly by agriculture. The Sioux, Cheyenne and Arapahoe tribes lived wholly by the chase and wild fruits; dwelling in skin tents. Warfare between these Nebraska tribes was perpetual, arising chiefly from contests over hunting ground and from love of adventure. The Pawnee, Ponca and Otoe tribes were removed to Oklahoma, the first in 1875, the second in 1877, the third in 1881. The Oglala and Brule Sioux gave up their Nebraska land in 1877 and are now permanently located on reservations in South Dakota. The Cheyenne and Arapahoe Indians are located partly in Oklahoma and partly in Wyoming. At the last census there were 3,784 Indians remaining in Nebraska, all of whom are full citizens of the State. The Omaha tribe numbers 1,276, living in Thurston County. The Winnebago tribe, 1,063 in number, adjoin the Omahas, and were transferred to Nebraska from their old home in Wisconsin and Minnesota. The Santee Sioux number 1,155 and were transferred from Minnesota to Nebraska in 1863. About 290 Poncas returned from Oklahoma and reside at their old home on the Niobrara. The Sauk and Fox Indians occupy a small reservation in southeast Nebraska and northeast Kansas and number about 100.

Exploration.—Francisco Vasquez Coronado with a party of 30 horsemen reached the Nebraska-Kansas region in the summer of 1541 from the valley of the Rio Grande. He probably entered Nebraska although the controversy is unsettled. About the year 1700 French traders came up the Missouri and brought back reports upon the country and the tribes which were fairly accurate. French maps of this period show the various Indian tribes and principal streams. The first definite account of the region is given by the Mallet brothers who named the Platte River and crossed the State from northeast to southwest in 1739. France, Spain and England claimed the region, but the French influence predominated through navigation of the Mississippi and Missouri rivers. In 1762 France ceded the region to Spain. There were Spanish governors at New Orleans and Saint Louis, but the French population and language remained and the early place names in Nebraska are French. The Louisiana Purchase of 1803 brought Nebraska into the American Republic. Explorations under American auspices follow rapidly. The Lewis and Clark expedition in 1804; the Major Long expedition in 1819; the Lieutenant Fremont expeditions of 1842 and 1843, each added to information upon the region. Major Long, who crossed the State from east to west, stated in his report "it is almost wholly unfit for cultivation and of course uninhabitable for people depending upon agriculture for their subsistence," and placed the words "Great Desert" upon the map prepared from his surveys. Before the close of the century practically all the region had been claimed as homes.

The fur traders, the early missionaries and travelers on the Oregon trail furnish the body of Nebraska history until 1854. Manuel Lisa, a Spaniard, was the leading fur trader and ruling spirit of Nebraska from 1807 until his death in 1820. Fort Atkinson, established in

1820 on the Council Bluff, the farthest west United States army post, 16 miles north of Omaha, upon the site of the present village of Fort Calhoun, had a garrison of several hundred men until it was abandoned in 1827. The American Fur Company established regular steamboat navigation of the Missouri in 1832, and among the passengers upon their steamer *Yellowstone* in 1832 was George Catlin, first painter of Nebraska Indians and scenery, and in 1833 Prince Maximilian of Germany who added both paintings and literature upon the region. The Oregon Trail, began in 1830 as a fur-trader's wagon track to the Rocky Mountains, was extended to Oregon by Nathaniel Wyeth in 1832, and by 1842 had become the great transcontinental highway, crossing Nebraska diagonally from southeast to northwest. Other trails, such as the California trail, the Denver trail, starting from different points on the Missouri River, crossed Nebraska, and for 40 years great trains of immigrants, military, freighters and fur traders were the prominent and picturesque features of Nebraska life. The first missionary to the Nebraska Indians was Moses Merrill who came to the Otoe tribe at Bellevue in 1833. In 1834 Samuel Allis and John Dunbar came as missionaries to the Pawnee, and in 1838 Father De Smet reached the Nebraska region as Catholic missionary. The record made by these missionaries and others forms a large part of our knowledge of Nebraska during this period.

Federal legislation made Nebraska from 1 Oct. 1804 to 4 July 1805 a part of the territory of Indiana with its capital at the town of Vincennes. From 4 July 1805 to 7 Dec. 1812 it was part of the territory of Louisiana with its capital at Saint Louis. It then became a part of the territory of Missouri until 1821, when Missouri was made a State and Nebraska cut off and left outside any organized government. On 30 June 1834 Congress established the "Indian Country," of which Nebraska was a part, excluding all white men except military and those having special permission from the government.

The movement to make a Nebraska territory was part of the national movement to colonize and hold the Oregon country. In 1842 Lieut. Fremont mentions the principal river by its Otoe Indian name Nebraska (*Ne-brath-ka*) signifying "shallow water." In 1844 Secretary of War Wilkins suggests that the Platte or Nebraska River would very properly furnish a name to the territory. Stephen A. Douglas introduced the first bill to create Nebraska territory 17 Dec. 1844, followed by other similar bills in 1848 and in 1852. On 30 May 1854 the Nebraska-Kansas bill creating the two territories became a law after a struggle over the exclusion of slavery, which disrupted political parties and churches and prepared the way for the Civil War.

Territorial Period.—The principal events of the territorial period (1854–1867) were the establishment of the capital at Omaha and the resulting bitter feud between the north and south Platte regions; the creation of claim clubs, which undertook to control land settlement regardless of United States laws; the chartering of wild-cat territorial banks with an issue of \$400,000 in paper currency; the growth

of a demand for a free homestead law; the promotion of Pacific Railroad schemes; the organization and growth of the Republican party from 1858 on, and the Sioux-Cheyenne Indian War of 1864.

Statehood.—The first proposal for statehood was defeated 5 March 1860 by a vote of 2,094 for to 2,372 against. On 19 April 1864 Congress passed an enabling act upon petition of the territorial legislature. A constitutional convention, held 4 July 1864, adjourned without action, a majority of the delegates being pledged against statehood. On 2 June 1866 a constitution submitted by the legislature was adopted by the vote of 3,938 to 3,838. At the same election the Republicans elected the State ticket and a majority of both houses of the legislature by nearly the same vote as that cast for the constitution. In this campaign the Democrats, led by J. Sterling Morton, opposed statehood, while the Republicans favored it. The real issue was the fight then on between President Andrew Johnson and Congress, and the question whether two United States senators should be sent from Nebraska to aid Republican leaders in Congress in their controversy with the President. The bill to admit Nebraska under this constitution passed 27 July 1866, but failed to receive President Johnson's signature. In January 1867 Congress again passed an act to admit Nebraska but attached the condition that its legislature should first declare that the provision in the new constitution restricting suffrage to white men should not be enforced. President Johnson vetoed this act. Congress passed the act over his veto. The Nebraska legislature was convened in special session and accepted the condition on 20 February. On 1 March 1867 the President's proclamation admitted Nebraska to the Federal Union.

The capital was removed from Omaha and located 29 July 1867 upon an open prairie with the name of Lincoln. The sale of town lots supplied funds for the erection of a new capitol building. The Union Pacific Railroad was completed to the west line of the State in 1867. A vast tide of immigration set in, largely composed of soldiers from the Civil War. To insure settlement of the prairies where material for building fences was inadequate the legislature in 1870 passed the herd law. In 1871 Gov. David Butler was impeached and removed from office for misuse of public funds. On 4 Jan. 1872, upon motion of J. Sterling Morton, the State Board of Agriculture instituted Arbor Day, since then adopted in many States and countries. Grasshoppers in vast numbers visited the State in 1874–75. The adoption of the new constitution 4 Nov. 1875 marks an important era in the State's development. Wars with the Sioux and Cheyenne Indians along the western border lasted from 1874 to 1877, ending with the surrender of the hostiles and their removal from Nebraska. The third great land-seeking migration began about 1880 and continued for 10 years, taking up the desirable free land to the farthest borders. Conflicts between the "grangers," as the homesteaders were called, and cattle men were a leading feature of this period, resulting in numerous tragedies.

In 1890 and again in 1894 drouth visited the State. The legislatures of 1891 and 1895 appro-

priated \$450,000 to aid settlers. Thousands of homesteads were abandoned and real estate values struck bottom. During this period began the cultivation of sugar beets and the erection of beet sugar factories. Winter wheat and alfalfa became State-wide staple crops. The dairy industry of the State was greatly stimulated and encouraged by the introduction of cream separators on farms and the establishment of centralized creameries. Irrigation and dry land farming became general. The woman's club and the local library systems were established. Social and political ideas were reconstructed. It was a period of revolution. The Kinkaid Homestead Act enacted in 1904 provided 640-acre homesteads for settlers in the sand hills region. Within 10 years about 8,000,000 acres were taken under this Act, practically all of the remaining free government land in the State. About the year 1900 a farmers' co-operative elevator movement began. A vigorous war with the large grain dealers and railroad companies followed. The co-operative movement secured from the legislature of 1905 a law to give them shipping facilities which was affirmed by the Supreme Court. Since then the co-operative movement has steadily grown. About 1913 the farmers' union began a still wider organization for buying and selling co-operatively. This reached a membership of about 35,000 in 1918, carrying on a very large distribution business and promising great changes in the future. In 1912 the State adopted an initiative and referendum amendment to its constitution and in 1916 it adopted a prohibitory amendment by a majority of nearly 30,000. In 1922 the erection of a new Capitol at Lincoln was begun, the appropriation for the building, exclusive of power plant, grounds and furnishings being \$5,000,000.

Nebraska War Activities.—Since the United States entered upon the World War up to 1 July 1919 Nebraska furnished to the army and navy approximately 47,800 men and contributed \$242,000,000 to the five Liberty loans and war charities. Nebraska leads all other States in per capita contribution to war savings stamps and her membership in the American Red Cross is 585,156 or 49 per cent of the population for 1910 census.

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NEBRASKA, University of, The, at Lincoln, Neb., was founded by act of the legislature in 1869. Funds for the erection of the first building were provided by the sale of lots in the then new capital city of Lincoln. This first building, now called University Hall, was completed in 1871, the lumber and part of the brick being hauled from the Missouri River in wagons. The College of Literature, Science and the Arts was opened 6 Sept. 1871, with a faculty of five professors and 90 students. The charter act contemplated six colleges, but an amendment in 1877 reduced the number to five, merging the State Agricultural College and the College of Practical Science into the Industrial College. The board of regents, originally 12 members, but now six, constitute the governing body. The University comprises the Graduate School (degrees, Master of Arts and Doctor of Philosophy); the College of Literature, Science and the Arts (degree, Bachelor of Arts); the Industrial College (degree, Bachelor of Science), which includes the School of Agriculture, the School of Mechanic Arts, and the School of Domestic Science; the College of Law (degree, Bachelor of Laws); the College of Medicine (degree, Doctor of Medicine); the School of Fine Arts; the School of Music; and the summer session. Each college and school has its faculty, charged with the instruction and the immediate management thereof. Law and medicine are not organized into departments. The other colleges are so organized, having the following departments: agriculture; animal husbandry; animal pathology; astronomy and meteorology; bibliography; botany; agricultural chemistry; general chemistry; education (pedagogy); civil engineering; mechanical engineering; electrical engineering; dairy husbandry; domestic science (household arts); mechanical drawing and machine design; elocution; English language; English literature; entomology and ornithology; forestry; geology (including palæontology and geography); Germanic language and literature; Greek language and literature; Roman language and literature; Romance languages; American history and jurisprudence; European history; horticulture; mathematics; military science and tactics; philosophy; physics; physical education; political economy and sociology; zoology. Nebraska students in the College of Literature, Science and the Arts and in the Industrial College pay no tuition. Non-resident students, also all students in the professional schools and in the schools of fine arts and music, pay small tuition fees. All departments are open to both sexes on equal terms. A tax of one mill per dollar on the assessment roll of the State, together with interest income from land sales and land leases are the chief sources of revenue. The University receives the benefit of the Morrill Acts for the maintenance of instruction in branches relating to agriculture and the mechanic arts, and of the Hatch Act, in aid of agricultural experimentation. The 10 buildings on the city campus, with their class rooms, laboratories, libraries and offices, house all the departments except the School of Agriculture, the work of which is done mainly at the university farm, and the College of Medicine, in which the last two years' work is given at Omaha. There are five buildings at the farm. This consists of 320 acres, a little removed

from the city campus. Here are located the departments of agriculture, animal husbandry, animal pathology, dairying and horticulture. About 100 acres are laid out in experiment plats for field crops, fruit and vegetables. Herds of cattle, sheep and swine are owned, being used for experimentation. Four new buildings were recently erected, an administration building and a physics laboratory on the city campus, a hall of agriculture, a dairy building, shops, and a horticulture laboratory at the farm. The library contains about 155,000 volumes. The latest statistics show an enrollment of 5,345 students, exclusive of 2,366 attending the summer session, and 368 professors and instructors. About two-fifths of the students are women.

NEBRASKA CITY, Neb., city, county-seat of Otoe County, on the Missouri River, and on the Missouri Pacific and the Chicago, Burlington and Quincy railroads, about 45 miles in direct line east by south of Lincoln, and 52 miles below Omaha. It is in a fertile agricultural region. It is built on the site of old Fort Kearney (1848) and was laid out in 1855. It was incorporated in 1871 and chartered in 1891. The chief manufacturing establishments are flour and lumber mills, planing mills, a cannery, brick works, press-drill works, cigar, vinegar and pickle factories, windmill works, starch factory, foundries, machine shops and cereal mills. It has large grain elevators, cold storage buildings, lumber yards, stock yards, and packing and provision house. It is the seat of the State Institute for the Blind and the Academy of the Annunciation. It has a public library, a government building, city and county buildings, a number of churches, a high school, and public and parish elementary schools. There is a public monument to J. Sterling Morton, whose home, Silver Lodge, has been handsomely developed and contains a fine arboretum. The government is administered under the commission plan. Pop. (1920) 6,279.

NEBRASKA RIVER. See PLATTE.

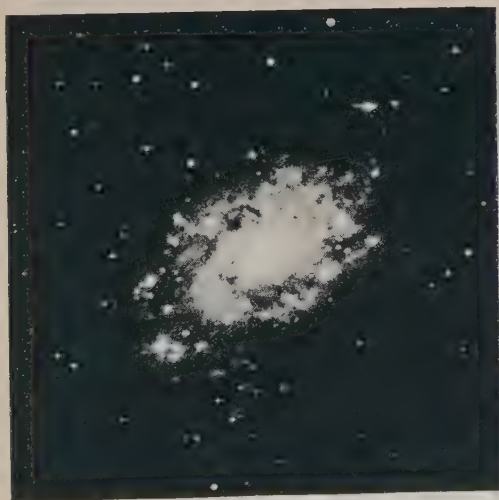
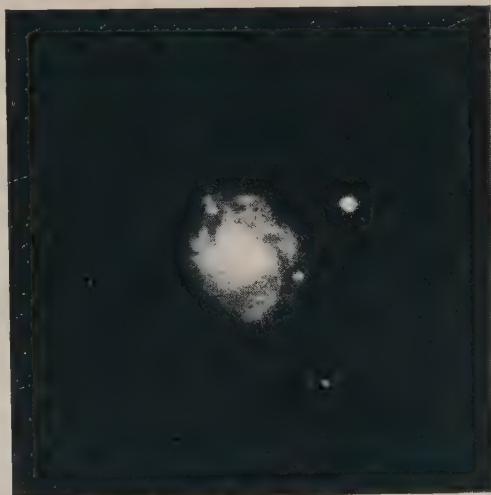
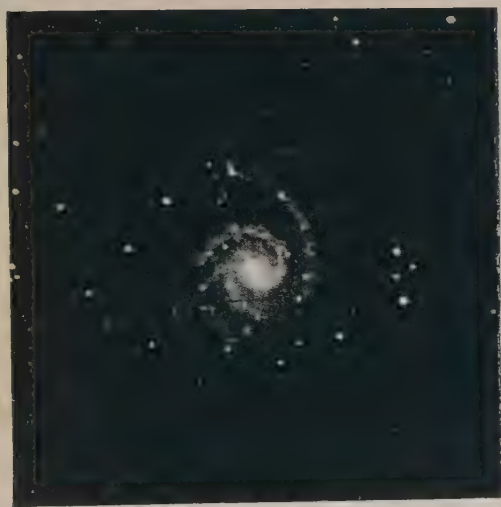
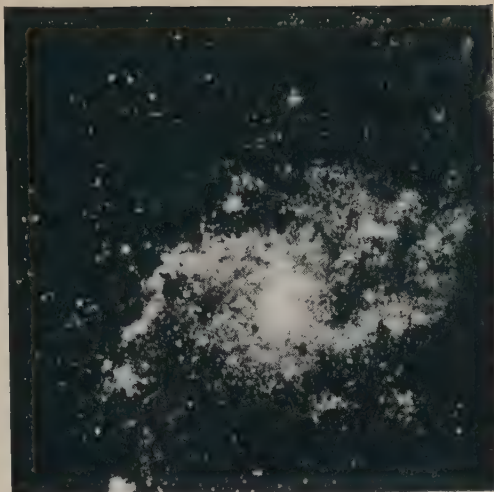
NEBRASKA WESLEYAN UNIVERSITY, The, is located at University Place, four miles from the capital city of Nebraska, has its own municipal government, and is connected with the city of Lincoln by lines of electric railway. The University is a denominational institution of the Methodist Episcopal Church, organized in 1887 as the result of an effort to unify the educational interests of the denomination within the State. It consists of a College of Liberal Arts, an academy with courses fitted to the college curriculum, a Teachers' College, a School of Expression and a Conservatory of Music. It is coeducational, and its standards for degrees are those required by the college senate of the denomination for its first class institutions. Its first graduates were the class of 1890, which consisted of four members. Its present number of students is 950; its professors and instructors 46. Its college graduates number about 687; its library has 8,000 volumes; its buildings and grounds are valued at \$225,000; its productive endowment is \$295,000.

NEBUCHADNEZZAR, nēb'ū-kad-nēz'ar (Nabu-Kudurriuzur, "Nebo protect my dominion"), the most illustrious monarch of the New Babylonian or Chaldean kingdom, son of Nabo-

polassar (q.v.). In the lifetime of his father he defeated as crown prince the Egyptian Pharaoh Necho at Carchemish 605 B.C., and ascended the throne as his father's successor 604 B.C. He at once began his career of conquest, subduing Syria, and laying Judah and its king, Jehoiakim, under tribute. In 598 he marched against Jerusalem and led away into captivity at Babylon Jehoiakim, the 18-year-old son of Jehoiakim, just as he had succeeded to the throne on his father's death. With the young king the most eminent rulers of the land were carried off, 10,023 in all, together with the costly spoils of the temple and royal palace. As Zedekiah who succeeded Jehoiakin in the latter's exile entered into a treaty with Egypt Nebuchadnezzar's army besieged and captured Jerusalem a second time, carrying off Zedekiah into captivity (586 B.C.). Nebuchadnezzar meanwhile had strongly established his headquarters at Ribla in Cœlo-Sydia. The remaining inhabitants of Jerusalem were taken as captives to Babylon, and the Jewish capital absolutely destroyed. For the 13 years between 585 and 573 B.C., the city of Tyre was besieged by Nebuchadnezzar to no purpose; in 572 B.C. he invaded Egypt and conquered it from Syene to the frontiers of Ethiopia. Pharaoh Hophra was defeated and dethroned and from 569 to 536 B.C. a Babylonian army occupied Egypt. Besides his activity in these campaigns Nebuchadnezzar was tireless in efforts for the security of his realm, the welfare of his people, the adorning and fortification of his capital Babylon. He restored the ruined canal and cut another, the King's Canal. At Sippara he made a lake like Lake Moeris, 10 miles in circumference, which received and distributed the overflowing waters of the Euphrates, and he founded the city of Terodon at the mouth of that river. He built the Median wall as a defense to his kingdom, and completed the vast ramparts which his father Nabopolassar had begun. He beautified the royal residence with palace and temple buildings, finished the tower of the seven planets at Borsippa, restored and decorated the royal palace of his father, and built a new palace on a height surrounded by hanging gardens for the pleasure of his Median wife, Amytis. This great work is said to have been completed in 15 days. He died after a reign of 43 years, 561 B.C., deeply deplored by his subjects, having been on the whole a great and wise king.

NEBULÆ, The, in astronomy, a term derived from the Latin, signifying little clouds. The nebulae may properly be divided into two distinct classes, the green and the white. The former are frequently very large and irregular in form, sending out sprays and streams in all directions, while the latter have often a spiral structure. The difference between the two classes is fundamental, and it is questionable even if they might not properly be designated by different names. The spectrum of the green nebulae consists chiefly of green and blue lines with sometimes a very faint continuous spectrum,—their constitution is therefore obviously mainly gaseous. The spectrum of the white nebulae is continuous, with, in a few instances, evidence of very faintly marked bright and dark lines. Their nature is, therefore, uncertain, but probably they are made up largely of solid as well as gaseous matter. The green

NEBULÆ



The Great Nebula in Andromeda
M 74, Piscium
H.V 44 Camelopardi

M 33, Trianguli
M 77, Ceti
H.I 200, Leonis Minoris

nebulae are distributed in and near the Milky Way; the white ones are located on either side, and are generally remote from it. In this respect they differ from the star clusters, which in other respects they somewhat resemble. While the Milky Way shines chiefly by the light of the countless stars that it contains, a portion of its light is also due to enormous areas of green nebulous matter, which serves as a luminous background to the stars themselves. Undoubtedly the finest telescopic object in the sidereal heavens is the great nebula in Orion, which belongs to this class. It fills a large part of the constellation, and is the largest nebula known outside of the Milky Way. Next to it in size and also in magnificence is 30 Doradus, in the larger Magellanic Cloud. The Argus and Trifid nebulae are other fine specimens of this class. All these nebulae are obviously connected with a large number of stars, and are possibly in process of dispersion from them. Frequently a single star will be connected with a nebular wisp; in the well-known little group of the Pleiades nearly all of the larger stars have such nebulous streamers connected with them and many of the nebulous streamers connect star with star, the whole cluster being apparently full of nebulous matter. Recent observations indicate that this very faint nebulous matter shines principally by the light which it reflects from the brighter stars of the cluster and that it is largely or wholly in an opaque, non-luminous condition.

There is a second division of the green nebulae. These have the same spectrum, but owing to a slightly different division of the light usually present a somewhat bluish appearance. These are known as planetary nebulae on account of their rounded well-defined discs. The discs are generally somewhat diversified and contain sometimes one and sometimes two stellar nuclei. The largest and finest of the planetary nebulae is known as the Owl nebula in Ursa major. It is so called because it formerly somewhat resembled the face of an owl. For a few years it had two brilliant nuclei which corresponded with the two eyes. Later, first one and then the other of these disappeared, and now it has a single nucleus in its exact centre. If the planetary disc is too small to be distinguished as such, the formation is designated as a stellar nebulae. When a *nova* or temporary star fades out, it is usually converted into one of these bodies. If the central portion of a planetary nebula is comparatively dark, it is then called a ring nebula. The best known example of this class is the ring nebula in Lyra. Many of the white nebulae exhibit a spiral structure, and they often are of a double instead of a single spiral structure.

The largest and most brilliant white nebula in the heavens is the great nebula in Andromeda. It is the only nebula indeed that is conspicuous to the naked eye. The one best showing its spiral nature, however, is the Whirlpool nebula in Canes Venatici. Often, as is the case with both of these objects, a secondary nucleus terminates one of the spirals. Smaller nuclei frequently occur at intermediate positions upon both spirals. If the solar system condensed from a former large nebulous mass, it is likely to have been from an object such as one of these, but the solar nebula must have been very much smaller. Unlike the green

nebulae, the white ones are not associated with brilliant stars, but that they are sometimes connected with small ones is shown by the fact that in 1885 a small temporary star suddenly appeared close to the centre of the nucleus of the great nebula in Andromeda; no less than eight new stars have thus appeared within spiral nebulae at various times. It is certain that the association of these stars with the nebulous cloud cannot be accidental. While we have little evidence bearing upon the subject, it seems most likely that the white nebulae are condensing at present upon numerous nuclei located within them. What the size of these nuclei may be we have no knowledge.

A subdivision of the white nebulae consists of small faint elliptical bodies showing no detail. It is possible that if they were nearer to us, and were better seen, that they, too, would show a spiral structure. In closing this brief summary of our knowledge of the nebulae, we must refer to one most unexpected property that some of them have exhibited—that of variability. Three variable nebulae have appeared and disappeared in the constellation Taurus, but the best known example is that of the Trifid nebula, a large section of which, which was formerly dark, is now bright, and apparently a region which was formerly bright is now dark. This is probably due not to a shifting of the material itself, but to a change in its luminosity. The source of this luminosity is unknown, but it may be suggested that the unknown gas which all the green nebulae contain in combination with hydrogen, and which is found nowhere else in the universe, may possess properties like radium, rendering the whole gaseous formation luminous until its original atomic structure is finally broken down. See COSMOGONY.

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NEBULAR HYPOTHESIS, The. A theory of the method in which the development of the Solar System has taken place from an original nebula. It was first outlined in a somewhat general and indefinite way by Swedenborg and afterward by Kant. It was, however, first presented in detail by La Place and is generally referred to as "La Place's Nebular Hypothesis." See COSMOGONY; GEOLOGY; LAPLACE.

NECESSITARIAN. See DETERMINISM.

NECESSITARIANISM, or NECES-SARIANISM. The doctrine of philosophical necessity which postulates that every event happens according to immutable laws; that freedom of will does not mean freedom from will; the will is free to act according to its own nature, but all actions are related necessarily to hyperphysical causes and natural laws in a universal scheme of predetermined events, outside the range of human knowledge and control. See DETERMINISM; FREE WILL; FREEDOM OF WILL; MECHANISM; MECHANISM AND VITALISM; MECHANISMS, MENTAL; and related references.

NECHES, nĕch'ĕz, a river in Texas, which has its rise in Van Zandt County and flows southeast into Sabine Lake (q.v.). It traverses a fertile agricultural section of the State, and in its lower course passes through an oil region. Beaumont (q.v.) is on its bank a short distance

from the mouth. The Neches is about 350 miles long.

NECHO, nē'kō, or **NEKAU**, Egyptian king, the Pharaoh-Nechoh of the Bible: b. last half of the 7th century B.C.; d. 595 B.C. He was son of Psammetichus I, succeeded him in 609, attempted to hold Syria after the collapse of the Assyrian empire, and in this campaign killed at the battle of Megiddo King Josiah of Judah, whose son Jehoahaz was made king dependent on Necho. He extended the boundaries of his kingdom to the Euphrates, but the later campaign was less fortunate for the Egyptian king, who was defeated at Carchemish in 604 by Nebuchadnezzar, and thus lost possession of Syria. Necho's internal rule was vigorous; he built a canal from the Nile to the Red Sea and sent out Phœnician sailors to explore the African coast. This fleet is said to have circumnavigated the continent. Consult Budge, 'History of Egypt' (1902); Breasted, 'A History of the Ancient Egyptians' (ib. 1908),

NECK, that part of the body in the higher animals which forms the juncture of the head with the trunk. In man the neck is formed mainly of the muscles passing from the skull to the thorax, and of the trachea and the œsophagus. There are also the cervical or neck vertebræ, in man numbering seven, the same number being constant in nearly all the *Mammalia*. The most notable exceptions are seen in the manatees and the two-toed sloth, having six neck-vertebræ; while in the three-toed sloth nine cervical segments exist. In long-necked birds as many as 25 cervical vertebræ may be present. In fishes no neck or cervical region is distinguishable, and structures such as the gill-slits, which belong to the neck region of the mammal, are found in intimate collocation with cephalic organs such as the skull, and thoracic organs such as the heart. A cross-section of the neck at the level of the sixth cervical vertebra shows in front near the middle line the two anterior jugular veins. Behind this come the sternohyoid and sternothyroid muscles, from the breastbone to the hyoid bone and the thyroid cartilage of the larynx, respectively. Just laterally of the sternohyoid the omohyoid runs from the hyoid bone to the shoulder. Still more laterally the sternomastoid, the great cord that shows through the skin of the neck, runs from the breast-bone and collar-bone to the skull behind the ear. In the middle line the trachea or windpipe, the collapsed tube of the œsophagus, and the vertebral column with the spinal cord within it follow one another from front to rear behind the sternothyroid. The space between the trachea and œsophagus, on the one hand, and the sternomastoid and sternothyroid on the other is filled anteriorly by the thyroid gland, posteriorly by a mass of connective tissue containing to the outside the internal jugular vein, to the inside the common carotid artery, and behind the vagus nerve. Between these structures and the spinal column is the longus colli muscle, which helps in bending the neck. The external jugular vein lies just outside of the hind edge of the sternomastoid. Within the foramina in the transverse processes of the vertebræ run the vertebral artery and vein. Behind and to the side of the vertebral column lie the scaleni, the splenii, the complexus, the semispinalis colli, the levator anguli scapulæ,

and the trapezius. The recti are also associated with the vertebral column. The entire front surface of the neck is covered with a thin layer of muscular tissue just underneath the skin, known as the platysma myoides.

Some of the muscles of the neck form triangles with the clavicle, the middle line of the neck, the hyoid and the jaw. These are useful to the surgeon in describing and locating the structures of the neck.

Besides the thyroid gland, the thymus is located in the neck. At the bifurcation of the carotid artery the carotid gland is found. The neck also possesses lymph glands, which are liable to tuberculous infection. In the lower animals especially—as in the horse or elephant—there is a strong band of fibres, forming the ligament nuchæ, which suspends the head on the neck. In man, the head being balanced on the spinal column, this ligament is of comparatively small size, and it extends from the occipital protuberance at the back of the skull to the spine of the seventh or last cervical vertebra. The term neck is also used in anatomy to indicate any attenuated process or part of a bone which serves to unite or support parts of larger proportions; for example, the neck of the femur or thigh-bone, the neck of the humerus, of the radius, etc. See ANATOMY; CAROTID ARTERY; JUGULAR VEIN; LARYNX; THYMUS GLAND; THYROID GLAND; TRACHEA.

NECKAR, nēk'kär, Germany, an affluent of the Rhine, which rises in the Black Forest in Württemberg, near one of the sources of the Danube, and flows through Baden into the Rhine at Mannheim, after a course, including windings, of about 240 miles. The area of its basin is 4,150 square miles. It is navigable for small boats from Heidelberg near its mouth, so far as Cannstadt, but the actual navigation of the river extends only to Heilbronn, up to which steamers ply.

NECKER, nā-kär, Jacques (English, nēk'är), French Minister of Finance: b. Geneva, Switzerland, 30 Sept. 1732; d. Coppet, near Geneva, 9 April 1804. In 1750 he went to Paris to enter the banking-house of his uncle, M. Vernet, and having become partner in a banking business, soon acquired an immense fortune. After giving up his business he held the post of Resident Minister at Paris, representing his native town. Ambitious of literary distinction he produced his 'Eloge de Colbert' (1773), which gained the prize of the French Academy. His 'Essai sur la législation et le commerce des grains' (1775) was violently attacked by the economists, owing to his expressing himself in favor of restrictions on the exportation of corn. In July 1777 he obtained the post of Director-General of Finances. Malversation under the preceding reign had caused a great deficit to which the American war made additions. New taxes would have been unpopular and Necker endeavored to meet the exigency by loans and reforms. The salon of Madame Necker (q.v.) became the centre of the literary and political life of Paris. But the partisans of Turgot found fault with his innovations. In 1781 he published his 'Compte rendu au Roi,' relative to his administration. This statement of the financial condition of the nation found favor with the people, but displeased the court and Necker was dismissed in

May 1781. He went to Switzerland where he published his work 'Administration des finances' (1784). The errors and prodigality of Calonne, who next had the management of the state finances, increased Necker's reputation; the latter returned to France in 1787, wrote against Calonne, who had accused him of being the author of the deficit, and was exiled in consequence. But in 1788 Necker was recalled as comptroller-general, he supported the convocation of the States-General, which was the wish of the nation and the giving a double representation to the *tiers état*. When the court in a royal sitting, held on 23 June 1789, wished to annul the decision of the Third Estate, by which the National Assembly was constituted, Necker refused to appear in the sitting. On 11 July the advisers of the king succeeded in inducing him to give Necker his dismissal and to order him to leave the kingdom. No sooner was his removal known than all Paris was in a ferment. The storming of the Bastille followed (14 July) and symptoms of popular violence became so alarming that the king found himself compelled to recall the banished minister. His first object was to restore tranquillity and security of person and property. But as Minister of Finance he was obliged to propose measures unacceptable to the populace. His moderate opinions in regard to the administration of government did not keep pace with the wishes of those who dictated to the people, notably Mirabeau. Under these circumstances he wrote to the Assembly, in September 1790, requesting his dismissal. His daughter, Madame de Staël (q.v.), has given a somewhat too favorable view of his character as a statesman in her 'Considerations.' His ability, though considerable, was much overrated in his day. Among his other works are 'De l'importance des Opinions Religieuses' (1788); 'Réflexions présentées à la nation française' (1792); 'Du pouvoir exécutif dans les grands états' (1792); 'De la révolution française' (1796); and 'Dernières vues de politique et de finances' (1802). A collective edition of his works was published at Paris in 1820-22 by his grandson, August de Staël Holstein. Consult Nourrisson, 'Trois Révolutionnaires: Turgot, Necker, et Bailly' (2d ed. 1886); Hermann, J., 'Zur Geschichte der Familie Necker' (1886); Gomel, Charles, 'Les causes financières de la révolution française: les ministères de Turgot et de Necker' (Paris 1892).

NECKER, Susanne Curchod de Nasse, French matron: b. Crassier, Switzerland, 1739; d. Coppet, Switzerland, 1794. She came of a French Protestant family and as a girl was noted for her beauty, wit and wide knowledge which so attracted the historian Gibbon that he wished to marry her. In 1764 she married Jacques Necker (q.v.) and in Paris her house soon became frequented by the most distinguished men of the day, among them Buffon, Saint Lambert and Marmontel. She educated her daughter, the famous Madame de Staël in this atmosphere and devoted much time to philanthropic work, founding the hospital named for her. She wrote 'Réflexions sur le Divorce' (1794) and 'Mélanges' (published posthumously in 5 vols.). Consult D'Haussonville, 'Le Salon de Madame Necker' (1882; Eng. trans. by H. M. Trollope, 2 vols., London 1882);

D'Arvor, 'Madame Necker, 1737-94' (Paris 1897); Gambier-Parry, M., 'Madame Necker, Her Family and Her Friends' (Edinburgh 1913).

NECKER DE SAUSSURE, *dé sô-sür*, **Adrienne Albertine**, French writer: b. Geneva, Switzerland, 1765; d. 1841. She was married to Jacques Necker, a cousin of Madame de Staël with whom she was intimate. She published 'Notice of the Character of Madame de Staël' (1820) and 'L'Education progressive ou étude sur le cours de la vie' (2 vols. 1828-32) for which the Academy gave her the Montyon prize in 1832. Part of the work was translated into English (Boston 1835).

NECROMANCER, *The*. See RAMIREZ, IGNACIO.

NECROMANCY (Greek, *nekros*, dead, and *manteia*, divination), the divination of the future by questioning the dead under the belief that the spirits or souls of the dead could be communicated with and could give information regarding the future. This, like many superstitious rites, it is supposed, is of the highest antiquity. Mention is made of necromancy in the Old Testament; for instance, in Deuteronomy (xviii, 11), where it is forbidden. In the 28th chapter of the first book of Samuel the witch of Endor is related to have raised up Samuel to gratify the desire of Saul. In many parts of Greece there were oracles of the dead and necromancy was practised in the temples by priests or other religious persons. It was also practised in Thessaly, notorious for magic and sorcery. From the first the practice was condemned by the Christian Church and during the Middle Ages necromancers were persecuted in all ways, imprisoned, tortured, burned. See MAGIC.

NECRONITE (Greek, "a corpse"), a variety of orthoclase feldspar occurring in granular limestone near Baltimore, Md. It is nearly white in color and derives its name from the fact that it emits a fetid odor when struck.

NECROPOLIS (Greek, "the city of the dead"), a term applied to the cemeteries in the vicinity of ancient cities. In classical antiquity the name is given to a suburb of Alexandria, where the corpses were received and embalmed. Here Cleopatra applied the asp to her breast. Among the famous cemeteries of antiquity are those of Egypt at Ghizeh, the west bank of the Nile at Thebes, Beni Hassan and Abydos, the Etruscan tomb groups of Volci, Tarquinii and Capua, Italy, Petra in Syria. These ancient burial places are of prime importance to the archæologist because of the rich yield of domestic utensils, tools, weapons and jewelry brought to light through the general custom of the ancients in burying such with the deceased.

NECROSIS (Greek, literally, "a state of death"), in *pathology*, the death of a circumscribed piece of tissue. In surgery, the term is specifically applied to the death of a bone, in part or in whole, but especially in mass. The part affected by necrosis, like a slough of the soft tissues, has no longer any organic connection with the body. This dead portion, especially when detached from the bone to which it belonged, is called the sequestrum. If the necrosis is confined to the superficial layers of the bone-substance, the operation of nature by

which the dead layers are thrown off is called exfoliation. The line of demarcation is the boundary between the living tissue and the dead. If it is the whole of the outer case of the bone that suffers, the periosteum or investing membrane sometimes remains healthy and deposits a lymph which rapidly ossifies and surrounds the diseased part with a healthy crust. The bones that most usually suffer from necrosis are those of the lower extremity, the tibia and femur; necrosis of the soft parts is called gangrene (q.v.).

NECTANEBO I, nĕk-tă-nĕ'bō, king of Egypt: d. 364 B.C. The first king of the 30th dynasty he came to the throne in 382, formed an alliance with Evagoras of Cyprus against the Persians; successfully met a Persian invasion in 374; was conservative in religion and restored many old temples. The British Museum possesses his sarcophagus. This great general was succeeded by Teher or Taho, who was supplanted by NECTANEBO II in 361, also a general and also an ally of the Greeks, with whose help he put down a pretender to the throne and for a time held the Persians off, only to succumb to them (343) after the defection of Mentor, one of his Greek generals. He left Egypt and fled to Ethiopia—or by a late and untrustworthy tradition to Macedonia where he seduced Queen Olympias and thus was the father of Alexander the Great. This story is evidently suggested by a longing for poetic justice to the king defeated by the Persians, who in turn were crushed by Alexander. Egypt was a Persian province from 343 to 332, when it came into the control of Macedonia. Consult Wiedemann, 'Geschichte Aegyptens von Prammethich I bis auf Alexander den Grossen' (Leipzig 1880).

NECTAR, a sweet liquid secreted by a glandular surface structure in a plant called a *nectary*; and the name is extended by botanists to any aborted part of a flower in the place between the gynoecium and androecium (see FLOWER) where nectaries usually occur. Nectar varies in composition with the plant that produces it, but consists mainly of water, with sugar and grape-sugar, with traces of other carbo-hydrates and proteids which give it flavor and odor. Nectaries may occur in many places and are of various forms. Those outside of flowers are most often found at or near the base of the petiole or about stipules. Within flowers the nectar glands form a more or less continuous ring between the stamens and pistil; or the disc itself may secrete a sweetish fluid; or other parts, as the petals (for example, in acornite) may become nectaries. In many cases the secretion exudes directly from the surface and not from any definite pore or excretory opening.

Such structures belong mainly to seed-producing plants and serve the purpose of attracting insects whose visits are beneficial in effecting cross-pollination (see FLOWERS AND INSECTS) as they go from flower to flower in search of this delectable food, which bees, wasps and others transform into honey. The nectaries on the outside of certain plants attract ants (q.v.) which protect the plant. The exudation of nectar is dependent on the little understood process of the secretion of sugar by the cells of the nectaries. The water of the nectar is then extracted from these cells by plasmolysis or osmotic action.

The terms nectar and nectary are derived from the name given by the Greek poets to the drink of the immortal gods on Mount Olympus. It was poured out by Hebe, the goddess of Youth, and conferred immortality. Homer describes it as resembling red wine. It was joined with ambrosia, the immortalizing food of the gods, and like it was of most delicious odor.

NECTARINE, a smooth-skinned peach formerly regarded as two distinct species, which may be derived from the seed of a peach or from a peach bud by bud variation, and which, conversely, may produce a tree bearing peaches by either of the means mentioned. In all ways as an orchard fruit the nectarine is managed like the peach, but is far less popular. Commercial orchards of this tree are planted in California, the product being mainly dried or canned. Consult Darwin, 'Animals and Plants under Domestication' (1868).

NECTURUS. See PROTEIDÆ.

NEDJED, nĕd'jĕd, **NEJD**, or **NEJED**, Arabia, the general name signifying "elevated country," applied to the central Wahabi kingdom in great part covered by the heights of Jebel Toweyk. The capital is Riad (pop. 30,000), a centre of Mohammedan orthodoxy and fanaticism. A great part of the region is sandy desert interspersed with fertile spots inhabited by Bedouins. The more elevated districts with towns and villages inhabited by the settled population, feed immense droves of camels and the best breeds of Arab horses. The climate is healthful. Politically it is a dependency of Jebel Shammar. The inhabitants are Wahabis, est. at 1,000,000. Consult Palgrave, 'Central and Eastern Arabia' (1865).

NEEDHAM, nĕd'am, **Charles Willis**, American college president: b. Castile, N. Y., 30 Sept. 1848. He was graduated from the Albany Law School and in 1874-90 practised law in Chicago where he assisted in founding the University of Chicago. In 1890 he removed to Washington where he established a law practice and in 1897 began his connection with Columbian University (now George Washington) of which he became president in 1902. He resigned this position in 1910, when he became counsel for the Interstate Commerce Commission. He is also professor of constitutional and interstate commerce law in the Washington College of Law and is the author of several pamphlets on education, law and jurisprudence and is a contributor to periodicals.

NEEDHAM, **James George**, American naturalist: b. Virginia, Ill., 18 March 1868. He was graduated in 1891 from Knox College, Galesburg, Ill., and studied later at Johns Hopkins and Cornell. He was professor of biology at Lake Forest University from 1898 to 1906, and had charge of the New York Entomological Field Station after its establishment in 1899. He was called to Cornell in 1906 to initiate a new line of university studies in limnology and has been since 1914 professor of entomology and limnology in Cornell University. He has written 'Elementary Lessons in Zoology' (1895); 'Outdoor Studies' (1898); 'General Biology' (1909); 'The Natural History of the Farm' (1913); 'The Life of Inland Waters,' with J. T. Lloyd (1915).

NEEDHAM, John Turberville, English naturalist: b. London, England, 10 Sept. 1713; d. Brussels, Belgium, 30 Dec. 1781. He was a Roman Catholic priest and was in his later years director of the Academy of Sciences at Brussels. He published 'New Microscopical Discoveries' (1745); 'Idée sommaire, ou vue générale du système physique et métaphysique sur la génération' (1780).

NEEDLE, a small instrument of steel pointed at one end and usually with an eye or hole at one end through which a thread is passed in sewing and stitching. The needle was known in very ancient times, its invention being ascribed by the ancients to the goddess, Bellona. The earliest instruments of this kind were fashioned of wood or fish-bones and did not have the eye, but were used after the manner of an awl. The skill in embroidery possessed by early peoples such as the Babylonians, Phrygians and Egyptians attest their acquaintance with a needle of a highly-developed type. In Pompeii both ordinary and surgeon's needles have been found. The Chinese appear to have been the inventors of steel needles, which spread later throughout the Moslem world and reached Europe through the Moors. Nuremberg was the earliest seat of the needle-making industry in Europe, needle-makers being incorporated there as early as 1370. It was not until 1560 under Elizabeth that the manufacture of needles assumed any importance in England, and not until a century had passed did this industry reach important proportions. Toward the close of the 18th century mechanical processes had been perfected for producing a steel rod of the length of two needles, which were subsequently cut and drilled by hand. In 1826 for the first time a stamping machine was used to drill the eyes but it was not until the 80's of the last century that machinery had displaced all the old hand processes. At the present time the processes in manufacturing needles is in excess of 20. First comes the selection and gauging of the wire which is now coiled by winding it in a circle of 16 feet circumference. The coil is cut into exact halves by means of powerful shears. The next process is the cutting of the half-coils into two needle lengths. The wires, now of two-needle lengths and still somewhat curved, are now heated to a dull red and placed in bundles inside iron rings and are straightened by being rolled to and fro on a plate with a curved bar. They are next pointed at both ends, being advanced to the grindstone from a hopper on a pulley, the blanks are held to the face of the grindstone by a rubber-band arrangement. A current of air is employed to draw off the fine steel dust, which is highly injurious to the operators. The blanks are now fed to a machine which forms the flats for the eyes, which are now driven through by a punching machine. The double needles are next placed on two wires, are broken apart between the heads, other processes being used to remove the burr of the stamping and in general to grind the heads to the required shape, polish and temper the needles. Hardening is performed by dipping in cold oil after the needles have been raised to a red heat; the process of tempering is continued by moving the needles on a belt of wire gauze, traveling over gas flames. The needles are next rolled

under the finger on a smooth stone, and bent ones are removed. After being made into large parcels they are washed in order to remove all oil or emery powder still adhering to them. Fine quality needles have the eyes gilt. The eyes are polished with fine emery and flax thread. The whole needle is polished by being passed between leather-covered rollers, with retaining-rollers above them. Another machine next lays the needles with their heads in one direction. Gauges are used for sorting the needles according to length. Lastly, they are put up in small packets in a machine of the folding or envelope-making type.

In addition to the ordinary needle, special kinds are designed for sewing canvas, leather, upholstery, surgical operations, etc., and for sewing machines. Crochet needles have a hook at one end. Other hooked needles are used for hosiery and stockinet work. Sewing machine needles have a hook, eye or barb at the pointed end. A wax-thread needle of varying shape according to the nature of the work is used for leather. Some have hooks which pull the thread through a hole pierced with an awl. A welting-machine needle is a section of a circle in shape.

In the United States the manufacture of needles is a minor industry. The total value of products reported by the industrial census of 1914 was \$2,556,888. If the quantity made in connection with other industries could be definitely ascertained, it is likely that the total annual manufactures of needles would reach \$3,000,000 in value. In the same year the value of hand-sewing, darning and shoe-machine needles imported into the United States reached \$481,631. Consult the *American Machinist* (Vol. XXX, New York 1907).

NEEDLE GUN, a primitive breech-loading bolt-action rifle, used by the Prussians in 1866 and by the Germans in the Franco-Prussian War. It was invented from 1824 to 1836 by one Von Dreyse, raised to the nobility in 1864. In 1841 it was first adopted by the Prussians. The firing-pin had to penetrate the powder-charge of the paper cartridge before it could reach the detonator at the base of the bullet. The range of the gun was short, even compared to contemporary muzzle-loaders, and especially as compared to the chassepot of the French. Much gas escaped at the breech. The needle gun was superseded by the Mauser. The calibre of the needle-gun was .607 inch, its weight without the bayonet 10 pounds and 4 ounces. With a charge of 75.15 grains of black powder, it propelled a 478 grain lead bullet at a muzzle velocity of 1,000 feet per second. It was sighted to 800 paces, or about 656 yards.

NEEDLE-ORE, the common name for aikinite also called aciculite and acicular bismuth. It is a sulphid of bismuth, lead and copper, of formula $3\text{Pb}(\text{u}_2)\text{S.BiS}_3$, and is found native in connection with gold in various localities. It has a dull metallic lustre and is of a blackish lead-gray color. Its hardness is 2.5, its specific gravity is 6.7-6.8. It occurs in embedded acicular crystals of needle-like formation and hence derives its name.

NEEDLEFISH, a marine gar of the genus *Tylosurus* (see GAR), especially *T. acus*.

NEEDLES, The, a group of small but very prominent peaks in the southwestern part of Mohave County, Ariz., which are conspicuous from the Santa Fé Railroad. They are near the bank of the Colorado River and are about 1,100 feet above the stream. They consist of volcanic rock.

NEEFS, nâfs, more correctly, **NEEFS**, **Pieter, THE ELDER**, Dutch painter: b. Antwerp, about 1578; d. there, between 1656 and 1661. He was a pupil of the painter of architectural views, Hendrik van Steenwijck (q.v.), began his career as a painter in the same department of art in 1605, and in 1609 was elected a member of Saint Luke's Guild of painters in Antwerp. His paintings are numerous, and he is well represented in the Louvre at Paris, the Pinakothek at Munich, the Museum at Ghent, the Gallery at Dresden and other European collections. They are mainly interiors of churches, the gloom of the building being lit up with torches or tapers and are remarkable for aerial and linear perspective. The technique is delicate and highly finished. He generally secured the services of some other artist to introduce figures in his views, among others Teniers, Francken and Van Thulden.

NEENAH, ne'na, Wis., city in Winnebago County; on Lake Winnebago at its outlet, and on the Fox River; also on Chicago and Northwestern, Minneapolis, Saint Paul and Sault Sainte Marie, and Chicago, Milwaukee and Saint Paul railroads; about 90 miles north by west from Milwaukee and 13 miles north of Oshkosh, the county seat. It is partly on Doty Island, through the centre of which an imaginary line separates it from its twin city, Menasha, the two cities being one in commercial interests but each having an independent municipal government. Neenah was settled in 1843 and in 1850 incorporated as a village, and as a city in 1873. Fine water power is obtained from the Fox River. It is the centre of the paper manufacturing industry in Wisconsin and in addition has large plants manufacturing doors and other interior finish, shoes, knit goods, stoves, municipal castings, paper-mill rolls, castings and other requisites, cellulose, fibre rugs, bags, flour, cotton waste, ruled and blank books, etc. It is the centre of a great dairying district and its exports of cheese run into millions of dollars yearly. It contains the home offices of the Equitable Fraternal Union, Wisconsin's largest fraternal insurance society, and of the Jewelers' Fire Insurance Company, both doing business in practically every State in the Union. The city is most attractive for tourists, the hotels being among the best and most beautiful in the northwest. Fine public buildings, parks, churches, theatre, armory, splendid library, Kimberly High School and Theda Clark Memorial Hospital, two electric interurban lines, three banks, with resources over \$3,000,000, two daily newspapers, well-paved streets and municipal water system stamp it as one of Wisconsin's most progressive cities. Pop. (1920) 7,171.

NEER, nâr, **Aart van der**, Dutch painter: b. Amsterdam, 1603; d. there, 9 Nov. 1677. He became famous in his native city about 1640. He excelled particularly in moonlight effects among the casual scenery of Holland, as well

as in winter landscapes, skaters on the ice, fires or conflagrations. These midnight scenes of raging flame are sometimes filled with figures, which give them a powerful dramatic effect. His pictures are found in the galleries at Dresden, Brussels, London, New York, the Schwerin Gallery, the Berlin Museum and in the museums of Amsterdam and Brunswick and the collection of Lady Wäntage. He ended his days as an innkeeper.

NEERWINDEN, nâr'vîn-dên, Belgium, a village in the province of Liège, 16 miles from Louvain, which gives its name to two battles fought in the vicinity: (1) on 29 July 1693 when the French under the Marshal of Luxembourg gained a victory over the English and Dutch allies under William III of Britain; (2) on 18 Mar. 1793 when the French under Dumouriez were defeated by the Austrians under the Prince of Coburg. It was occupied by the Germans in the European War in 1914.

NEES VON ESENBECK, nâs fôn ä'zën-bek, **Christian Gottfried**, German botanist and natural philosopher: b. in the Odenwald, 14 Feb. 1776; d. Breslau, 16 Mar. 1858. He was long a practising physician, but became professor of botany successively at Erlangen (1818), Bonn, (1819), Breslau (1831), and Berlin (1848-52). He displayed much originality of thought in his 'Naturphilosophie' (1841), forming Vol. I of his uncompleted 'System der spekulativen Philosophie.' Among his other writings are 'Handbuch der Botanik' (1820-21); 'Bryologia Germanica' (1823-31). His specialty was cryptogamous plants on which his chief work is 'Naturgeschichte der europäischen Lebermoose' (1833-38).

NEF, **John Ulric**, American chemist: b. Herisau, Switzerland, 14 June 1862; d. 1915. He was graduated from Harvard University in 1884 and at Munich. In 1887-89 he was professor of chemistry in Purdue University, Lafayette, Ind., and in 1889-92 he was engaged at Clark University, South Atlanta, Ga. He became professor of chemistry in the University of Chicago in 1892 and since 1896 was head professor of that department. His scientific papers were published in the *Annalen der Chemie*.

NEGAPATAM, nêg-a-pa-tâm', India, a town and port of the Tanjore district, Madras. It has an active trade in rice, tobacco, cigars, hides, cotton goods, betel nuts and camphor with Ceylon, the Straits Settlements and Burma, and is the terminus of the South Indian Railway. It was an early settlement of the Portuguese; was taken by the Dutch in 1660, and by the British in 1781. Pop. about 70,000.

NEGATIVE QUANTITY. See MATHEMATICS.

NEGATIVES, Development and Treatment of. The development of a negative must be considered as beginning with the exposure of the plate in the camera (see PHOTOGRAPHY), for the change in the sensitive silver salts on the negative plate is begun by the action of the light which reaches them during exposure. With an insufficient exposure the negative cannot be developed. A nearly sufficient exposure can be "tinkered" into something of a negative from which unsatisfactory prints may be made, and in some cases these are the best which may be had under existing conditions. An over-ex-

posure can nearly always be saved and made to produce acceptable positives. The principles of development of both glass dry-plate and film photographic negatives are the same. They are usually developed in a photographic dark-room or in special small portable dark-rooms or in developing machines. Photographic dry plates have spread upon the surface a coating of a gelatine emulsion containing a certain amount of bromide of silver. The emulsion is flowed over the plate surface in a warm fluid condition, which solidifies when cooled. Sensitized photographic films are prepared by spreading the emulsion upon a transparent support resembling celluloid. When the prepared glass plate or film is exposed in the camera, the light acts upon the gelatino-bromide of silver in such a way, it is believed, as to convert the bromide of silver in the film into a sub-bromide which becomes thereafter susceptible to the action of a reducing agent known as the developer, in proportion to the amount of light to which it was subjected. The bromide of silver not acted upon by the light is not affected chemically by the developer. The chemical change which the developer induces in the sub-bromide of silver is a reduction of the light-affected parts to metallic silver. Any substance which will effect this reduction is known as a developing agent. There are new ones being added continually to the list. Most developers are derivatives of coal tar, the more common ones being pyrogallol, known as "pyro," quinol, amidol, metol, ortol, adurol, glycin and eikonogen. While a solution of any of the developing agents alone would in time reduce the exposed silver bromide to metallic silver, in practice it is found best to combine the developing agent with an alkali, carbonate of soda, ammonia or carbonate of potash to hasten the action. The alkali is called the accelerator. To prevent a too rapid oxidization of the developer, sodium sulphite is added and preserves the developer solution prior to the mixture with it of an alkali. For this purpose with certain developers oxalic acid, as well as other acids of a similar character like sulphuric or sulphurous acids are added, which will keep the solution from oxidizing, evidenced by its discoloration. There are many different developing agents and many different formulæ for making developing solutions. These differ but slightly from each other in their action; the general method of use is the same. In compounding developers it is sometimes advisable to introduce a very small proportion of potassium bromide, or ammonium bromide, particularly in the development of plates known to be or suspected of being over-exposed. They are known as restrainers and have the power of retarding the action of the developer on the parts which received the least light, which is sometimes desirable. Instead of dissolving the bromide of potassium or ammonia in the developer, it is usual to prepare a weak solution of bromide in water, about five grains to five or eight ounces of water, and immerse the plate in this solution for three or four minutes before developing, then remove and transfer the plate to the developing tray and pour upon it the normal developer. The preliminary bromide treatment checks the rapidity of development in the shadows and lower tones and helps to prevent an over-exposed plate from becoming flat or foggy.

In general to obtain the proper density in the film for most commercial plates, it has been found that four grains of pyrogallol acid, metol, ortol, glycin, pyro-catechin, adurol, eikonogen, diogen, imogen, edinol and other similar developer agents, to the ounce of water, is about the right proportion. Bromide of potassium aids in increasing the density. In some cases where it is desired to secure thin quick-printing negatives full of detail the normal percentage of the developing agent to the alkali can be reduced one-fourth.

The method of developing plates or cut films in a dark-room is as follows:

The exposed plate or film must be removed from the holder in a dark room or a room illuminated only by a deep ruby-red colored light. The plate or film is then placed in a tray and the developing solution, previously prepared, poured over it in a smooth even flow. Perhaps an easier way to secure the even covering with no dry spots is to tilt the tray till the developer is in one end, lay the plate into the tray touching the empty end first, and as the other end falls into the developer tip the tray in the other direction, flowing the developer with one progressive sweep over the plate. The developer at once begins its action although it is not immediately visible and should be kept in motion by rocking the tray. In about a minute after immersion parts of the plate are seen to grow dark where the developer is changing to metallic silver the light-affected silver sub-bromide, the parts receiving the strongest light, such as the sky, being the first to turn dark. The operator watches the progress of the change by holding his plate up to the colored light from time to time.

In about four or five minutes, with a proper exposure and normal developer, all the susceptible silver bromide has become metallic silver, forming the negative image of the object photographed. The silver is densest where the light has acted most vigorously on the sensitive film; thinnest where there was the least light as in the shadows. When the image is fully developed so that no further details are desired in the shadows, the plate or film is well rinsed in water to remove the developer, and is ready for the second chemical step, called "fixing." In developing roll film the roll is unwound from the spool and the ends detached from the black paper backing. Holding the film by the two ends, it is first run back and forth from end to end through a deep tray of water two or three times and then through the tray of developer, back and forth, until finished.

The chemical commonly used for the fixing process is hyposulphite of soda—"hypo" in the photographic vernacular. To prepare the fixing solution, about one ounce of "hypo" is dissolved in six ounces of water and the solution is poured into a separate tray used solely for this fixing bath, and in this the negative is immersed. The action of the solution on the negative is to dissolve away the unreduced silver in the plate or film, a process requiring about five minutes. As the action of the fixer proceeds, the milky appearance of plate or film is seen gradually to fade out. When all the soluble silver has been removed—indicated by the total disappearance of the whitish color—the negative is chemically complete and may be

exposed to light without injury. But it should be returned to the hypo for five minutes longer, as some invisible salts of silver require to be removed. The negative should now be removed from the "hypo," rinsed in clear water and placed in a bath of alum and water for a few minutes. Instead of alum a formaline solution may be used. These solutions toughen the gelatine so that it will not be readily marred or scratched in subsequent handling. The negative should then be washed thoroughly in running water for about an hour to eliminate all the hypo and alum. The washing process may be more effectively carried out by changing the water 10 times at intervals of five minutes. If cold washing water can be had the first five changes should be made before the film is hardened in the alum bath. If a glass negative, it may be immediately placed in a rack to dry and the drying hastened by placing the rack in a window or in front of an electric fan, every possible care being taken to prevent dust from settling on the wet negative. In the case of film negatives, a short soaking in a glycerine solution is advisable. This is to prevent the contraction of the gelatine side of the film, in drying, from curling the film. After removal from the glycerine solution, the negative is dried without washing. With the "non-curling" (N-C) films the objectionable glycerine bath is unnecessary. Drying requires a number of hours under ordinary conditions.

Glass plate negatives are developed one at a time for the best results. Where time presses and fair results will answer, as many as will cover the bottom may be placed in the developing tray at once. Film may be developed in the entire strip of 2, 4, 6, 10 or 12 negatives, as the film cartridges are prepared; or they may be cut apart and each exposure handled separately. The cutting apart may be done at any time after development has proceeded sufficiently to show the dividing line between the exposures on the film strip. The temperature of both developing and fixing solutions should be between 60 and 70° F., as should the alum hardening bath. If the temperature of the solutions is materially higher, the gelatine emulsion softens unduly and may be lost. If the solutions are below 60°, development is retarded. In the case of over-exposure, whether accidental or intentional the development should be checked when the shadows begin to darken. That is the condition of highest contrast of dark and light obtainable with that exposure. If the negative is then too thin for a good print, a mild intensification will produce a very fine negative, particularly for making lantern slides.

Sometimes after development, negatives are found to be too "dense" to give good results in printing—that is, the metallic silver has formed too thick over the whole negative, or parts of it. This may be due to several causes, chiefly to too great a proportion of alkali in the developer, or too high a temperature. It may also occur with too concentrated a developer. "Dense" negatives may be improved by what is called reducing. This is done by immersing the negative, previously washed with care, in a weak bath of ferri-cyanide of potassium, a small amount of hyposulphite of soda and water. This solution gradually dissolves

away the reduced metallic silver of the negative image. When enough has been removed to make the negative of proper density, the reduction is checked by washing, and the negative is dried in the usual way. Negatives may be reduced locally by applying the solution to the parts with a small brush. In place of ferri-cyanide of potassium, persulphate of ammonia without hypo can be used. The formula is as follows:

Persulphate of ammonia.....	30 grains
Water.....	4 ounces

Make a fresh solution each time and add two drops of nitric acid. The salt readily dissolves. The negative if dry should be first soaked for half an hour in water and then be immersed in half the ammonia solution. Reduction proceeds gradually. If the reduction is not complete in four minutes throw away the solution, and pour on the other half of the fresh persulphate solution. When the reduction is sufficient, wash the negative under the tap and immerse for 10 minutes in a 10 per cent solution of sodium sulphite to check the action of the persulphate; then wash and dry. This reducer is particularly useful for hard contrasty flash light negatives as it works strongest on the high lights while preserving the details in the shadows.

Negatives are sometimes underdeveloped, owing to a very short exposure. In case the image has not impressed itself upon the plate it cannot be developed far enough to give good prints, not enough metallic silver having been formed. Such negatives may be "intensified," which is a sort of redevelopment. A negative must be well washed to eliminate the hypo prior to the intensification process. There are different ways of accomplishing this with a variety of formulæ. A common way is to immerse the negative in a solution containing bichloride of mercury. This changes the dark negative image to a white color, the metallic silver in the film having been reduced to silver chloride by association with the mercuric chloride. The whitened or bleached negative is now transformed, after being well washed with water, by immersing in a bath of water and dilute ammonia or a solution of sodium sulphite and water, until the white color becomes brown or black. The action of the alkali changes the chloride to metallic silver again with the addition of mercuric deposits. The negative now possesses greater opacity in the high lights and will yield more vigorous prints. But no process will bring out the wealth of detail secured only by a sufficiently long exposure, and while an underdeveloped plate may be improved by intensification it cannot be made a truly satisfactory negative. The intensifying process may be repeated by washing the film carefully after each step. Repeating the process causes the deposit to become browner and thus more resistant to the passage of actinic light in printing. Another and much more important use of the intensifying process is in the thickening of the very thin image on overexposed plates. In such cases the development would have to be cut short to avoid fogging, and the image, while full of detail, would not have printing density. Judicious intensifying will in such circumstances produce a perfect negative. Negatives may be intensified locally by applying the chemi-

cal solutions to the desired parts with a camel's hair brush after soaking the negative in water.

How far to carry the development of glass plates or film is an important point in negative making. Some operators rely entirely on their judgment in the case of each negative, examining it by the dark-room light to see when the desired density has been attained. The uncertainty of results in thus trying to stop development at just the right point resulted in the introduction of what is known as the "factorial system" of development. This system is based on the theory that a certain definite relation exists between the total length of time required for development, and the time elapsing between immersing the plate in the developer and the first appearance of the image. Different developers have different factors according to their various actions. So, multiplying the time elapsing from immersion in developer to appearance of image, by the factor of the developer used, gives total length of development needed. In these calculations the temperature of the developer is a most important factor, also. The factor of any developer at a definite uniform temperature can be determined by experiments.

Underlying this "factorial system" is the theory that in every case the time of exposure of plate or film alone determines the final quality of the negative. The eminent authorities, Alfred Watkins and Hurter and Driffield, hold this view, which is being generally accepted. The graduation between light and shadow in the negative (not its general "density" or "thinness") really determines its printing quality; what this scale of graduation or ratio of contrast is going to be eventually is fixed before the image makes its appearance in the developer. But, if the operator knows before development of over or under exposure, he may influence the contrast in his negative somewhat by altering his developer. In view of the above, time development is now recognized by many workers as the correct way of development, the length of time to elapse between the immersion of plate or film into the developer to the completion of development varying with solutions of different compositions and their temperatures.

The Kodak developing machine, made for film only, is based on the principles of time development. With it film is developed without a dark room. Introduced in 1901, the Kodak developing machine became immediately popular with film workers and has become the favorite method of development. The advantages of machine development are many. No dark room is needed; the operations are simpler and therefore more likely to be successful. The general results are better than by the older development method. With the Kodak developing machine the operator of course does not have to depend upon his own judgment as to when development should cease. He times development, thus being certain of his results, assuming the exposure to have been correctly timed. The chemicals to be used with the machine are prepared in powder form, needing only to be combined with water to form the proper solutions. The chemical principles of development in the Kodak developing machine and in the dark room are identical. The ma-

chine itself is a light-tight metal box containing a colored transparent apron. Its operation is as follows:



Kodak Developing Machine.

The spool of film is inserted in the machine so that the black paper, which protects the roll of film from light in the cartridge, will lead from the top, as shown in cut, the transparent apron (F) having first been wound onto arbor "A." The black paper is then pulled out and the end attached to arbor "B" by slipping under the wire guard. Arbor "B" is then turned to the right until the word "stop" printed on the black paper to mark the beginning of the film strip appears. The developer is then poured into compartment "E," the end of apron (F) is hooked onto arbor "B" and the top put on the machine. The operator then turns handle to the right until the time of development (four or five minutes) has expired. The film "G" winds up inside of apron, but with the face not touching it, thus allowing free action of the developer. The cover is then removed from machine, developer poured off and fixing solution poured in; the cover replaced and the handle turned again for about five minutes, when the fixing is complete. After fixing, the film is removed from machine by taking hold of either end of black paper and pulling out of machine, the film being taken hold of when it appears and pulled free from the black paper. Nothing remains to be done except to wash the film, harden it in the alum solution and pin up to dry. Film must always be developed in the entire strip when using the machine. For those who mix their own developer the following formula will be found reliable:

TANK DEVELOPER.

Water.....	4 ounces
Sulphite of soda.....	300 grains
Potassium bromide.....	15 "
Adurol.....	105 "
Metol.....	15 "
Potassium carbonate.....	750 "

This is the stock solution. For developing, 1 ounce of this is diluted with 16 ounces of water. It develops the film in 25 minutes at a temperature of 65°.

GENERAL FORMULÆ.

PYRO DEVELOPER.

1.	
Pyrogallie acid.....	$\frac{1}{2}$ ounce
Sulphuric acid.....	20 minims
Pure water.....	32 ounces
2.	
Sulphite of soda (anhydrous).....	3 ounces
Carbonate of soda.....	2 "
Pure water.....	32 "

To develop take

Water.....	2 ounces
No. 1.....	1 ounce
No. 2.....	1 "

EIKONOGEN DEVELOPER.

1.	
Eikonogen.....	1 ounce
Sulphite of soda (crystals).....	3 ounces
Water.....	60 "
2.	
Carbonate of potash.....	3 ounces
Water.....	30 "
To develop take	
No. 1.....	2 ounces
No. 2.....	1 ounce
Water.....	2 ounces

METOL DEVELOPER.

A.	
Distilled or boiled water.....	10 ounces
Anhydrous sodium sulphite.....	250 grains
Metol.....	50 "
B.	
Distilled or boiled water.....	10 ounces
Potassium carbonate C. P.....	1 ounce

For normal developer take 3 parts of A and add 1 part of B.

For over-exposure take 3 parts of A, add $\frac{1}{2}$ part of B, 4 parts of water and 10 to 16 minims of a solution of potassium bromide, 1 to 10.

Carbonate of soda can be substituted for carbonate of potash.

METOL-QUINOL DEVELOPER.

Make two solutions as follows, each will keep a long time:

1.	
Metol.....	50 grains
Hydroquinone.....	40 "
Potassium metabisulphite.....	$\frac{1}{2}$ ounce
Distilled water.....	10 ounces
2.	
Sodium carbonate (crystals).....	2 ounces
Distilled water.....	10 "

For use mix equal parts. Bromide of potassium should be added in very small quantities in cases of great over-exposure.

EDINOL DEVELOPER.

Edinol.....	240 grains
Potassium metabisulphite.....	120 "
Sodium carbonate.....	800 "
Sodium sulphite.....	400 "
Potassium bromide.....	40 "
Water.....	10 ounces

This is a one-solution developer. For use 1 part of above is put into 7 parts of water. Can be used for several negatives. Is of a light straw color.

HYDROQUINONE DEVELOPER.

For those who have no conveniences for weighing and compounding formulas, a developer which will always give excellent results with almost all dry plates and films on the market may be made by taking two packages of the Eastman hydroquinone developing powders, mixing both sections of the hydroquinone in 8 to 10 ounces of water and adding only one section of the alkali powder. At a temperature of 70° F. this developer gives strong, virile negatives with fine clean shadows and abundant detail.

FIXING SOLUTION.

Hyposulphite soda.....	4 ounces
Water.....	16 "

ALUM BATH.

Saturated solution of alum allowed to settle and decant.

ACID FIXING BATH.

Into an 84-ounce bottle or jar put 56 ounces of warm water, 1 dram of sulphuric acid and 2 ounces of sulphite of soda crystals. When these are dissolved add 16 ounces of hyposulphite of soda. When entirely dissolved add a previously prepared solution of 1 ounce of chrome alum in 8 ounces of water. This keeps a long time and may be used over and over till exhausted.

TO MAKE FARMER'S REDUCER.

Dissolve 1 ounce ferri-cyanide of potassium in 9 ounces water, forming a 10 per cent solution. Add enough of this solution to fresh hypo bath to make it a light straw color. This acts very rapidly and must be used with great care. It reduces all parts of the plate alike, thus differing from the persulphate of ammonia reducer.

INTENSIFIER.

1.	
Mercuric chloride.....	1 dram
Ammonium chloride.....	1 dram
Water.....	4 ounces
2.	
Ammonia (.880).....	1 dram
Water.....	4 ounces
Bleach in No. 1, wash well, and blacken in No. 2.	

A milder but in many respects better intensifier is made by dissolving 4 ounces sodium sulphite in 20 ounces of water and adding 90 grains of the red iodide of mercury. The negative builds up steadily and is to be washed when done and dried. It may afterward turn whitish or yellow, but this will not injure its printing qualities.

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RICHARD FERRIS,

Editorial Staff of The Americana.

NEGAUNEE, nĕ-gâ'nĕ, Mich., city in Marquette County, on the Duluth, South Shore and Atlantic, the Lake Superior and Ishpeming and the Chicago and Northwestern railroads, about 12 miles west by south of Marquette. It was settled in 1846 and in 1873 was chartered as a city. It is in the iron region of the State and has within the city limits several productive iron ore mines. The ridge (Iron Mountain) upon which Negaunee is located is over 1,000 feet above Lake Superior. The chief industries of the city are connected with the mining and shipping of iron ore. It has excellent public and parish schools. The city owns and operates the electric-light plant and the water-works. Pop. (1920) 7,419.

NEGLEY, nĕg'li, James Scott, American soldier: b. Liberty, Pa., 22 Dec. 1826; d. Plainfield, N. J., 8 Aug. 1901. He was educated at the Western University of Pennsylvania and served in the ranks through the Mexican War. At the outbreak of the Civil War he organized a brigade, was commissioned brigadier-general and joined the Army of the Ohio. He defeated the Confederates at Lavergne in 1862 and was

promoted to the rank of major-general for gallant conduct at Stone River. Commercial and railway enterprises engaged his attention after the war and in 1869-73, 1875-77 and 1885-87 he was a member of Congress.

NEGLIGENCE, in law, is the failure to do something which a prudent and reasonable man would do under similar conditions, or the doing of something which such a man would not do. This involves in either case a violation of a legal duty, and a resultant damage to the person to whom that duty was owed. Moreover, the person charged with negligence must have been under an obligation to exercise care or diligence either assumed by contract or imposed by law. The third element of negligence is the legal damage to the one toward whom the person charged is bound to exercise care or diligence. Three degrees of negligence are recognized in law: *Ordinary*, the want of ordinary care or diligence; *slight*, the want of great care or diligence, and *gross*, the want of slight care or diligence. The standard of care or diligence required in a given case is usually a question of fact to be determined by a jury. When the evidence of the parties to a suit is not conflicting the court decides the question of the negligence of the defendant. In such cases it often happens that the plaintiff is nonsuited because according to his own statement the injury for which he seeks legal redress was not caused by a negligent act or omission on the part of the defendant. In most jurisdictions, however, the jury, after instruction by the court in the law governing the case, determine whether the defendant exercised the care or diligence requisite in his case.

Negligence is not presumed by the law on the part of any one, hence the burden of proving the fact rests with the plaintiff, except when the thing resulting from the negligence speaks for itself. An awning-frame falls from a window, injuring the plaintiff; in this case we have a situation which would not exist had the owner of the building taken even ordinary precautions for the safety of pedestrians. The presumption of proper diligence in his case is overcome and the plaintiff will recover damages unless the defendant can show that, despite this circumstance, he was without fault. A general rule may here be stated: A person undertaking the performance of a special task requiring special knowledge or skill is liable if he fails to do all that a person equipped with such special knowledge could reasonably be expected to do in the case, due consideration being given to all the circumstances. If an automobile repairman undertake to put a motor in good running order he binds himself to do so with the care of the average motor repairman. It is also held generally that the amount of care may vary with the apparent risk. For example, a man sets about burning brush or weeds upon his land and the fire, getting beyond control, spreads to his neighbor's property. In passing upon his act the circumstances of the dryness or dampness of the brush or weeds, the direction of the wind and the efforts, if any, made by him to confine the conflagration to his own property must be taken into account.

The duty of taking proper care or diligence is always relative, never absolute. Consequently negligence cannot exist where there is no duty to exercise care. An example of this

may here be stated: A man sets out poisoned meat on his lands in an effort to destroy marauding animals, such as coyotes, which are worrying his sheep, his neighbor's hogs break into his land and one or more of them eat the poison and die. This man was not negligent in a legal sense toward the owner of the hogs, for he was not bound to exercise even ordinary care toward trespassers, and the advent of the hogs upon his land was a trespass. His sole obligation toward trespassers was to abstain from wilful or wanton injury to his neighbor's stock. A licensor or one who permits others upon his property is obliged to exercise ordinary care but this is often slight. Unguarded excavations, stairwells, etc., in a new building, the existence of which is known to the workmen, do not constitute negligence on the part of the contractor at common law and in most jurisdictions. The contractor is bound, however, to warn his employees of new dangers confronting them, and, generally speaking, to render the place as reasonably safe as may be expected having regard to the ordinary exigencies of the work carried on there. In this connection it is proper to note the special legislation obtaining in some jurisdictions under which the contractor is obliged to insure his employees against injury. See **WORKMEN'S COMPENSATION LAWS**.

The third element of negligence must also be proved before the plaintiff may recover damages. He must show that he has sustained legal injury as the result of the defendant's negligence. The act of negligence must always be the proximate cause of the injury sustained. A common illustration of this is afforded in the average railroad or steamship accident where numbers of passengers are made ill by the shock of such accident due to negligence on the part of the owners or the railroad company. In many jurisdictions no cause of action is permitted on the ground that such illness is not the natural consequence of the negligence. Action is permitted, however, in many States, for mental anguish, shock, etc., even when there is no attendant physical injury. There is frequently experienced considerable difficulty in determining whether the injury sustained by the plaintiff is the proximate or remote effect of the defendant's negligence. The general test applied is whether there is an unbroken sequence of events forming an unbroken chain between the negligence and the injury. A master is responsible for the negligence of his servants, but in no case can redress be had where contributory negligence on the part of the plaintiff is proved. Negligence causing the death of a human being will subject one to criminal prosecution if such negligence is the proximate cause. In a factory fire in New York a few years ago 146 young girls lost their lives because, it was alleged, the factory proprietors had locked all the exits, thus depriving the girls of egress to the stairways and fire escapes, the ordinary methods of safety under such circumstances. The proprietors were indicted for manslaughter and narrowly escaped conviction. They were, however, held liable in tort in civil actions by defendants and relatives. See **EMPLOYER'S LIABILITY; MASTER AND SERVANT; TORT**, and consult Barrow's 'Handbook on the Law of Negligence'; Beven, 'Negligence in Law' (3 ed.,

Toronto 1908); Shearman and Redfield, 'Treatise on the Law of Negligence' (5th ed., New York 1899); Thomas, E. B., 'Negligence' (2d ed., ib. 1904); Thompson, S. D., 'Commentaries on Negligence' (7 vols., Indianapolis 1905-07).

NEGOTIABLE BILLS OF EXCHANGE. See **BANKS AND BANKING—COMMERCIAL PAPER.**

NEGOTIABLE INSTRUMENTS, any note, bill, contract or document which can be endorsed and transferred to a third party. In addition to negotiable paper, other written instruments considered negotiable are deeds, insurance policies, contracts, liens, judgments, etc. See **BANKS AND BANKING—BANKING IN THE UNITED STATES** and **COMMERCIAL PAPER; CURRENCY; MONEY.**

NEGOTIABLE PAPER. See **NEGOTIABLE INSTRUMENTS.**

NEGRI, nā'grē, **Ada**, Italian poet: b. Lodi, near Milan, 3 Feb. 1870. She became a school-teacher at Motta-Visconti, on the Ticino, and in 1892 published a small volume of poems, 'Fatalità,' which in Italy aroused a general interest and by 1894 had passed through six editions. She received from the city of Florence an honorary stipend of \$340 (1,700 lire) annually for a period of 10 years, and was appointed an instructor in literature at the Scuola Normale of Milan. Her further work includes the volume 'Tempeste' (1896); and 'Mater-nità' (1904). Much of her verse is an appeal for the working-classes. There is a German translation by Jahn of some of the poems. Consult Dornis, 'La Poesie italienne contemporaine' (1898); Guido Mazzoni in the 'Nuova Antologia' (Rome 1893).

NEGRITOS, nā-grē'tōz, the aboriginal negroid race inhabiting the Philippine Islands at the time of their discovery by the Spaniards who gave them this name, signifying "little negroes." They are found also on the Andaman Islands and the Malay Peninsula. They are believed to have sprung from the Negrillos of Africa, and to have reached their present habitat by migration. The race includes the Mincopies of the Andaman Islands; the Mantras and Sakaies of Malacca; and the Schobaengs of the Nicobar Isles. Some ethnologists include the Semangs, but it is objected to this that many of the latter are distinctly light in color, and the Negritos are black. In the Philippines they are called Aitas, Aëtas or Itas. The Negritos of the Philippines may be considered typical of their race and to be found in their greatest purity on Alabat Island, near Manila, and along the northeastern coast of Luzon, between Palawan and Cape Engano, and the interior woods of that section. The few families living upon the slopes of Mount Mariveles are regarded as the typical specimens of the race, and variations from this type as due to mixtures with other races. In the Philippines the Negritos have intermarried with the Ilongots of Luzon, the Mangayans of Mindoro and the Tagbanuas of Palawan and a great variation from type obtains. As a race they are of small stature, the men seldom more than four feet eight inches in height and the women four feet four inches. They have the brachycephalic or globular head form; their skin is

dark brown, almost black, and with a coppery hue; the hair is brownish black, very abundant, bushy and tensely frizzed, but the beard is scanty; and their features resemble those of the negroes, though the lips are not so thick. They are of slight build with thin, calfless legs, and become potbellied with age. The reach of the arms exceeds the height by from one to five inches. They are true savages, depending for their food upon hunting, fishing and the digging of wild roots. Their food is generally devoured in a raw state, though sometimes scorched or seared. They do not build villages nor stable huts, but roam through the mountains in small bands of six or eight families, sleeping at night on the ground around a common camp fire. They make baskets of a rude sort and their bows and arrows for hunting, lances for warfare and, in some sections, blowguns. Their only clothing is a girdle about the waist. For the rest they decorate the upper part of the body with a pattern work of scars formed by cuts with bamboo through the skin, into which is rubbed dirt to cause festering. They affect ornaments also; earrings, bracelets, anklets and necklaces, generally woven of palm fibre. Their intelligence is almost infantile in grade. They cannot count above five. They are exceedingly indolent and have never risen from their original low estate. They have few words in their language and their few customs are crude. They are cruel and often murderous, burying alive any one incurably sick or dangerously wounded. Their religion is one of ancestor worship, and they hold the graves of their dead in great veneration, and make long journeys to visit them. To this they add a short-lived worship of oddly shaped rocks and trees, shifting their reverence continually to newly-discovered objects. They have a few crude musical instruments, a sort of flute blown by one of the nostrils, and a stringed instrument of bamboo.

They are found only in the islands of Luzon, Panay, Palawan, Negros and Mindanao; and their number is estimated in the later United States reports as 20,000. Their origin and relationship to other races present many interesting ethnological questions which have not been satisfactorily settled; their geographical distribution, however, leaves little doubt that they were the original inhabitants of the Philippine Archipelago and at one time practically the sole possessors of the islands; they were probably driven back into the mountainous interior by invasions of primitive Malaysians. See **PHILIPPINE ISLANDS.**

NEGRO, a name properly applied to the races inhabiting the continent of Africa, originally between lat. 10° N. and 20° S. The term does not include the inhabitants of northern Africa, the Egyptians, Berbers, Nubians, Abyssinians and others. Neither do the Hottentots in South Africa belong to the Negro race. The term Negro, therefore, is not synonymous with African, and is not a national appellation, but denotes an ideal type constituted by certain physical characters, namely, black skin, woolly hair, flat nose, thick everted lips and a prognathous form of skull.

Out of Africa, Negroes are found in the United States, the West Indies, Brazil, Peru, the Cape Verde Islands and Arabia. They are

rare in Europe, Polynesia and Australia. Negroes were nearly unknown to the Hebrews and the Homeric Greeks; the Egyptians, however, about 2300 B.C., became acquainted with Negroes through the conquests of their rulers, and represented them on their monuments as early as 1600 B.C.; for nearly 35 centuries the type has remained unchanged in Egypt. Negroes were unknown to the Greeks until the 7th century B.C., their Ethiopians being merely any people darker than the Hellenic, like the Arabs, Egyptians, Libyans or Carthaginians, none of which are Negroes.

The Negro race is divided naturally into two great divisions: (1) African Negroes, (2) Papuans or Melanesians. There are four subdivisions of African Negroes, according to locality: (1) West Sudan and Guinea; (2) Central Sudan and Chad Basin; (3) East Sudan and Upper Nile; (4) South Africa. Authorities estimate their number at 130,000,000, with probably 20,000,000 full-blood or half-caste negroes, either slaves or descendants of slaves, chiefly in tropical or sub-tropical America, and enumerate the following as the chief anatomical and physiological points in which the Negro differs most from his own congeners:

1. The abnormal length of the arm, sometimes reaching to the knee-pan.
2. Prognathism (Facial angle 70°, in Caucasian 82°).
3. Weight of brain, 35 ounces (in gorilla 20 ounces, average Caucasian (Europe or America) 45 ounces).
4. Full black eye, black iris and yellowish sclerotic coat.
5. Short, flat, snub nose, broad at extremity, with dilated nostrils and concave ridge.
6. Thick, protruding lips, showing inner surface.
7. Very large zygomatic arches.
8. Exceedingly thick cranium, enabling him to use the head as a weapon of attack.
9. Weak lower limbs, terminating in a broad, flat foot, with low instep, projecting and somewhat prehensile great toe, and "lark heel."
10. Complexion deep brown, blackish, or even black, not due to any special pigment, but to the greater abundance of coloring matter in the Malpighian mucous membrane.
11. Short, black hair, distinctly woolly, not frizzly.
12. Thick epidermis, cool, soft and velvety, mostly hairless, and emitting a peculiar odor described as hircine.
13. Frame of medium height, thrown somewhat out of the perpendicular by the shape of the pelvis, the spine, the backward projection of the head and the whole anatomical structure.
14. The cranial sutures, which close much earlier in the Negro than in other races.

The native African Negroes display considerable ingenuity in the manufacture of weapons, in the working of iron, in the weaving of mats, cloth and baskets from dyed grasses, in the dressing of skins of animals, in the structure of their huts and household utensils and in the various implements and objects of use in a barbarous state of society. Their religion consists in the worship of idols and fetishes, representing a supreme power which they all acknowledge; they believe also in good and evil spirits, in witchcraft, charms and spells, omens, lucky and unlucky days, etc.; they make fetishes of serpents, elephants' teeth, tigers' claws and many similar objects, and reverence wooden images and sacred things, which they think have received a peculiar power from their divinities to drive away evil spirits, and protect them from danger, disease and witchcraft. They make prayers and offerings to their idols, and have sacred songs, festivals, dances, ceremonies and places; they sacrifice animals and sometimes human victims, especially during funeral obsequies; they have their priests and holy men, who are also magicians and doctors.

They believe generally in an after life, without any distinct idea of retribution, and some tribes in the transmigration of the human soul into a gorilla, or other bird, beast, reptile or fish. Being very fond of music, they have many ingeniously contrived musical instruments, generally of a noisy character; they have a keen sense of the ridiculous and are of a cheerful disposition; though cruel to their enemies and prisoners, and setting little value on human life, they are naturally kind-hearted, hospitable to strangers and communicative of their joys and sorrows; the females are remarkably affectionate as mothers and children, and as attendants on the sick, even to foreigners. They are less dirty in their persons and dwellings than most other barbarous races. For the history and development of the negro in America, see NEGRO IN AMERICA and NEGRO EDUCATION.

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NEGRO IN AMERICA, The. In 1910 there were in the United States and its dependencies 10,215,482 persons of Negro descent. They were descendants of the slaves brought from Africa to America in the 15th, 16th, 17th, 18th and 19th centuries. The demand for workmen in the mines and on the plantations of the Spanish West Indies was the primary incentive for opening the African Slave Trade to America. A small European slave trade from Africa had begun with the voyage of the Portuguese sailor, Antonio Gonzales, to the River of Gold in 1442. This trade was soon turned toward America when the Indians failed as workmen and it was encouraged by King Ferdinand and the Emperor Charles V. The Bull of Demarcation having debarred Spain from African possessions, she was compelled to secure her slaves through contract with the Portuguese and later with other trading nations. This contract for supplying the Spanish Indies with Negroes became to be a great commercial prize and the zeal with which the Portuguese, Dutch and English successively filled these contracts was the main means of transplanting this race.

The African Slave Trade thus established cost Negro Africa 100,000,000 souls. It disorganized Negro culture and industry, stopped the development of art, overthrew governments and was the cause of that modern stagnation of culture which has marked the Dark Continent since 1600.

Early Immigration.—The exact number of Negroes brought to America will, of course, never be known. Dunbar estimates that nearly 900,000 came to America in the 16th century, 2,750,000 in the 17th, 7,000,000 in the 18th and over 4,000,000 in the 19th, less than 15,000,000 in all. In the limits of the United States the growth of the black population has been steady and has even since the cessation of the slave trade far outstripped that of any other of the

original groups of Americans. In colonial times the slaves went mainly to the West Indies, and, although a few landed in Virginia as early as 1619, they were not brought to the continent in large numbers until England secured the Spanish contract in 1713. At that time there were perhaps 50,000 Negroes in continental America; by 1727 this had reached 75,000, and the subsequent increase is estimated by Bancroft as follows:

1750.....	220,000
1754.....	260,000
1760.....	310,000
1770.....	462,000
1780.....	511,000

Exact statistics as given by the census reports beginning in 1790 show the following figures for Negro population within the limits of continental United States and excluding dependencies:

DATE	Total negroes	Per cent of increase	Per cent of increase of whites	Per cent of total population
1790.....	757,208	.....	.....	19.27
1800.....	1,002,037	32.33	35.76	18.88
1810.....	1,377,808	37.50	36.12	19.03
1820.....	1,771,656	28.59	34.12	18.39
1830.....	2,328,642	31.44	34.03	18.10
1840.....	2,873,648	23.40	34.72	16.84
1850.....	3,638,808	26.63	37.74	15.69
1860.....	4,441,830	22.07	37.69	14.13
1870.....	4,880,009	9.86	24.76	12.66
1880.....	6,580,793	34.85	29.22	13.12
1890.....	7,488,789	13.79	26.68	11.93
1900.....	8,833,994	18.00	21.20	11.60
1910.....	9,827,763	11.20	22.30	10.70
1920.....	10,463,131	6.50	21.40	9.90

The census of 1870 was defective and probably that of 1890, also, which would explain the chief irregularities in the rate of increase of Negroes. The higher rate of increase of the whites is due to the large immigration.

History.—The history of the Negro in America up until 1863 is largely the history of slavery (q.v.). And yet he was not altogether the passive victim of the system. In the earlier days the tendency was to recognize him as a kind of feudal serf, not essentially different from the white serfs. Consequently, when freed, the free black had in many cases the right to vote and intermarried with the white servant class. Gradually, however, a color caste arose which condemned a person of Negro descent to civil and legal inferiority, no matter whether he was technically a slave or not. The Negroes did not submit to slavery or caste restrictions wholly without a struggle. Before 1850, while the fire of African freedom still burned in the veins of the slaves, there was in all leadership or attempted leadership but the one motive of revolt and revenge,—typified in the terrible Maroons, the Danish blacks and Cato of Stono, and veiling all the Americans in fear of insurrection. The liberalizing tendencies of the latter half of the 18th century brought, along with kindlier relations between black and white, thoughts of ultimate adjustment and assimilation. Such aspiration was especially voiced in the earnest songs of Phillis, in the martyrdom of Attucks, the fighting of Salem and Poor at Bunker Hill, the intellec-

tual accomplishments of Banneker and Derham and the political demands of the Cuffes. Stern financial and social stress after the Revolutionary War cooled much of the previous humanitarian ardor. The disappointment and impatience of the Negroes at the persistence of slavery and serfdom voiced itself in two movements. The slaves in the South, aroused undoubtedly by vague rumors of the Haitian revolt, made three considerable attempts at insurrection,—in 1800 under Gabriel in Virginia, in 1822 under Vesey in Carolina and in 1831 again in Virginia under Nat Turner. In the free States, on the other hand, a new and curious attempt at self-development was made. In Philadelphia and New York color-proscription led to a withdrawal of Negro communicants from white churches and the formation of a peculiar socio-religious institution among the Negroes known as the African Church,—an organization still living and controlling in its various branches over a million of men.

Walker's wild appeal against the trend of the times showed how the world was changing after the coming of the cotton-gin. In 1830 slavery seemed hopelessly fastened on the South, and the slaves thoroughly cowed into submission. The free Negroes of the North, inspired by the mulatto immigrants from the West Indies, began to change the basis of their demands; they recognized the slavery of slaves, but insisted that they themselves were freemen, and sought assimilation and amalgamation with the nation on the same terms with other men. Thus, Forten and Purvis of Philadelphia, Shad of Wilmington, Du Bois of New Haven, Barbadoes of Boston and others strove singly, and together as men, they said, not as slaves; as "people of color," not as "Negroes." The trend of the times, however, refused them recognition, save in individual and exceptional cases; considered them as one with all the despised blacks; and they soon found themselves striving to keep even rights they formerly had of voting and working and moving as free men. On the other hand, it was impossible to suppress wholly the upward struggles of the free Negro or even of the exceptionally gifted slaves. When the war with England broke out, Negroes fought in the ranks; they helped man the victorious ships in the struggle of 1812, and finally in the Civil War turned the scale of victory for the North at a critical point. The number of free Negroes was as follows:

1790.....	59,466
1800.....	108,435
1810.....	186,476
1820.....	233,631
1830.....	319,599
1840.....	386,293
1850.....	434,495
1860.....	448,070
1870.....	4,880,009

Barred out of the labor market by slavery, on the one hand, and color prejudice, on the other, these Negroes were in a desperate condition; and even in the free States "black laws" curtailed their civil rights. Nevertheless, they struggled bravely. In 1830 they held their first national convention in Philadelphia, and began to agitate for civil rights and education, and to discuss schemes of migration to Canada and elsewhere. As the abolition movement grew it received substantial aid from free

Negroes; it was in a Negro church in Boston that the American Anti-Slavery Society was formed, and the first subscribers to Garrison's *Liberator* came from a Philadelphia Negro, James Forten. Led by Remond, Nell, Wells-Brown and Douglass, a new period of self-assertion and self-development dawned. To be sure, ultimate freedom and assimilation was the ideal before the leaders, but the assertion of the manhood rights of the Negro by himself was the main reliance, and John Brown's raid was the extreme of its logic. After the war and emancipation, the great form of Frederick Douglass, the greatest of American Negro leaders, still led the host. Self-assertion, especially in political lines, was the main program, and behind Douglass came Elliot, Bruce and Langston, and the Reconstruction politicians, and, less conspicuous but of great social significance, Alexander Crummell and Bishop Daniel Payne.

Civil Rights.—As a slave, the Negro could be (1) sold or given away by his legal owners, (2) seized for debt, (3) separated from his family, (4) could own no property, (5) had no right to vote, (6) could not hold office, (7) nor could he testify in a court of law, save in suits for his own freedom. (8) He could not legally marry, (9) nor trade or make contracts. (10) He could not move about without permission, (11) could be punished corporally and even killed by the master in some cases and (12) was not permitted to learn to read and write. Being thus legally deprived of all essential rights of manhood, he was utterly defenseless before the aggressions of the unscrupulous, even in matters of life and limb. Free Negroes in slave States, like Virginia and North Carolina, were disfranchised early in the 18th century; later their right to testify in courts was taken away, then the right to hold any office, and finally legal pressure was brought to bear in the shape of vagrancy laws and curtailment of economic freedom, so as to force them into slavery or drive them from the State.

The free Negroes of the North were very generally subject to codes of "Black Laws" which varied from State to State. Those of Ohio as adopted and amended in 1804, 1807, 1824, and later, prohibited Negroes from settling in the State unless they could show a certificate of freedom and give bonds guaranteeing good behavior and self-support; a Negro was disqualified from testifying in court trials where a white person was a party, or to serve as a jurymen in any case; his children were excluded from the public school; finally he could not vote. Some States had less rigorous laws and tended to alleviate the position of the blacks; others tended toward greater restrictions.

When the Civil War came, despite disclaimer and compromise, the Negro was the central issue. The first pressing question was the treatment of fugitive slaves; Butler confiscated them as "contraband of war," Fremont sought to free all slaves and Halleck sought to catch and return them. Finally beginning at Port Royal, S. C., under Pierce and extending to Fortress Monroe, New Orleans, Vicksburg, Cairo and wherever these fugitives were massed, there grew up systems of controlled Negro labor under the guardianship of government officials. General Banks, for instance had

90,000 ex-slaves under him in Louisiana, with 50,000 laborers under his guidance and an annual budget of \$100,000. He made out 4,000 pay rolls a year, registered the freedmen, inquired into and redressed all grievances, laid and collected taxes and established a public school system. Colonel Eaton in Tennessee, General Saxton in South Carolina and others had similar work in charge.

Meantime, missionary and freedmen's aid societies began sending money, clothes and teachers south, and there was a demand that the government take hold of this work, unify it and help make easier the transition of 4,000,000 persons from slavery to freedom. This was the genesis of the Freedmen's Bureau. This "Bureau of Refugees, Freedmen and Abandoned Lands" was established as a part of the War Department by the Act of 1865, and was modified and extended by the Act of 1866; the larger part of its functions ceased in 1869. General O. O. Howard conducted this Bureau and "scarcely any subject that has been legislated upon in civil society failed at one time or another to demand the action of this singular Bureau." The Bureau had in its period of greatest activity 900 officials scattered from Washington to Texas. Their work included (1) the relief of physical suffering caused by the war; (2) the overseeing of the beginnings of free labor; (3) the buying and selling of land for the freedmen; (4) the establishment of schools; (5) the payment of bounty money to Negro soldiers; (6) the administration of justice between white and black in the Bureau courts.

The Bureau distributed 21,000,000 free rations in 50 months, treated 500,000 patients in 60 hospitals and asylums, transported 30,000 fugitives back to the plantations, and made many thousands of contracts for the new free laborer. Little was done in the matter of furnishing the freedmen with land, as the confiscated plantations were restored under the amnesty measures; but aided by the "carpet-bag" governments and the missionary societies a system of common schools and higher institutions was founded and nearly \$6,000,000 spent on it. The Bureau courts were not successful and the general attitude of the whites was bitterly hostile to the institution. Such was the work of the Freedmen's Bureau. To sum it up in brief, we may say: it set going a system of free labor; it established the black peasant proprietor; it secured the recognition of black freemen before courts of law; it helped to found the free public school in the South. On the other hand, it failed to establish good will between ex-masters and freedmen; to guard its work wholly from paternalistic methods that discouraged self-reliance; to make Negroes landholders in any considerable numbers. Its successes were the result of hard work, supplemented by the aid of philanthropists and the eager striving of black men. Its failures were the result of bad local agents, inherent difficulties of the work and national neglect. The Freedmen's Bureau expired by limitation in 1869, save its educational and bounty departments. The educational work came to an end in 1872, and General Howard's connection with the Bureau ceased at that time. The work of paying bounties was transferred to the Adju-

tant-General's office, where it was continued three or four years longer.

The Freedmen's Bureau really ended in the 14th and 15th Amendments to the Constitution (1868 and 1870) giving Negroes the right of suffrage. The last efforts of Charles Sumner were given to the Civil Rights Act of 1875, which forbade the exclusion of Negroes from public conveniences and places of entertainment on account of color. This was afterward declared an interference with the rights of the States by the Supreme Court, and, therefore, unconstitutional. The matter of civil rights of Negroes is, therefore, to-day left to the States, and has resulted in widespread discrimination in the former slave States. Whites and Negroes are separated in schools, railway trains, hospitals, jails and graveyards by law, and by custom in hotels, theatres, lectures, libraries and churches, and often in street cars and elevators. Beside this there is a tendency to limit all economic and social intercourse to the barest amount necessary among neighbors. Inter-marriage is forbidden and the concubinage of black women, though decreasing, is still considerable; and while it is very difficult to secure the punishment of a white man who violates a black woman, the black man who is even accused of rape against a white woman is usually lynched before he has had a legal trial. These separating laws and centrifugal tendencies have gone beyond reason, and the better thought of the South realizes it. In the future it is probable that lynching will cease, and kinder intercourse be cultivated.

Political Rights.—Free Negroes voted in many of the colonies in early times, when otherwise qualified, but later the privilege was taken away, as in Virginia in 1723. In the free States they continued to vote, but later were restricted sometimes by special qualifications, as in New York in 1821, or by limiting the suffrage to whites, as in Pennsylvania in 1838. The 14th Amendment to the United States Constitution sought to penalize States which reduced the electorate, and the 15th Amendment made discrimination on account of race and color in the qualification of voters illegal. These enactments were made necessary by the opposition of the South to the Freedmen's Bureau and the evident determination of the Southern legislatures to re-enslave the freedmen to all intents and purposes by civil restrictions, vagrancy laws and special legislation. The result of the Amendments was to throw the government of the Southern States largely into the hands of the freedmen during the years 1866-76. So, sudden increase of the electorate in any community would mean a period of disturbance and difficulty, but with honest leadership the outcome might have been different. As it was, dishonest and self-seeking politicians from both North and South sought to use the ignorant Negro voters for their own ends, and much extravagance and some misgovernment ensued. Nevertheless, it has been truly said of these Negro governments:

They obeyed the Constitution of the United States, and annulled the bonds of States, counties, and cities, which had been issued to carry on the war of rebellion and maintain armies in the field against the Union. They instituted a public school system in a realm where public schools had been unknown. They opened the ballot box and jury box to thousands of white men who had been debared from them by a lack of earthly possessions. They introduced home

rule into the South. They abolished the whipping post, the branding iron, the stocks and other barbarous forms of punishment which had up to that time prevailed. They reduced capital felonies from about twenty to two or three. In an age of extravagance they were extravagant in the sums appropriated for public works. In all of that time no man's rights of person were invaded under the forms of law. Every Democrat's life, home, fireside and business were safe. No man obstructed any white man's way to the ballot box, interfered with his freedom of speech or boycotted him on account of his political faith.

And a Negro legislator of that period in South Carolina said in defense of his race that the men who criticised the extravagance of the period between 1869 and 1873 failed to mention

"Those imperishable gifts bestowed upon South Carolina between 1873 and 1876 by Negro legislators—the laws relative to finance, the building of penal and charitable institutions, and, greatest of all, the establishment of the public school system. Starting as infants in legislation in 1869, many wise measures were not thought of, many injudicious acts were passed. But in the administration of affairs for the next four years, having learned by experience the result of bad acts, we immediately passed reformatory laws touching every department of state, county, municipal and town governments. These enactments are to-day upon the statute books of South Carolina. They stand as living witnesses of the Negro's fitness to vote and legislate upon the rights of mankind."

Nevertheless, by force and fraud the Negro governments were overthrown about 1876, and from that time until the present the Negro has been disfranchised either by physical compulsion or cheating at the polls or ingenious legislation. The effects of these methods were so unfortunate that there arose in the South about 1890 a movement to deprive the Negro of his vote by legal enactment. This has been practically accomplished now in Mississippi, Louisiana, South Carolina, North Carolina, Alabama and Virginia, and movements in that direction have been started in other States. The avowed objects of these constitutional amendments have been (a) To disfranchise no white voter; (b) To disfranchise as many Negroes as possible. This has been accomplished by the following measures:

1. **Illiteracy.**—The voter must be able to read and write. (This discriminates against Negroes because the Negro public school system in the South is much poorer than that of the whites).
2. **Property.**—The voter must own not less than \$300 worth of taxable property and pay taxes on it. (This of course, discriminates against a poverty-stricken race of freedmen who could not legally hold property prior to 1863, and who to-day suffer in economic competition by reason of their color and training).
3. **Poll Tax.**—A voter must have paid his poll tax. (This is a source of discrimination only when it extends back for several years, as in Virginia).
4. **Occupation.**—A voter must have a regular occupation. (This is designed to shut out Negro laborers, and is a source of discrimination because of the difficulty of proving its truth).
5. **Army Service.**—Soldiers or their descendants may vote. (Thoroughly vicious like the preceding).
6. **Character.**—Persons of "good character" who "understand the duties of citizenship may vote." (This is a source of much discrimination and puts too much power in the hands of the registrars).
7. **"Grandfather" Clause.**—Persons who could vote 1 Jan. 1867 or their descendants may vote if registered within a limited time. (This is a thoroughly vicious attempt to admit ignorant white voters when the same class of blacks are barred).
8. **"Understanding" Clause.**—Persons may vote who "understand" a clause of the Constitution and can explain it when read to them. (Another indefensible provision designed to shut out blacks arbitrarily by placing large powers of discretion in the hands of local registrars.)

Thus far States have adopted the above qualifications as follows:

Mississippi.—The literacy (1) qualification or the "understanding" clause (8) together with the poll tax (3) provision.

Alabama.—The army service (5) and character. (6) clauses for persons registering prior to 1903; thereafter the literacy clause (1) and occupation clause (4), or the property qualification (2).

South Carolina.—For those registering before 1898, the literacy clause (1) except that writing is not required, or the understanding clause (8); after 1898 the literacy (1) or property (2) qualifications.

Louisiana.—Literacy (1) or property (2) clauses, in addition to the "grandfather" clause (7) which originated here.

North Carolina.—Literacy (1) and poll tax (3) provisions, and "grandfather" clause.

Virginia.—For those registering before 1904, army service (5) or property clauses (2); or literacy (1) and understanding clauses (8). After 1904, poll tax clause (3) providing the tax has been paid for three years, and literacy clause (1). Army service (5) excuses from the poll tax (3).

Georgia.—Literacy clause (1) or property clause (2) or Army service (5) or character clause (6).

The more flagrant provisions of these laws are unconstitutional and the "Grandfather" clauses have already been declared null and void by the United States Supreme Court. If the Negroes progress in the future as hitherto they cannot permanently be deprived of the suffrage.

Economic Status.—The occupations of Negroes according to the latest census report were as follows showing 71 per cent of total Negroes 10 years of age and over in gainful occupations:

Agriculture, etc.	2,893,380
Domestic and personal service.	1,112,182
Manufacturing and mechanical industries	631,421
Transportation	255,969
Trade	119,491
Professional service.	67,245
Extraction of minerals.	61,129
Public service.	22,382
Clerical occupations.	19,336

This shows that most of the freedmen's sons are farmers and servants, as one would expect.

Statistics of ownership of property show that in the Southern States Negroes owned 430,449 homes or 22.4 per cent of all the homes which they occupy. The corresponding figure for 1890 was 18.9 per cent. If we consider particularly Negro farmers, we find that in the country districts of the South emancipation has been but partial, and that the Negro serf is still bound to the soil by peonage, plantation stores and a system of crop mortgages. Nevertheless 922,914 Negro farmers in 1920 operated farms with a total area of 41,318,496 acres. Of the farms operated 217,584 were owned by Negroes.

Colored owners increased 16.8 per cent during the decade from 1900 to 1910, and the land in these farms from 15,976,098 to 19,076,463.

Beside these independent farmers there are a vast number of Negro laborers, who raise the crops on the farms of the white farmers.

Negroes are just entering into lines of commercial business. There are 20,653 retail dealers, 953 undertakers, 336 bankers, 1,833 insurance agents and officials.

A list of the principle specific occupations of Negroes in the United States follows:

SEX AND OCCUPATION.

Males	3,178,554
Farm laborers	981,922
Farmers	798,509
Laborers — building and hand trades	166,374
Laborers — saw and planing mills	91,181
Laborers — steam railroad	86,380
Porters, except in stores	51,471
Draymen, teamsters, and expressmen	50,689
Coal mine operatives	39,530
Laborers, porters, and helpers in stores	36,906
Waiters	35,664
Laborers — road and street building and repairing	33,914
Cooks	32,453
Deliverymen — stores	30,511
Carpenters	30,464
Janitors and sextons	22,419

Barbers, hairdressers and manicurists	19,496
Retail dealers	17,654
Clergymen	17,427
Longshoremen and stevedores	16,379
Laborers — brick, tile and terra-cotta factories	15,792
Firemen (except locomotive and fire department)	14,927
Lumbermen and raftsmen	14,005
Laborers — blast furnaces and rolling mills	13,519
Hostlers and stable hands	12,965
Laborers — public service	12,767
Brick and stone masons	12,401
Garden laborers	11,801
Laborers — domestic and personal service	10,380
All other occupations	500,699

Female 2,013,981

Farm laborers	967,837
Laundresses (not in laundry)	361,551
Cooks	205,939
Farmers	79,309
Dressmakers and seamstresses (not in factory)	38,148
Teachers — (school)	22,441
Nurses (not trained)	17,874
Chambermaids	14,071
Laundry operatives	12,196
Housekeepers and stewardesses	10,021
All other occupations	284,594

Social Condition.—The illiteracy of the Negro population 10 years of age and over has decreased as follows:

	Per cent
1870	80
1880	70
1890	57.1
1900	44.5
1910	30.4
1920	22.9

In the parts of the United States where deaths are regularly registered the death-rate of Negroes was 32.4 per 1,000 in 1890, 30.2 in 1900 and 25.5 in 1910. The corresponding figures in cities are 33.7, 31.1 and 27.5. In neither case do these figures apply to those rural districts where the Negro population is massed.

In 1914 the Negro death rate had fallen to 21.9 per thousand as compared with 13.1 for the whites. Comparison as to specific diseases shows these rates per 10,000 living:

	White	Colored
Typhoid	14.3	35.9
Malaria	1.6	14.8
Whoopingcough	9.2	32.0
Influenza	8.6	18.8
Tuberculosis of the lungs	115.2	363.8
Pneumonia	122.0	220.8
Nephritis, etc.	98.8	168.5

The high record for diseases of the lungs shows a progressive decrease.

	1890	1900	1914
Consumption	546.11	490.6	363.8
Pneumonia	278.97	349.0	220.8

The Negro death rate is lower for Negroes than whites in measles, scarlet fever, diphtheria and cancer. Infant mortality among Negroes is still very high.

There were during the year 1910 112,436 colored prisoners committed and 103,267 discharged. On 1 Jan. 1910 there were 42,631 prisoners in confinement, of whom 41,729 were of Negro descent. Unfortunately comparisons with former census reports are impossible, owing to differing methods, but the commitments for petty crimes of misdemeanors would seem high.

The home life of the Negro has greatly improved since emancipation. The one room cabin is slowly disappearing, the chastity of girls is being protected more effectively and the development of social classes and organizations has received great impetus.

The habitat of the Negro population has shown no great change until the recent migration northward. The centre of Negro population is in De Kalb County, Ala. South Carolina and Mississippi have over half their population Negro; Louisiana, Alabama, Georgia and Florida have from 37½ to 50 per cent Negro; Arkansas, Virginia and North Carolina have from 25 per cent to 37½ per cent.

THE NEGRO POPULATION SECTIONS IN 1920.	
South Atlantic.....	4,325,120
East South Central.....	2,523,532
West South Central.....	2,063,579
Total South.....	8,912,231
New England.....	79,051
Middle Atlantic.....	600,183
East North Central.....	514,554
West North Central.....	278,521
Total North.....	1,472,309
Mountain.....	30,801
Pacific.....	47,790
Total West.....	78,591

Following the Civil War the dearth of labor caused a considerable migration from the South northward. In 1922-23 this emigration was very pronounced, the number of such emigrants for the year ending 1 Sept. 1923 being estimated by the United States Department of Labor at 478,700.

In 1860 only 4.2 per cent of the Negroes were in cities of 8,000 or more inhabitants; in 1890 this had increased to 12 per cent. In 1910 the urban Negro population numbered 2,684,797 and the rural, 7,142,966; in 1920, Negroes in cities numbered 3,559,473 and those in the country, 6,903,658.

The church census of 1906 showed 36,770 Negro church organizations, with churches seating 10,481,738 persons, and property valued at \$56,636,159. There were 3,685,097 church members. The largest churches are the Baptists (2,261,607 members) and the Methodists (M. E., 308,551 members; African M. E., 494,777 members; African M. E. Zion, 184,542 members; Colored M. E., 172,996 members).

Amalgamation of Blood.—The Negroes of America are not of pure Negro blood. There has gone on in the country first an intermingling of the various African tribes transported and, secondly, a large infusion of white blood. The census reports of this latter intermingling are admittedly far below the truth:

1850.....	405,751	mulattoes or	11.2%	of all Negroes
1860.....	588,352	"	13.2%	" "
1870.....	585,601	"	12.0%	" "
1890.....	1,132,060	"	15.2%	" "
1900.....	2,050,686	"	20.9%	" "

Literature and Art.—The chief contribution of the Negro to American art has been his beautiful and plaintive folkmusic. This music has been developed by composers like J. Rosamond Johnson and Harry Burleigh. Henry O. Tanner, the artist; W. S. Braithwaite, the poet and critic; Charles W. Chesnut, the novelist; and Kelly Miller, the essayist, are colored. Other distinguished Negroes have been Frederick Douglass, the Abolitionist; Paul Laurence Dunbar, the poet; Ira Aldridge, the actor; Daniel Payne, the bishop, and Booker T. Washington, the educator.

References.—The history of the Negro prior to emancipation will be found in the

abundant literature of slavery. Official sources of information are the United States census reports, especially 1850-1900.

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W. E. B. Du Bois,
Author of 'The Souls of Black Folk'; 'The Negro,' etc.

NEGRO DISFRANCHISEMENT. Negroes have been practically disfranchised in the States of Alabama, Kentucky, Louisiana, Mississippi, North Carolina, Virginia, South Carolina and Georgia. The chief method used in disfranchising the negro in the Southern States has been and is a high educational test as a qualification for voting, which includes the ability to "interpret" any part of the State constitution. The so-called "grandfather clause," by which any person who voted in or before 1867 or 1868 (the details of the law differed in different States) was entitled to a vote, was nullified by the United States Supreme Court for the States of Maryland and Oklahoma on 21 June 1915. The first Constitutional Convention disfranchising the negro was that held in Mississippi in 1890; when the educational qualification mentioned above was made part of the constitution of the State. Previous to that time the imposition of a poll tax was for some years effective in the Southern States. The other constitutional means of disfranchising the negro, to quote Prof. Charles A. Beard's 'Contemporary American History,' are "a small property qualification" and "the wide extension of disfranchisement for crimes by including such offenses as obtaining money under false pretenses, adultery, wife-beating, petit larceny, fraudulent breach of trust, among those which work deprivation of the suffrage."

NEGRO EDUCATION. The first problem of the South was to enlighten the Negroes brought from the African wilds. In accepting the institution of slavery, intelligent masters were easily convinced that Negroes who had some conception of modern civilization and understood the language of their owners would be more valuable than wild men with whom one could not communicate. Not a few slaveholders, however, believing that slaves could not be enlightened without developing in them a love for liberty, maintained that the more brutish the bondmen the more pliant they become for purposes of exploitation. The attitude of the Southern white people toward the Negroes, therefore, had been variable, but the unbenevolent planters finally won the majority of Southerners to their way of thinking and determined that Negroes should not be elevated to the dignity of manhood.

The early advocates of the education of the

Negroes were masters who desired to increase the efficiency of their labor supply, sympathetic persons who wished to help the oppressed and zealous missionaries sent out for the propagation of the gospel in the New World. Of these three classes the masters were the most effective. The slaveholders, then, just as planters do now, dealt with the situation to suit themselves regardless of public opinion and the law. When measures were passed to prohibit the education of slaves some masters continued to teach Negroes in defiance of the hostile legislation. Sympathetic persons, however, did not accomplish much. Like many of the Northerners whose interest in the Negro to-day is limited to an academic discussion of the race problem, these persons were content to dwell in practically free settlements far from the plantations on which the bondmen lived. The missionaries were generally successful in teaching Negroes, especially after the removal of their greatest impediment through the abrogation of the unwritten law that a Christian could not be held a slave. The French and Spanish Catholics, the Puritans, Anglicans, Quakers, Presbyterians, Methodists and Baptists shared this important task.

This movement, however, was to develop into something more potential than that of merely enlightening the blacks to bring them into the church. The necessary impetus was supplied by the spreading of the nascent social doctrine incident to a general study of the political philosophy of Milton, Blackstone, Baxter and Locke to justify the coming of the lowly to power. When Patrick Henry and James Otis demanded liberty for the colonists, Daniel Appleton, John Woolman, Anthony Benezet and Mathew Clarkson demanded the liberation of the Negroes' bodies that they might enjoy freedom of mind. These reformers were somewhat successful. The frequent acts of emancipation which followed this change in the attitude toward persons of color turned loose upon society a large number of men whose chief needs were education and training in the duties of citizenship. The result was that friends of the colored people established throughout the country a number of schools which effected a material change in the condition of the blacks and served them so well that many of these institutions are intact to-day.

These new efforts made possible more significant achievements throughout the country. Negroes became more useful as servants, some proved to be first-class artisans and not a few exhibited the power to rise in the business world. It was the day of Cæsar, the doctor, Phyllis Wheatley, the writer of verse, Andrew Fuller, the mathematician, and Benjamin Banneker, the surveyor and astronomer. Even slaves attached to the masters' homes learned the rudiments of education in schools maintained for white children. A few bondmen were reading and writing French, Spanish and German. Some of them were associated with indentured servants in the teaching of white persons.

The more general advancement of the Negroes, however, was made in their religious development. The American Revolution effected a remarkable change in the attitude of Christians toward the black population.

Negroes were extensively instructed by pious whites, many of them were taken into the church on the basis of equality and a few were trained to share the propagation of the gospel among the neglected classes. They so impressed their hearers that scores of them were invited to preach to white congregations. Among those who enjoyed this privilege were Jacob Bishop, sometime pastor of the First Baptist Church (white), Portsmouth, Va.; John Chavis, Henry Evans, Ralph Freeman, Harry Hosier, Black Harry of Saint Eustatius, Lemuel Haynes and S. R. Ward.

These favorable conditions, however, did not continue in many parts of the South later than the second quarter of the 19th century. The rapid strides of certain Negroes and the tendency of some to organize insurrections could not but startle a large number of Southerners who easily found reason for eliminating them from the higher classes and making them tools in the hands of the rich planters produced by the industrial revolution. In the most Southern States, therefore, laws were enacted to reduce the negroes to the plane of beasts. These measures not only put an end to the helpful contact of the Negroes with white people but closed the colored schools and made it a crime for a Negro to teach his own child. Slaves once sought as valuable because of their mental development were thereafter regarded as dangerous to the peace of the South. Having then no incentive to struggle upward, most slaves tended to become heathen-like, and Negroes brought in the rough from Africa found among their fellows in the Christian world nothing to encourage the pagan to live a better life. Ignorance of the fact that a degraded laboring class is an impediment to the economic progress of the country, the South paid this price to protect its pet institution.

Ambitious slaves and free Negroes could not suffer the humiliation which such a reaction entailed. Many of them, therefore, moved North and established settlements to which fugitive slaves learned to repair. The coming of these people to the North increased the number of progressive Negroes in that section, making possible greater achievements in education. In Washington and Baltimore, though not in the North but more liberal than the lower South, free Negroes accumulated sufficient wealth to make themselves comfortable and to provide for their posterity. Many became owners of property in Philadelphia as they had there the assistance and protection of the Quakers. In New York the economic progress of the free Negroes was referred to by the anti-slavery societies as the reason why they could provide better facilities of education for their children. It was not uncommon to find a property holder, a trader or merchant among the Negroes of New England. Later in the first half of the last century, however, less progress was noted. The change came when the intolerable conditions in the South drove Negroes to Northern communities where, on account of the fear of being burdened by undesirables, some white people not only ceased to help them, but undertook to frighten them from that section.

The progress of the free blacks in favorable Northern communities, however, convinced a

few Southerners that the attitude of their sections toward the uplift of the Negroes was wrong. Men of both sections, therefore, endeavored to show that the South was its own tremendous handicap. Certain planters in North Carolina and Georgia began to advocate the repeal of the laws which prohibited masters from teaching their slaves to read. In North Carolina the matter ended with bringing a memorial on this subject before the legislature. The reform party of Georgia, however, carried the matter further. A bill providing for the repeal of the undesirable law was introduced in the legislature, piloted through the lower chamber and all but enacted in the upper house. These facts show that had not the Civil War broken out as early as it did the South would have for economic reasons taken other steps for the improvement of the Negroes.

The forces effective in the development of Negro education since the Civil War have been the enterprise of the negroes themselves, their Southern friends and philanthropists of the North. Negro teachers who had braved the dangers of disregarding public opinion and even of violating laws hostile to their education eagerly grasped the opportunities vouchsafed by the triumph of the Union forces. They at once became, so to speak, shining lights which had long lay hidden under a bushel. Many Negroes who, because of the persecution of those of their race known to be enlightened, had never posed as educated persons, were found to be well equipped for this important work of the remaking of the race through education.

More successful than these, however, were the teachers and preachers of the white race, who volunteered to work among the freedmen. At first there were teachers among the victorious Union soldiers, who gave the Negroes in certain parts of the South their first opportunity for enlightenment. Then came the more effective work of the representatives of the numerous northern agencies intended to elevate the Negroes. Desiring to promote liberal education these workers established a number of schools, sometimes undertaking the work of colleges and universities, with a view to offering the undeveloped mind of the Negro every opportunity for growth. Yet although having a common impulse and struggling to reach the same end, these agencies, to some extent, defeated their own purposes through failure to systematize their efforts and co-operate with others in the field. Their most unfortunate blunder was to undertake to do for the Negro through education, in a generation, what it had not done for the white race in centuries.

There arose too a number of schools resulting from the initiative of the Negroes themselves. These, however, following in the footsteps of the systems already in the field, promoted in many cases a reduplication of effort for special ends as they were too often founded by ambitious leaders and supported by Negro churches for denominational reasons. But these schools have been decidedly helpful, not only in the actual work done, but in showing the initiative of the Negro and his determination to be educated even at his own expense; they have been a factor in securing aid from others. Persons called upon to aid Negro educa-

tion always give serious consideration to what the Negroes have done for themselves.

Along with these institutions worked also those established by the State. The Negroes themselves gave the South its first effective public schools during the Reconstruction period. As these systems, however, were democratic, giving equal facilities to the Negro and sometimes even the privileges of the coeducation of the blacks and whites, this work was undone, when the aristocratic whites regained control. These radicals, however, did provide for some sort of education of the Negro in segregated public schools. These schools have never been adequate to the crying need for the education of the masses, but as a result of the interest of certain liberal Southerners like Haygood, Curry, Ruffner, Northern, Vance and Dillard, they have been considerably improved. The Negro public schools, however, have always constituted an impoverished group, the sum spent on colored pupils per capita, even to-day, being \$2.89, while that for the white schools is \$10.32. Above these common schools the Southern States have established also 28 higher institutions, 16 of which are supported partly by the Federal government as land grant schools. The total income of these institutions to-day is \$963,611 and the value of their property \$5,727,608. The annual income of the land grant colleges is \$544,520. The Federal government appropriates to their support \$259,851 of this amount and the States \$263,094.

These appropriations being inadequate, the Negro has had to depend in many cases on Northern philanthropy. The North, therefore, has been called on not only to send its sons and daughters as teachers of Negroes, but has purchased for them school property valued at \$26,191,892 and contributes annually \$2,645,577 to the support of their schools. The total annual income for current expenses in all colored private schools is now \$2,026,460 and the value of the plant equipment and endowment of the same \$28,496,946.

These schools as a whole, though inadequately supported, rendered valuable service. A majority of the useful Negroes now serving their race effectively were trained in these institutions. It was evident, however, that this educational system did not supply the needs of an undeveloped people. They were not sufficiently equipped to compete with the white institutions in achievements in the literary world and failed to enable the Negro to solve the problem of their economic struggle. Thereupon appeared Booker T. Washington, who in emphasizing the Hampton idea of education effected a revolution by dissociating it from leisure and luxury and connecting it with the life of the individual. The movement for the enlightenment of the Negro, therefore, has been well worth while, if it had done nothing more for the world's good than to produce Booker T. Washington, the only American who has ever revolutionized an educational system.

This leader's task in inducing the world to recognize the sanity of his educational program was not easy. There was a natural antagonism to be expected from those enthusiastic white people who, believing that the Negro was to have special problems to solve, contended that the problem of promoting his gen-

eral progress could be soon solved by their policy of educating him along traditional lines. It provoked, moreover, the fiercest opposition from the misguided talented tenth of the Negroes whose lack of foresight made them the irreconcilable enemies of Booker T. Washington. The opposition of the Negro to Mr. Washington was not due so much to the work of the man himself as to the manner in which the South interpreted his educational theory. Misunderstanding the foresight of this great man, the South welcomed industrial education as an opportunity so to reconstruct the school system of the South as to make education mean one thing for the white man and another for the Negro, giving the white man the exclusive privilege of studying literature and philosophy, while the Negro should be taught to use his hands skilfully in the service of the superior class. Southern States soon ceased to appropriate money to the support of the academic education of the Negroes, diverting these funds to industrial education; and Northern philanthropists, at first adverse to this policy, yielded to it in a generation. Divested of these misconceptions and shorn of its rough edges the theory brought forward by Booker T. Washington has been accepted by the world as a great lesson for the education of all men of all conditions.

Finally, one must naturally inquire as to what all of these agencies have accomplished. They have produced the majority of our teachers of Negroes, most of their preachers, many of their physicians, dentists and pharmacists, not a few of their lawyers and a considerable number of progressive business men. They have been a decided encouragement to thrift as is attested by the Negroes' ownership of 30,000,000 acres of land, valued, together with other property, at over \$1,000,000,000, yielding the government a tax to support Negro schools and further voluntary contributions of one-half a million annually to the fund for the extension of the school term. They have taught the Negroes self-help, in that they not only assist but have been moved to take the initiative in establishing 153 schools themselves, with an annual income of \$380,933, and property valued at \$2,307,054. Above all, these institutions have reduced the illiteracy of the Negroes from 90 per cent to 30 per cent. In fact, during the last 50 years the Negro race has been actually remade by the work of these schools.

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NEGRO EXODUS, in American history, a term applied to the emigration of Southern Negroes to the West and Southwest in 1879 and 1880. During these years upward of 50,000 negroes, men, women and children, moved to Kansas, and as many more were scattered among the other Western States. So many of the emigrants were penniless and destitute that a Freedmen's Relief Association was organized among the citizens of Kansas. The movement proved so disastrous that emigration ceased at the close of 1880. The Negroes undoubtedly removed to the West to better their condition, but the charge was openly made that the movement originated with the Republican party, in order to ensure the election of Republican presidential electors in doubtful States. The Nashville Colored Convention (1879) endorsed the emigration, on the ground that the blacks suffered many disadvantages, both political and social, in the South. Consult articles by Greener, R. T., and Douglass, F., in *Journal of Social Science* (Vol. XI, Boston 1888), and Runnion, 'The Negro Exodus' (in *Atlantic Monthly*, Vol. XLIV, Boston 1879).

NEGRO FREE STATE. See LIBERIA.

NEGRO MELODIES. In slavery days the Southern negroes were noted for their field and cabin songs and dances. Many of their original plantation songs had been handed down from their African ancestors. The tunes, while melodious, had a range of a few notes, the major key predominating. They consist of a half recitative, half musical song, marked by a regular tempo. Accents and chords are introduced, producing in many instances original and strikingly harmonious effects. Following the ances-

tral melodies came the tunes adapted from Baptist and Methodist hymns. After the war the Negro songs began to disappear and nondescript Afric-European melodies, which eventually developed into ragtime, became popular in both the North and South. This change was due to two causes: the desire of the freed slaves to throw aside all remembrance of slavery days and to the widespread development of modern Negro minstrelsy. Consult Ritter, F. L., 'Music in America' (new ed., New York 1900); Edwards, C. L., 'Bahama Songs and Stories' (ib. 1895); Marsh, J. B. T., 'The Story of the Jubilee Singers and their Songs' (Boston 1880); Krehbiel, H. E., 'Afro-American Folk Songs' (New York 1913).

NEGRO MINSTRELS, a species of musical entertainment of a quaint and simple kind, which originated among the negroes of the southern United States, and was first made popular at public entertainments by E. P. Christy, the originator of the troupes of imitation Negro musicians. The words of the songs are generally in broken English and the harmonies almost entirely limited to the chords of the tonic and dominant. The bones and banjo and tambourine are the chief accompanying instruments, but minstrel troupes are usually accompanied by orchestras. Their entertainments are not now exclusively musical, but include amusing interludes, dramatic sketches, dancing, acrobatic and similar performances.

NEGRO MONKEY, the name of several monkeys noted for the blackness of their coats; especially a large long-tailed East Indian and Malayan langur (*Semnopithecus maurus*), which is reddish when young.

NEGRO PLOT, in American history, the name given to a local rebellion in New York City in 1741. On 18 March of that year a fire occurred in the chapel and barracks at Fort George at the Battery. It was generally believed to be accidental, but charges were set afloat that it arose from a plot by the Negroes to burn the city. Eight other fires of a mysterious nature within a month strengthened this belief, and later one Mary Burton, a servant, furnished testimony implicating a number of sailors and Negroes. Twenty-four whites and 154 Negro slaves were seized and imprisoned. Finally Mary Burton's accusations inculpated persons of prominence known to be innocent, the delusion instantly abated and the prisons were cleared of victims. It was charged that the Spanish were inciting plots among the Negroes through Roman Catholic priests. Four whites were hanged, 18 Negroes hanged, 14 burned at the stake and 71 transported. The Negroes had no counsel and were executed on insufficient evidence. Many confessed to save their lives and accused others.

NEGRO (nā'grō) **RIO**. See **RIO NEGRO**.

NEGRO SUFFRAGE. See **ALIENS**; **ELECTORAL QUALIFICATIONS**; **WOMAN SUFFRAGE**; **ELECTIONS**; **NATURALIZATION**; **VOTES**, **VOTERS**, **VOTING**; **UNITED STATES — SUFFRAGE**.

NEGROPONT, nē'grō-pōnt. See **EUBŒA**.

NEGROS, nā'grōs, Philippines, an island lying southeast of Panay, west of Cebu, and northwest of Mindanao, bounded on the north by the Visayan Sea, and on the south by the

Sulu Sea; length, 134 miles; greatest width, 33 miles; area, 4,839 square miles, with dependent islands, 4,994 square miles. It is the fourth island in size of the archipelago.

Topography.—A central mountain range, which divides the island into two almost equal divisions, extends from the extreme northern point to Caladías, only 14 miles from the southern coast; the spurs from this range extending east and west form large valleys. Near the northern end of the range is the Canlaón volcano, also known as Malaspina, 8,192 feet in height; and in the southern summits of the Sierra Dumaguete are two mountain lakes the larger five miles long, the smaller two miles. A few miles southeast of the larger lake are the hot springs of Mainit, and near the coast near Dauén are several sulphur and thermal springs. There are no large rivers, but numerous small streams flowing through the valleys.

Industrial Resources.—The soil is fertile and the vegetable products abundant; they include chocolate of excellent quality, sugar, coffee, rice, tobacco, wheat, cotton, hemp, corn, etc. There are also valuable forests in the interior. Important deposits of coal are found in both eastern and western Negros, and indications of iron in the western part. The most important industry of the island is agriculture; the natives understand methods of irrigation, and use the numerous streams for this purpose; next in importance are the fisheries; turtle shells, sea cucumbers and sea shells are also gathered. Sugar and sugar sacks are manufactured, hydraulic machinery being used in the production of the former; in the eastern part of the island cotton pillows are manufactured, which are used on steamers. A wagon road or trail follows the coast, but there are few roads extending far into the interior; there are only two defiles through the mountain range. All the important towns are on the seacoast and most of the local trade is carried on by water.

People and Government.—The people of the coast are Visayans, and those of the mountains Panayanos; the chief language is Visayan. The island was occupied by United States troops in 1900, and operations were carried on against bands of outlaws and robbers. In 1899 a native constitutional convention was held at Bacólod, and a constitution framed and submitted to the United States authorities, this being the first attempt to institute civil government in the Philippines. A temporary government was proclaimed in July 1899, and in 1901 the Philippine Commission divided the island into two provinces, Negros Occidental (western), whose capital is at Bacólod and Negros Oriental (eastern), whose capital is at Dumaguete, and established civil government similar to that in other provinces. Pop. 460,000. Consult 'Apuntes de la Isla de Negros' (Milan 1894).

NEGRUZZI, nā-groot'sē, Jacob, Rumanian author, son of Konstantin Negruzzi (q.v.): b. Jassy, 11 Jan. 1843. He published his father's complete works; was professor of commercial law at Jassy and after 1885 at Bucharest; founded in 1867 the periodical called *Convorbiri literare* for which he wrote verse, fiction and prose idylls; and translated Schiller into Rumanian. His collected works were published at Bucharest (6 vols., 1894-96).

NEGRUZZI, Konstantin, Rumanian poet and author: b. Jassy, 1809; d. there, 1866. He studied in Jassy and Bessarabia, edited *Dacia Literaria* (1840) with Cogalniceanu and Alecsandri, was a leader in the Liberal party and a minister of Count Cusa, and wrote versions of Pushkin, Kantemir and Hugo: 'The Sins of Youth,' a volume in prose and verse; and the epics 'Aprodul Purice' and 'Lapusneanu.' His complete works were published in 1873.

NEGUNDO, a genus of trees of the maple-family, represented by the box-elder (q.v.).

NEGUS, a beverage made of wine, water, sugar, nutmeg and lemon-juice: so called from Col. Francis Negus, the inventor, who lived in the time of Queen Anne. Negus is also the native title bestowed upon the sovereign of Abyssinia.

NEHALLENIA, in Scandinavian and early Germanic mythology, a goddess who presides over commerce and navigation. She is represented in paintings and sculptures with a branch of fruit and at times with an oar in her hand.

NEHEMIAH (Heb. "the comfort of Yahwe"). A Jewish statesman, holding a position of honor at the court of Artaxerxes I Longimanus (465-425 B.C.) and acting as governor of Judæa for some time during the reign of this king. Our knowledge concerning him is derived wholly from the parts of his memoirs incorporated in the work of the Chronicler. (See **NEHEMIAH**, BOOK OF). The author of Ecclesiasticus xlix, 13, who praises Nehemiah as the restorer of the walls of Jerusalem obviously had no other source and the story in 2 Maccabees i, 18ff, of the restoration of the holy fire, at the command of Nehemiah, by means of a thick liquid called *nephthar*, found in the place where the fire had been hidden, is not likely to have been taken from a lost part of the Memoirs or any other reliable document. His father's name seems to have been Hachaliah or Hakkelliah ("wait for Yahwe"). It has been maintained by Eusebius, Isidore, Générard, Scaliger, Calmet, Carrières and many other scholars that he was a descendant of the old royal family, and this would account for his position as cupbearer which was ordinarily given to persons of distinguished lineage, his allusions to the sins of the house of his fathers (i, 6) and the house or the city of the graves of his fathers (ii, 3, 5), the reason he assigns for not hiding himself in the temple (vi, 11) and the suspicion of his enemies that he had set up prophets to proclaim concerning him in Jerusalem "there is a king in Judah" (vi, 7). But if this were the case it would be strange that his genealogy is not carried back further than to his father, unless indeed it was purposely abbreviated. There is no ground for believing that he was a Levite, as Malvenda, Estius, Cornelius a Lapide, Menochi, Dupin and others have supposed. The Latin Vulgate in 2 Maccabees i, 18, may be interpreted as ascribing to him priestly functions, but not the Greek text. From his own statement we learn that he was cupbearer to King Artaxerxes. Since three Achæmenian rulers bore this name, the text does not render it certain which of them is intended. Van Hoonacker and others were, therefore, free to suppose

that Artaxerxes II Mnemon (404-359 B.C.) may have been Nehemiah's patron. The statement of Ktesias that the butler's office was given to eunuchs, consequently to foreigners, in the time of Mnemon, while in earlier times it was an honor accorded to Persian nobles, seemed to support this view, though the possibility of an occasional exception to the rule must be granted. But the Aramaic papyri found in the archives of the Jewish military colony on the island of Elephantine, which mention the sons of Sanballat in Samaria as early as in 408 B.C., have rendered it exceedingly probable that the reference is to Artaxerxes I. It would then be in the year 445 B.C. that he received his appointment as *pecha*, or governor, in Jerusalem. The occasion for his request to be given this position was a visit by his brother Hanani and some men of Judah. There is no reason for doubting that Hanani was literally a brother of Nehemiah. Batten has plausibly suggested that he only introduced the little company that had recently come from Jerusalem and acted as their spokesman. The conversation between the two brothers is significant. Nehemiah asks "concerning the Jews who had escaped, remaining behind when the exiles were carried away" and Hanani answers that "the survivors left in the province after the exile are in a miserable plight and objects of reproach, seeing that the walls of Jerusalem are broken down and the gates are gone, having been destroyed by fire." Neither Nehemiah nor Hanani knows of any other Jewish community in Judæa than that remaining in the land after the catastrophe in 586 B.C. It has been urged by many scholars that some more recent destruction of the walls must have been meant, partly on the ground of the Aramaic documents in Ezra iv, partly because Nehemiah cannot be thought to have been so greatly excited over the well-known destruction wrought by Nebuchadnezzar more than a century and a half before his time. But whatever may be the conclusion as regards the historic character of Rehum's letter and the answer by Artaxerxes, these documents have nothing to say about a violent destruction of already completed walls. Concerning such an event history is absolutely silent. Nor is there any cause for astonishment in the fact that the descriptions given by the men of Judah brought home very vividly to the prosperous Jewish official in Susa the condition of the city of his fathers, that the thought of the ancestral graves occasioned an outburst of intense grief and that the idea came to him of using the favor he enjoyed with the king to secure permission to repair the walls. It is difficult to see how this request could have been granted without any allusion either by Nehemiah or the king to a rebuilding of the walls by "men coming from Artaxerxes," subsequently stopped by royal decree in view of the past history of Jerusalem, or the destruction of them that has been conjectured, if such things had actually occurred and were in fresh memory.

Having obtained leave of absence for a time and letters to the governors of Trans-Euphratene and the keeper of the king's forest, Nehemiah set out with a military escort. Upon his arrival in Jerusalem he personally inspected the wall, and the account of his famous night-ride

is of great topographical value. He then revealed his project to the priests and the nobles. As soon as the work began, however, difficulties arose. Opponents appeared. Among them was Sanballat, the Horonite, probably governor of Samaria. It is not certain what his birthplace was. His name does not necessarily indicate that he was of a Babylonian family. In the Chaldean and Persian periods, names of this type naturally found their way into Judæa and Samaria. He maintained close relations with the high-priestly family in Jerusalem, and married one of his daughters to a son of Jehoiada, the son of Eliashib. This Sanballat should probably be distinguished from the governor of Samaria by the same name who, according to Josephus, 'Antiquities,' xi, 302 ff., secured from Alexander permission to build a temple on Gerizim and installed his son-in-law Manasseh as high-priest. There was also Tobiah, "the Ammonite slave," possibly a freedman who had risen to an influential position, and Gashmu or Gushamu, the Arab, either a Nabataean from Idumæa or a descendant of the exiles deported from Hejaz to Samaria by Sargon. These men may have been officials under Sanballat. There is no intimation that they ever sent any troops against Jerusalem, or attempted forcibly to interrupt the work. But Nehemiah feared an attack and took all possible precautions against a surprise. He declined the request for an interview with Sanballat and Gashmu at Chephira in the valley of Ono, near Lydda. It is not impossible that they sincerely believed that Nehemiah planned to make Jerusalem independent and himself favored the prophetic enthusiasm that gathered about his name, and therefore sought to make a deal with him. Nehemiah, however, felt sure that they meant to do him mischief. One cannot quite escape the impression that the doughty leader had many admirers among the prophets. It is altogether probable that some of them were hailing him as the coming king of Judæa. One of their number, Shemaiah, whom he consulted in his house, seems to have feared for his life and gave him an oracle advising him to seek refuge in the sanctuary. But Nehemiah's suspicions were aroused, and he finally charged the prophet, who may have been altogether friendly, with an attempt to ruin him. There was apparently no love lost between him and the priestly class. They may have had no objections to the reparation of the walls, and may even have lent a hand in this undertaking. But the presence of a strong representative of the Persian government, though of their race, could not be favorable to their ambitions. Another source of internal dissension was the condition of the laboring people. A levy of peasants had been drafted for the work. Leaving their farms and finding the food supply in the city insufficient, they were facing starvation with their families. The prevailing distress gave the rich Jew an opportunity for profitable business. He was willing to take mortgage on farms and vineyards for ready cash that vanished quickly in a time of famine prices. But as he favored punctuality in the payment of all obligations, sons and daughters had to be sold into slavery. Deprived of his land, without bread for hungry mouths, pitted between money-lender and tax-gatherer, the poor farmer complained that

Jewish brethren, men of the same faith, should be his oppressors. Nehemiah finally called the aristocracy together, inquiring of them if they really demanded payment of debts at such a time, and at a general meeting finely contrasted the readiness of the Jews in Persia to buy the freedom of those who were unfortunate enough to become slaves in heathen households and his own disinterested services to the community with the cruel selfishness of the capitalists in Jerusalem. Several well-to-do-citizens promised that the farmers would have the use of their fields and vineyards, and that they would not demand payment of interest for the time being. How well they kept their pledge we do not know; it is a relief not to be told. Nehemiah expresses the hope that God may not forget how good he has been himself. After 52 days of work, if the text is correct, the reparation of the wall was completed. According to v, 14, he remained as governor until the 32d year of Artaxerxes (433 B.C.). His characterization of the former governors (v, 15), and his complete silence concerning Ezra, render it extremely difficult to accept the view, widely held among critics, that he was immediately preceded by Ezra who is thought to have arrived in 458 B.C. with a large company of exiles and a firman giving him extensive powers. Van Hoonacker's suggestion that Ezra arrived in Jerusalem after Nehemiah has been adopted by Lagrange, Schmidt, Wellhausen and Cheyne. Torrey considers Ezra as a wholly fictitious character created by the Chronicler. Wellhausen and Cheyne assumed that in Ezra vii, 8 the original text had some other figure than seven, possibly 27, so that Ezra's mission would perchance fall in 438 B.C.; but this is not very likely and has no manuscript authority. In the light of the Elephantine papyri, it appears most probable that Ezra left Babylonia in the seventh year of Artaxerxes II Mnemon (397 B.C.). Nehemiah's name did not originally occur in Nehemiah viii, 9, as it is not found in the earliest Greek version, 3 Esdras ix, 49.

Some time after his return to Susa, Nehemiah found it possible to go back once more to Jerusalem. On this occasion he discovered that a large hall in the temple, formerly used for storing the gifts intended for Levites, singers and doorkeepers, had been furnished as a guest-chamber for Tobiah, and that these subordinate officials, not receiving any share of the revenues, had retired to their farms in the country. He had Tobiah's furniture thrown out, re-established the Levites and provided for their support. He put a stop to the desecration of the Sabbath, and especially the selling of dry fish by Tyrian merchants on that day. When he found children who spoke the Ashdodite dialect of their mothers, he cursed their fathers, beat them, plucked off their hair and made them swear not to marry their sons and daughters to foreigners. It is possible that Nehemiah originally followed xiii and gives a list of those who took an oath in reference to this and some other matters. He also chased away the son of Joiada who had married the daughter of Sanballat. But he did not force the men to drive away their foreign wives and children, as Ezra subsequently seems to have done. The individuality of Nehemiah is so marked that it is comparatively easy to eliminate

the subjective element in his narrative and to form an independent judgment of the men and occurrences he so graphically depicts. He had the virtues and defects of the man of affairs, the practical politician. He knew his ends and worked for them indefatigably. He was bold, enterprising, cautious, circumspect and shrewd. He had a sense of justice and sympathy with the oppressed of his own people. He flattered himself with knowing men, was inclined to read their characters through his suspicions and manifestly took some pride in his ability to escape their wiles. He felt in all sincerity that he was a pious man, and looked with some anxiety for the reward. He had convictions, and was faithful to them. But he was not an idealist like the prophets who scorned dependence on military strength and would have no walls to the city where Yahwe dwelt, or looked with disapproval upon sacrifices, holy days and petty national exclusiveness, dreaming of an Israel that should through its sufferings and its knowledge become a light to the nations. Nehemiah thought he knew the value of walls and gates, and was armed day and night; the temple cult, the Sabbath, circumcision and the separation of the chosen seed were to him of great importance. He was conscious of his merits and recorded them in order that Yahwe might remember what he had done for Israel. The walls he built seemed to have become, as Sanballat surmised, a means of developing independence and stirring up revolt. If there was a revolt under Ochus, bringing on a "third captivity," it was no doubt due to the confidence they gave. Two centuries later Sabbath observance had taken such root in the national life that Judæan peasants were willing to be slain rather than to take up arms on the sacred day. The language in which Nehemiah wrote continued to be cultivated in spite of Aramaic, Arabic and European tongues. The particularism he helped to foster made and unmade Judaism. But the love he bore for Jerusalem inspired a devotion that caused poets to sing, martyrs to confess, patriots to die and one of the great religions of the world to live.

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NEHEMIAH, Book of. One of the canonical books of the Old Testament. In Hebrew manuscripts and early printed editions it forms a part of the book of Esra, and in the Greek Bible it also appears as the second part of Esdras B. Esra-Nehemiah in the Hebrew Bible precedes Chronicles; in the Greek Bible, its daughter-version and the modern translations this order is reversed, and the repetition of 2 Chron. xxxvi, 22-23 in Esra i, 1-3a by dittography renders it probable that this was the original sequence. Esra was clearly grouped by Josephus among the prophets; the reduction of the canon did not lead to the complete rejection of the book that bore his name, but only relegated it to the miscellaneous writings, while the importance still attached to him may have caused the transposition. Some manuscripts of the Latin Bible continued to treat Esra and Nehemiah as one book; in the majority they were separated as 1 Esdras and 2 Esdras, and the later printed editions of the Hebrew text adopted the current distinction between Esra and Nehemiah. In most of the Greek manuscripts Esdras B is preceded by another book called Esdras A, and this is also found in the Old Latin, the Hexaplaric Syriac, the Ethiopic and the Armenian. Its position, exclusive use by Josephus and frequent employment by Greek and Latin fathers indicate the authority it once enjoyed. Aside from some interpolations it is manifestly another translation of the Hebrew and Aramaic text of Esra-Nehemiah, differing chiefly in the transposition of some chapters and the loss of others. The most important departure from the Hebrew Esra is found in the fact that Nehemiah vii, 73-viii, 13a immediately follows Esra x, 44. Already Grotius, Whiston, Ewald and Lagarde maintained that the earliest Greek version has been preserved in Esdras A, and this view has been reaffirmed with weighty reasons by Howorth, Torrey and other scholars more recently. It has long been felt that the correspondence with Artaxerxes (Esra iv, 6-23) in the Masoretic text is out of place and has a more suitable position in Esdras A, as well as that the story of the reading of the law (Nehemiah vii, 73-ix, 37) in reality belongs to the book of Esra. As Esdras A ends in the midst of Nehemiah viii, 13, it is a matter of conjecture how much of what follows this verse preceded Nehemiah i, 1. Bertholet plausibly argues that the list of those who entered into an agreement and the pledge they gave not to marry foreign women, to keep the sabbath, to allow the land to rest in the seventh year, to pay tithes and to institute certain reforms (Nehemiah x) originally had a place after the reference to this pledge in Nehemiah xiii. If Esdras A represents the Old Greek version Esdras B is likely to represent Theodotion's recension, so that the case is similar to that of the book of Daniel.

It is generally recognized to-day that Chronicles-Esra-Nehemiah once formed a single work. The unity of these books seems to have been assumed already in the Babylonian Tal-

mud which declares: "Ezra wrote his book and the genealogy of Chronicles so far as to himself" ('Baba bathra,' 15a). This statement affirms the authorship of Ezra, but apparently intimates that there are interpolations in some passages, continuing the genealogies down to a later time. That Ezra was the author of the whole work remained the opinion of the mediæval Jewish interpreters. The position of Chronicles in the Greek and Latin Bibles and the separation of Ezra and Nehemiah tended to obscure the unity and lead to the assumption that there were three distinct authors. Spinoza rejected the Ezranic authorship, but felt so strongly that Ezra and Nehemiah (and also Daniel and Esther) were pervaded by the same spirit and showed signs of a later age that he ascribed them to a writer in the Maccabæan period, while it is not clear whether he also assigned to him Chronicles. His opinion was followed by Le Clerc in 1685. Some of the evidences that seemed to point to such a conclusion were at an early time regarded by scholars as interpolations. Thus Nehemiah vii, 1-26 was explained by de Vence as having been composed by Simon the Just or some other inspired writer later than the time of Ezra and Nehemiah. The fact that genealogies are brought down to the days of Alexander the Great, and in some versions even further, had to be accounted for. But the more thoroughly these books were studied, which had been so much neglected in earlier times that we have not a single patristic commentary, the more evident it became that as a whole they come, not from Ezra, but from the Chronicler whose hand is visible in all parts. Yet it is equally clear that this author copied extensively from already extant works. As he used the books of Samuel and Kings, and possibly other sources, in Chronicles, so he likewise made long extracts from various documents in Ezra and Nehemiah. Particularly is it obvious that he availed himself of memoirs written by Nehemiah. Spinoza's suspicion that these are fictitious was apparently aroused by the high-priestly line being carried down to Jaddua and Darius the Persian in xii, 22, and the list in vii, copied from Ezra ii, whose genuineness he doubted. But when the passages are removed that can be shown not to have belonged to the memoirs, there remains a document so marked by its peculiarities of style and language, and so impressed with the stamp of a personality unique in his rugged strength and naïveté, that it cannot be the creation of the Chronicler, whose idiosyncracies are always ready to display themselves, but may with utmost confidence be ascribed to Nehemiah himself. To this document belonged chs. i, ii, iv-vii, 4, and without much doubt also xiii, 4-31. Whether any part of iii, x-xii with the long catalogues had a place in it or as an original appendix to it is difficult to determine. Even the use of the first person is not decisive in this matter. It has long been seen that vii, 73-ix, 37 cannot have belonged to it. That this section originally belonged to the book of Ezra is clear from the Greek Esdras A, where it immediately follows Ezra x, 44. Many scholars to-day believe that the list in Nehemiah vii represents a census of "the children of the province" in the time of Nehemiah. The Chronicler evidently used only a part of

Nehemiah's memoirs. The remainder is lost, probably beyond recovery. Hence our ignorance as to his administration of 12 years, after the first two months, if the statement in v, 14 is accurately quoted from the memoirs, the possible disturbances during this period that may have left an echo in Ezra iv, the reason for his return to Susa and the date of his second mission to Jerusalem. It was probably after the events recorded in xiii that he wrote his account, and left in Jerusalem the copy which possibly the Chronicler used, perhaps two centuries later. With this autobiographical sketch a new branch of literature appears in Jewish life. It differs in its purpose from such works as Xenophon's 'Anabasis' and Cæsar's 'Commentaries.' Nehemiah does not seem to have written his narrative so much with a view to its effect upon his contemporaries, though he may to some extent have had in mind a defense of his administration against misrepresentations, as rather to set forth his deeds in a record that would remind Yahwe of the services he had rendered to his people. It is the memorial of a piety that is conscious of its worth and looks for its reward. Historically the memoirs are of very great value. They are written in a sober, orderly, matter-of-fact manner. Nehemiah informs his readers when the events took place. He describes the occasion that led him to request the privilege of visiting Jerusalem. He indicates what authority was given him. Very vividly he details the work done by him in rebuilding the wall, the opposition from without, the disturbing factors within, the successful completion of the task. Then he relates the story of his return, the ejection of Tobia and the restoration of the Levites, the enforcement of the sabbath laws, his indignation against the men who had married foreign wives, the expulsion of Jehoiada's son and the purpose of his writing. His very peculiarities reveal a character that vouches for the substantial accuracy of what he relates. Such a man as he cannot imagine facts, though he may be fanciful in the interpretation of them. We may differ from him in our judgment, but we can depend on it that what so deeply stirs his righteous wrath is not a creation of his own brain, but a stubborn external reality. It is not his fault, but due to excision of a part of his text, insertion of foreign material and a long process of editing, that we are still ignorant in regard to many things of which we would probably have first hand information if the complete work had been preserved.

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NEHLIG, nā-lēg, Victor, French painter: b. Paris, 1830; d. about 1910. He came to the United States in 1856, after learning his art under Cogniet and Abel de Pujol, and opened a studio in New York, where he was made a member of the National Academy (1870). Since 1872 he resided in Paris. He was a very successful painter of history and genre, and among his best-known pictures are 'The Bravo' (1870); 'Armorer of the Old Time'; 'Gertrude of Wyoming'; 'The Artist's Dream'; 'The Cavalry Charge of Lieutenant Hidden' (New York Historical Society); 'Battle of Antietam' (William Astor collection).

NEIDHART VON REUENTHAL, nīt'härt fōn roi'-ēn-tāl, German poet of the 13th century. A Bavarian and a poor noble by birth he is famous for his peasant lyrics, satiric and unflattering in tone, which created a new style of "court-poetry." Neidhart was a favorite of Frederick the Quarrelsome (after breaking with Leopold VII of Austria), with whom he went on the Egyptian Crusade of 1218-19. He died between 1240 and 1245, heartily hated by the peasants he ridiculed, who styled him "Neidhart Fuchs." His poems were edited by Haup (1858). A manuscript collection was made by Benecke (in Vol. II of 'Beiträge zur Kenntnis der altdutschen Sprache,' Göttingen 1832). Consult von Liliencron, 'Über Neidharts höfische Dorfpoesie' (in *Zeitschrift für deutsches Altertum*, Vol. VI, Leipzig 1848); Bielschowsky, 'Leben und Dichten Neidharts von Reuenthal' (Berlin 1891); Pfeiffer, 'Die dichterische Persönlichkeit Neidharts' (Paderborn 1903).

NEIGHBORS, Robert S., American pioneer and Indian service official: b. Virginia, 3 Nov. 1815; d. 13 Sept. 1859. Left an orphan in his youth, he drifted to the Southwest at the age of 19 and was living in Louisiana when the tidings of the fall of the Alamo appealed to his spirit of adventure and he went to Texas as a volunteer in the struggle of that commonwealth for independence from Mexico. He participated in the battle of San Jacinto and, after the end of the Texas Revolution, served with the Texas Rangers. He was a member of Kendall's Santa Fe Expedition, in 1839, and with his comrades was taken as a prisoner to the City of Mexico, where he was held a year before being released. Shortly after his return to his home at San Antonio, the Mexican general, Woll, invaded that place. Neighbors, who

was acting as clerk of the District Court (which was then in session) was captured and, with the other court officials and citizens, was carried to the Castle Perote, in September 1842, and was imprisoned until March 1844, when they were released at the urgent insistence of Gen. Waddy Thompson, the American Minister. Early in 1845 he was appointed as the agent of the Republic of Texas for the Toncawia (Tonkawa) and Lipan tribes of Indians, a position which he filled to the satisfaction of his superiors as well as to the people of the two tribes. He assisted the United States treaty commissioners (Pierce M. Butler and M. G. Lewis) in negotiating the treaty with the Comanche and other Indian tribes on the Brazos, in 1846, and was one of the agents selected to accompany the delegation of chiefs which went from that important council on a visit to Washington. After his return from Washington he was appointed as special agent for the Indians of the tribes living in Texas, and filled the place acceptably until superseded by a partisan appointee of the Taylor administration, in 1849. He then served as a commissioner of the State of Texas for the organization of El Paso County, in the performance of which duty great tact and firmness were needed as most of the residents of that section had been Mexican citizens and, consequently, hostile to Texas until a short time before. He was then elected to membership in the lower house of the fourth Texas legislature, where he served as chairman of the committee on Indian affairs. In 1853 he was reappointed as supervising agent for the Indian tribes living at Texas and the following year aided Capt. R. B. Marcy in selecting two reservations on the Brazos River, upon which all Indians in Texas were to be settled. The dismissal of a jealous-hearted subordinate was followed by a deliberate and systematically directed endeavor to prejudice and inflame the minds of the inhabitants of neighboring counties against the Indians living on the Brazos reservations. Violence followed and the protection of United States troops had to be invoked to prevent the wanton extermination of the people of the several fragmentary tribes. Throughout this crisis, Agent Neighbors was zealous and efficient in the discharge of his duty and, in consequence, he incurred the increased hatred of a baffled malevolence which plotted his destruction. Having aided most effectively in the transfer of the Indians of the Brazos reservations to a new reservation on the Washita, in the Indian Territory, he returned to Texas and, though warned that his life was in danger, walked unafraid into a settlement where cowardly assassins were thirsting for revenge because their wicked plots had been frustrated. There he was shot down, by a man to whom he was an entire stranger, and died a few minutes later, 13 Sept. 1859. He was a man of discernment and intelligence as well as great courage. He was quoted as an authority in matters pertaining to the Comanche Indians by Schoolcraft in 'History of North American Indians.' Consult 'Letter of Major [afterward General] George H. Thomas, 2d U. S. Cavalry' in Annual Report of the Secretary of War, 1859; 'Annual Report of the Commissioner of Indian Affairs for 1859,' pp. 220-334.

NEILGHERRY (nēl-gēr'ē) **HILLS.** See NILGIRI HILLS.

NEILL, Charles P., American educator and statistician: b. Rock Island, Ill., 12 Dec. 1865. At an early date his parents moved to Texas and he found employment in a bank in Austin. He began his college studies at Notre Dame University, but later went to Georgetown University, whence he was graduated in 1891 *summa cum laude*, the second student in 50 years to be so honored by that university. After graduating he returned to Notre Dame as instructor for three years, and then entered Johns Hopkins University, in Baltimore, for post-graduate work in economics and history, meanwhile teaching in the Catholic University at Washington. In 1897 Johns Hopkins conferred the degree of Ph.D. on him, and from then until 1905 he was the head of the department of economics in the Catholic University. He was assistant recorder for the Anthracite Coal Strike Commission under Carroll D. Wright, and recorder for the Alabama Coal Strike Commission under Judge Gray. He was vice-president of the Board of Charities and Corrections of the District of Columbia, and in March 1905 was appointed Commissioner of Labor by President Roosevelt. Remained as Commissioner of Labor under President Taft and was reappointed by President Wilson. Resigned this position in 1913 to organize a labor and welfare department for the American Smelting and Refining Company, at New York City. Remained in that work until 1915, when he returned to Washington to organize a bureau of information for the Southeastern Railways.

NEILL, nēl, Edward Duffield, American historian and educator; b. Philadelphia, 9 Aug. 1823; d. 26 Sept. 1893. He was graduated from Amherst in 1842, and later studied at the Andover Theological Seminary. In 1848, having entered the Presbyterian ministry, he was settled as pastor of the first Protestant church established at Saint Paul, Minn. He served (1851-53) as superintendent of public instruction for that territory, and as chancellor of the State University, 1858-61. As army and hospital chaplain he served in the Civil War from 1861 to 1864, then till 1869 was an assistant private secretary, first to President Lincoln, and afterward to President Johnson. In 1869 he was for a short time consul at Dublin. He was president of Macalester College, Saint Paul, 1873-84, and professor of history and literature there from the latter year until his death. His books included 'History of Minnesota' (1858); 'Terra Mariae,' a history of early Maryland (1867); 'English Colonization of America During the Seventeenth Century' (1871); 'Minnesota Explorers and Pioneers' (1881); 'Virginia Vetusta' (1885); and 'Virginia Carolorum' (1886).

NEILSON, nēl'son, James Beaumont, Scottish inventor of the hot blast in manufacturing iron: b. Shettleston, near Glasgow, 22 June 1792; d. Queenshill, Kircudbrightshire, 18 Jan. 1865. His father was a millwright, too poor to give his son much education. The latter worked at engines as a boy, acquired a little money by marriage, and in Glasgow at 25 became foreman of the new gasworks, in connec-

tion with which he opened a library, reading-room and lecture hall for the employees. His experiments with the hot blast date from about 1825; they were contrary to the theory of the ironmasters of the time who saw that the iron was more easily worked and better in winter and so attempted artificial refrigeration. The result, of course, was that no one would let Neilson use his blast furnace for a decisive test for a time. The method introduced (1828) by Neilson is thrice as cheap as the cold blast; hence the patent was constantly infringed and for 15 years he was involved in exhausting lawsuits, which, with the exception of the great case against the Bairds of Gartsherrie, who refused to pay license for the hot blast, were mostly unsuccessful. In 1847 he retired to the Isle of Bute, and spent his last days at Queenshill, where he established a workingman's institute.

NEILSON, Lilian Adelaide, English actress, whose real name was Elizabeth Ann Brown: b. Leeds, 3 March 1848; d. Paris, 15 Aug. 1880. She worked in a mill at Guiseley and then as a nursemaid, and, upon learning the story of her birth, ran away from her mother, an actress, and went to London. There she was a bar-maid; was educated for the stage through the efforts of a chance acquaintance; gave dramatic recitations from Shakespeare; and made her début in 1865 as Juliet, possibly her best rôle. She played for several years in London with great success due to her beauty, her girlish grace, splendid voice and dramatic power, and appeared in New York in 1872. She was married to Philip Lee early in life and was divorced in 1877. Her rôles included Isabella, Julia, Rosalind, Beatrice, Lady Teazle, Amy Robsart in Andrew Halliday's 'Kenilworth,' and Rebecca in Halliday's 'Ivanhoe.' Consult Scott, 'The Drama of Yesterday and To-day' (London 1899); Winter, William, 'Other Days' (New York 1908); Marston, 'Our Recent Actors' (London 1890).

NEILSON, Samuel, Irish politician, leader of the United Irishmen: b. Ballyronney, September 1761; d. Poughkeepsie, N. Y., 29 Aug. 1803. After marrying the daughter of a rich merchant he went into the woollen business in Belfast. His part in politics became increasingly engrossing and in 1791 he suggested the organization of the United Irish Society, which was very successful, thanks to Wolf Tone. To assist this enterprise Neilson became editor of the *Northern Star*, of which he was sole proprietor in 1794, and which was suppressed in 1797 after his arrest for treason. He was released in February 1798, rearrested almost immediately and was again released in 1802. He came to America in December 1802 and died in the next year. Consult Madden, 'United Irishmen' (1842-46), and the 'Life' by Dornin (1804).

NEISSE, nīs'sē, Germany, a town in the Prussian province of Silesia and the government of Oppeln, on a river of same name, 47 miles by rail southeast of Breslau. It is a place of considerable strength, surrounded by detached forts and other works; has some notable edifices, military and other important schools, and manufactures furniture, blankets, wire-netting, tapestry, cutlery, lace, and has an ex-

tensive trade in sugar, marble, vegetables and wood. Neisse was anciently the chief town of a principality and residence of a prince-bishop. It came into the possession of Prussia in 1741, when, after a valiant defense, it was taken by Frederick II. Pop. 25,938.

NEITH, nē'ith, or **NEITHA**, in Egyptian mythology, a goddess who was worshipped especially as a local divinity in Lower Egypt. By the Greeks she was identified with Athene. She often appears as the companion of Phtha, who, as local divinity of the old capital of Memphis, stood at the head of the pantheon of Lower Egypt; and on that account she is not unfrequently styled the great Mother of the Gods. Like all the great Egyptian goddesses, she was identified with Isis. Although mentioned at an early date she does not appear prominently until the 26th Dynasty. Her representation was a crowned woman, with sceptre and bow and arrows. Consult Budge, E. A. T. W., 'The Gods of the Egyptians' (2 vols., London 1904); Flinders, Petrie, 'Nagada and Ballas' (ib. 1896); Mallet, 'Le culte de Neit à Sais' (Paris 1889); Wiedmann, Alfred, 'Religion of the Ancient Egyptians' (Eng. trans., New York 1897).

NEJD, or **NEJED**. See **NEDJED**.

NEKRASOV, nĕk-rā'sŏf, **Nikolai Alexeievitch**, Russian poet: b. Podolia, 4 Dec. 1821; d. Saint Petersburg, 8 Jan. 1878. He was educated in Saint Petersburg, where he left the army for the University against his father's wishes and was disowned by his family. By teaching and writing he made a bare livelihood. In 1847 he succeeded Bielinsky as editor of the *Contemporary*, which post he kept until 1866; and in 1868 became editor of the *Annals of the Fatherland*, in which most of his poetry appeared. He bitterly attacked administrative abuse, notably in his long poem, 'Who Lives in Russia Happily?' showing the discontent and the suffering in all classes. His satiric attacks on the bureaucracy should be mentioned and the pathetic and powerful 'Last Songs' (1877). Nekrasov's works appeared in two volumes (Saint Petersburg 1909). Consult Newmarch, Rosa, 'Poetry and Progress in Russia' (New York 1907, with translations); Wiener, 'Anthology of Russian Literature' (New York 1903); consult also the lives by Pokrovski (Moscow 1906) and Pypin (Saint Petersburg 1905).

NEKTON, nĕk'tŏn, a term used to designate such of the minute surface-life of the sea (the plankton) as is able to swim against a current instead of merely floating with it. It therefore embraces the more active, and on the whole more advanced, class of lowly marine organisms. The term was introduced by Haeckel, but is not in very common use.

NÉLATON, nā'lā-tŏn', **Auguste**, French surgeon: b. Paris, 1807; d. Paris, 1873. From 1851 to his death he was connected with the medical faculty of Paris and until 1867 was professor of clinical surgery, and the year previous he became physician to the emperor, two years later Senator and in 1869 a member of the Institute. The improvements he made in surgery gained for him an international reputation. He wrote extensively on his subject of special study, surgery, not, however, to the

neglect of other aspects of the medical question. Among his more important works are 'Recherches sur l'affection tuberculeuse des os' (1837) and 'Éléments de pathologie chirurgical' (1844-49).

NELEUS, nē'lūs, in ancient Greek mythology, a son of Poseidon and twin brother of Pelias. He was exposed but reared by a shepherd. When they were grown, their mother Tyro recognized them. The inheritance kingdom of her husband, Cretheus of Iolcus in Thessaly, caused a quarrel between the two brothers and Neleus withdrew to Pylos in Messenia. He refused to purify Hercules after the murder of Iphitus, and Hercules in vengeance killed all his sons but Nestor. It is said that he revived the Olympian games.

NELIGH, nē'lig, Neb., city, county-seat of Antelope County, on the Elkhorn River and on the Chicago and Northwestern Railroad, about 120 miles in direct line northwest of Lincoln and 150 miles in direct line northwest of Omaha. It is in a fertile agricultural section in which corn and wheat are the chief farm products. Considerable attention is given to raising cattle and hogs. It is the seat of Gates Academy, under the auspices of the Congregational Church, and has a public library, public park, bathing beach, alfalfa and flour mills, grain elevators, creamery, marble and granite works, cement-block and brick works, etc. Pop. (1920) 1,724.

NELL GWYNN. See **GWYNN**, **ELEANOR**.

NELLORE, nĕ-lŏr', or **NELLUR**, nĕ-loor', India, a town, the capital of a district of Madras, on the Pennair River, eight miles from its mouth in the Bay of Bengal, and 109 miles by rail northwest of Madras city. The principal industries are dyeing and rice-husking. Pop. 33,246. The district of Nellore, area 8,765 square miles, is famous for its breed of cattle. There is an extensive irrigation system in the district. Pop. 1,497,796.

NELSON, **Aven**, American botanist: b. Lee County, Iowa, 24 March 1859. He was graduated from the State Normal School at Kirksville, Mo., in 1883; was instructor in Drury College, Springfield, Mo., 1883-85; principal of public schools, Ferguson, Mo., 1885-87; and since 1887 professor of botany in the University of Wyoming. He received the degree of M.S. from Drury College in 1890; M.A. from Harvard, 1892; Ph.D. from the University of Denver in 1904. As experiment station botanist he has published many bulletins, among them the 'Trees of Wyoming and How to Know Them' (1899). The leading botanical journals have published from his pen several important series of papers on the plants of the West. He has published the following books: 'Key to the Rocky Mountain Flora' (1902) and a 'Spring Flora of the Inter-Mountain States' (1910; 1912). He has revised and rewritten the 'Manual of Botany of the Rocky Mountains' (1909), which was originally issued by Dr. John M. Coulter (1885). He is fellow in the section of botany, American Association for the Advancement of Science, and in the Botanical Society of America.

NELSON, **Cleland Kinloch**, American Protestant Episcopal bishop: b. near Cobham, Va., 23 May 1852; d. 13 Feb. 1917. He was

graduated from Saint John's College, Annapolis, Md., in 1872, studied theology at Berkeley Divinity School, Middletown, Conn., and was ordained to the priesthood in 1876. He was rector of the church of Saint John the Baptist at Germantown, Philadelphia, 1876-82, and of the church of the Nativity, South Bethlehem, Pa., 1882-92. In the year last named he was consecrated bishop of Georgia. He received the degree of Doctor of Divinity from Saint John's College in 1891 and from the University of the South in 1892. When on account of increasing responsibilities his jurisdiction was divided in 1907, he chose the Diocese of Atlanta, the name adopted by the new portion set off. In 1904 Bishop Nelson was elected president of the Synod of Sewanee, comprising Southern dioceses.

NELSON, Henry Loomis, American journalist: b. New York, 5 Jan. 1846; d. there, 29 Feb. 1908. After a course at Williams College, he studied law, was admitted to the bar in 1869, was Washington correspondent of the *Boston Post* in 1875-85, and editor of that journal in 1885-86. In 1894-98 he was editor-in-chief of *Harper's Weekly*, and from 1902 professor of political science in Williams College. He published 'Our Unjust Tariff Law' (1884); 'The Money We Need' (1896); 'The United States and its Trade' (1902).

NELSON, Horatio, 1st Viscount, English naval officer: b. Burnham-Thorpe, Norfolk, England, 29 Sept. 1758; d. on board the *Victory* at Trafalgar on 21 Oct. 1805. He entered the English navy at 12 (1770). Three years after he went on an Arctic expedition under Commodore Phipps and on his return (1777) was made a lieutenant. Two years later he was promoted to the rank of post-captain. He was then sent to Nicaragua in command of a man-of-war, and took Fort San Carlos, in the San Juan River. In 1781-82 he made another expedition into the North Sea, but returned to the West Indies in 1782 and, placed in command of the *Boreas*; he was kept on this duty for five years, accomplishing much good from his vigorous attempts to prevent smuggling between the United States and the British colonies. Nelson's indomitable spirit in insisting upon enforcing the Navigation Acts against all foreign nations brought him into conflict with his commander, Sir Richard Hughes, and made him unpopular in commercial circles; for a long time he was harassed with vexatious lawsuits. He was, however, upheld by the British government. It was while on this station that Nelson met and married the widow of Dr. Josiah Nesbit (11 March 1787). Six months after his marriage he returned with his wife to England and was placed upon the retired list. It has been hinted that through jealousy undue influence was brought to bear upon the Admiralty to keep him from active service. At any rate he remained in obscurity until all officers were recalled into active service on the outbreak of the war with the French Republic in 1792.

The year 1793 saw the real beginning of Nelson's career. He had attracted Lord Hood's attention, and at his solicitation was placed in command of the ship *Agamemnon*, 64 guns, and sent to join Lord Hood in the Mediterranean, where he rendered him valuable assistance at the siege of Bastia (May 1794). He partici-

pated in the siege of Calvi and there had the misfortune to lose one of his eyes. While on this station he also served under Hotham and Sir John Jervis. While on a diplomatic mission to Naples in September 1793 he met Lady Emma Hamilton, who was destined to be so closely identified with an important part of his life. In 1796 he was promoted to be commodore and was given a new command. On 25 Sept. 1796 orders came ordering the abandonment of Corsica and the Mediterranean, and Nelson sorrowfully left the field. He was, however, shortly sent back to secure supplies which had been left on the island of Elba, and on returning passed through the whole Spanish fleet which had then joined the common cause of France. On the following day occurred the famous battle of Cape Saint Vincent (q.v.), 14 Feb. 1797. For his gallantry and skill in manœuvring his vessel he was made rear-admiral of the blue and appointed to the command of the inner squadron at the blockade of Cadiz. His next service was an attack on the town of Santa Cruz, in the island of Teneriffe, in which he suffered the loss of his right arm. The wound refused to heal and he was obliged to return to England. He was decorated with the Order of the Bath by George III and at the same time awarded a pension of \$5,000. On the 29th of March 1798 he again set sail and joined the Earl of Saint Vincent (Admiral Jervis) off Cadiz 30 April. The admiral sent him to watch the progress of the armament at Toulon. Notwithstanding his vigilance, the French fleet which conveyed Bonaparte to Egypt escaped. Thither Nelson followed, and discovered the enemy's fleet moored in the Bay of Aboukir, where he obtained a complete victory, all the French ships but two being taken or destroyed (1 Aug. 1798). This achievement was rewarded with the title of Baron Nelson of the Nile and an additional pension of \$10,000. Nelson set sail from Alexandria 19 August and arrived at Naples 22 September. Here began the pitiable period of his career, which left an indelible blot upon his otherwise unblemished name. He came under the influence of Lady Hamilton, wife of the English ambassador. His criminal relations with that lady, with whom he lived openly after the death of her husband, led to his ultimate separation from his devoted wife. Her influence can be recognized in many of his public acts during the two years he spent under her spell in Naples. During this time he seemed to fall into a lethargy which for the time being made him forget his duty to Great Britain, and at one time he practically acted in the capacity of admiral of the Neapolitan navy. He did, however, really get the Neapolitans to take up arms against the French, but their army was soon subdued and the Parthenopean Republic was established by Napoleon.

Finally Nelson seemed to awake to a new sense of duty, being goaded by the appointment of a junior officer, Sir Sidney Smith, to an important command in the Levant, and also aroused by the exciting news that Admiral Bruix had escaped with the French fleet from Brest and was about to enter the Mediterranean. The imminent danger of the French regaining the naval supremacy of the Mediterranean set Nelson to work with all his old time vigor. In

the meantime Jervis had resigned his command and was succeeded by Keith, with whom he was at variance from the very start. He determined to take Naples before the possible arrival of the French, and forthwith appeared before that city 24 June 1799. Here he found Commodore Caraccioli in command of a Neapolitan squadron which was in league with the Republicans who were in complete control. The forts of the city surrendered on 26 June and then followed Nelson's worst mistake. The Neapolitan admiral was not captured till 29 June, but Nelson immediately ordered a court-martial and condemned him to death, thus violating the capitulation concluded 23 June. Caraccioli was cruelly hanged. The whole miserable affair has been attributed to the influence of Lady Hamilton, who was also the favorite of the queen of Naples. It was little honor to Nelson that the despicable king of Naples, Ferdinand IV, soon after this created him Duke of Bronte.

Nelson's flagrant disobedience of orders shortly after this is also ascribed to feminine influence. He obstinately remained at Naples when ordered to join Lord Keith, who expected to meet the French fleet. This meeting, as a matter of fact, never took place, but a great victory might have been won had Nelson's fleet put in an appearance in time. This affair had a great deal to do with his quarrels with Keith and also his subsequent orders recalling him to England. He arrived home 6 Nov. 1800, having traveled overland with the Hamiltons; soon after this the scandal of his life culminated in the final breach with his wife.

Nelson's promotion to the rank of vice-admiral was dated 1 Jan. 1801 and he was at once employed on an expedition to aid Sir Hyde Parker against the league of the Northern Confederation. This league by its policy of armed neutrality was really aiding the French Republic, and Nelson wished to strike first at Russia, but this policy was overridden, and Nelson contented himself with making a bold attack on the Danish fleet at Copenhagen. He completely annihilated the fleet and silenced the shore batteries 2 April. During the battle his attention was called to the fact that his ship had been signaled to cease firing. Placing a telescope to his blind eye he remarked: "I really cannot see the signal." This remark added to his popularity at home. For his success and gallantry upon this occasion he was created a viscount, and his honors were made hereditary in his family, even in the female line. He then took command of the squadron for defense against the contemplated French invasion of England and attacked the French flotilla off Boulogne 15 August. He then went back to Lady Hamilton in Merton Surrey and remained there during the Peace of Amiens. When hostilities recommenced after the Peace of Amiens, Lord Nelson was appointed to command the fleet in the Mediterranean, and for nearly two years was engaged in the blockade of Toulon. But in spite of his vigilance the French fleet got out of port (30 March 1805), and being joined by a Spanish squadron from Cadiz, sailed to the West Indies. The British admiral hastened to give chase and pursued them all the way to the West Indies and back again to Europe, one of the most exciting chases that ever took place in naval history. Villeneuve finally took refuge at Cadiz, but Nelson's object had been accom-

plished, for without his naval forces Napoleon could not carry out his plan of invasion and was now obliged to turn his attention to Austria, which had in the meantime declared war. Nelson now had Villeneuve in a trap, but hardly expected him to leave the harbor. The French admiral, however, learned that Napoleon was contemplating relieving him of his command because he would not fight. In despair, Villeneuve decided on desperate measures and the French and Spanish fleets sailed forth to meet the dreaded enemy, leaving the harbor 19 October, the French commanded by Villeneuve, the Spaniards by Gravina. On 21 October they came up with the British squadron off Cape Trafalgar. Then occurred the famous battle of Trafalgar, as desperate an engagement as ever took place upon the high seas. The engagement ended in a glorious victory for the British, but it cost them the greatest naval hero England ever produced. Nelson was mortally wounded early in the day and died during the afternoon. His remains were carried to England and he was buried with much pomp in Saint Paul's Cathedral 8 Jan. 1806. In Trafalgar square in 1849 a fine monument was erected to his memory.

Consult Southey, 'Life of Nelson' (1828); de Forgues, E., 'Histoire de Nelson' (1860); Jeaffreson, J. C., 'Lady Hamilton and Lord Nelson' (1888); 'The Queen of Naples and Lord Nelson' (1889); Laughton, 'Nelson' (London 1904); Mahan, 'Life of Nelson' (Boston 1899) very reliable; Russell, 'Horatio Nelson' (1899); Browne, G. L., 'The Public and Private Life of Horatio, Viscount Nelson, as Told by Himself, His Comrades, and His Friends' (London 1891); Fitchett, W. H., 'Nelson and His Captains' (ib., 1902); Laughton, J. K., 'Nelson and His Companions in Arms' (ib., 1905); White and Moorhouse, 'Nelson and the Twentieth Century' (ib., 1905); Matcham, M. E., 'The Nelsons of Burnham Thorpe' (ib., 1911); Moorhouse, E. H., 'Nelson in England: A Domestic Chronicle' (New York 1913).

NELSON, Julius, American biologist; b. Copenhagen, Denmark, 6 March 1858; d. 16 Feb. 1916. He was graduated at the University of Wisconsin in 1881 and Johns Hopkins University in 1888. He was appointed biologist of the New Jersey State Tuberculosis Commission, which post he gave up after a year. From 1889-1916 he was professor of biology at Rutgers College and chief biologist of the New Jersey agricultural experiment station. Professor Nelson was identified with the investigation of oyster culture in New Jersey, co-operating with the chief of the bureau of shell fisheries. He formerly was vice-president and consulting adviser of the Lederle Laboratories in New York.

NELSON, Knute, American legislator; b. near Bergen, Norway, 2 Feb. 1843; d. 28 April 1923. In 1849 his mother brought him to the United States. He studied at Albion Academy, and entered the Union army during the Civil War. He was wounded and captured by the Confederates at Fort Hudson, La. In 1867 he was admitted to the bar and in 1867-69 served in the Wisconsin legislature. In 1871 he removed to Alexandria, Minn., and from 1872 to 1875 was attorney of Douglas County.

In 1875-78 he was a member of the Minnesota senate and was a presidential elector in 1880. In 1882 he was elected member of Congress and was re-elected in 1884 and 1886. Although a Republican in politics, he did not follow strictly party lines and frequently asserted his independence by voting for measures proposed by members of the Democratic party. From 1886 to 1892 he was engaged in the practice of law and acquired a vast knowledge of the laws relating to public lands and land cases generally. He became governor of Minnesota in 1892 and was re-elected two years later. His administrations were deemed excellent by the people of the State and in 1895 he was sent to the United States Senate in succession to W. D. Washburn. He was elected for a full senatorial term in 1900, and was re-elected in 1906, 1912 and 1918. In the Senate Mr. Nelson introduced the bill creating the Department of Commerce and Labor.

NELSON, Samuel, American jurist: b. Hebron, N. Y., 10 Nov. 1792; d. Cooperstown, N. Y., 13 Dec. 1873. He was graduated from Middlebury College, Vermont, in 1813, and in 1817 was admitted to the bar. He soon established a reputation which gained for him a large practice and in 1823-31 he was circuit judge. In 1831 he became associate justice of the Supreme Court of New York and in 1837-45 he was chief justice. He was appointed associate justice of the Supreme Court of the United States by President Tyler in 1845 and in the famous Dred Scott case he sustained Chief Justice Taney in his decision that if Congress had authority to destroy slavery it had also power to establish it. He disapproved the intrusion of military power in what he considered civil affairs, but maintained an unquestioned loyalty during the Civil War. He was appointed by President Grant a member of the Alabama Arbitration Committee in 1871, and in 1872 he resigned from the bench.

NELSON, Thomas, American patriot: b. Yorktown, Va., 26 Dec. 1738; d. in Hanover County, Va., 4 Jan. 1789. He was the son of William Nelson, governor of Virginia 1770-71, and was educated at Eton and Trinity College, Cambridge, England. Returning to Yorktown in 1761, he was elected to the House of Burgesses, in which he served for several terms; and he also sat in the provincial conventions, 1774-75-76, in the last of which he introduced the resolution instructing the Virginia delegates in the Continental Congress to move for a declaration of independence. Later (1775-77) he was himself a delegate to the Continental Congress and was a signer of the Declaration. He resigned on account of impaired health, but was soon (August 1777) in command of the Virginia State forces, at whose head he remained until near the close of 1782. At the siege of Yorktown he ordered American gunners to fire upon his own mansion, in which Cornwallis was believed to have his headquarters. In 1779 he was again a member of Congress, and again resigned by reason of ill health. During the next year on his own security he raised public moneys for Virginia and paid certain military arrearages out of his private funds. In 1781 he became governor of the State, succeeding Thomas Jefferson, but in a few months resigned. His patriotic generos-

ity had impoverished him and he saw his property sold for payment of public debts contracted on the security he had given, while his own days ended in circumstances of privation.

NELSON, William, American sailor and soldier: b. Maysville, Ky., 1825; d. Louisville, Ky., 29 Sept. 1862. Entering the United States navy in 1840 he became lieutenant in 1855 and at the opening of the Civil War was put in command of the gunboats on the Ohio with rank of lieutenant-commander. On leaving the navy, soon after he entered the army, became a brigadier-general of volunteers and commanded the 2d division under Buell at the battle of Shiloh. In a quarrel with the Federal general, Jefferson C. Davis, he was fatally shot at the Galt House in Louisville.

NELSON, Wolfred, Canadian physician: b. Montreal, Canada, 10 July 1792; d. there, 17 June 1863. He was a surgeon in the British army in the War of 1812, but in 1837 he headed the rebellion decided upon in the meeting of the "Four Countries." He was captured and sentenced to imprisonment for life in the Bermudas, but the sentence was declared illegal and he was liberated. He lived in the United States in 1838-42, when he returned to Montreal; served in Legislative Assembly of Canada in 1844-45, and in 1851 was made inspector of prisons. He was twice chosen mayor of that city. Consult Dent, J. C., 'Canadian Portrait Gallery' (1880) and 'Canada Since the Union of 1841' (Toronto 1881).

NELSON, Canada, city and capital of Kootenay District, British Columbia, at an altitude of 1,769 feet, on the Kootenay River, of which Kootenay Lake is an expansion, and about 270 miles west of Vancouver on the Canadian Pacific and Canadian Northern railways. It is the centre of the noted Kootenay silver-mining region, and has large stamp-mills and smelters; gold, copper, lead, zinc and coal are also produced in the vicinity. There are saw mills, machine shops and boat yards. Steamships ply between Nelson and points on Kootenay Lake. The Doubhokors hold great areas in the district for fruit-growing. Pop. about 7,500.

NELSON, England, a municipal borough of Lancashire, about three miles northeast of Burnley and 30 miles north of Manchester. Among its chief municipal features are a free library, technical school and market hall; it owns also its water, gas, electric-lighting plants and baths. It is a thriving cotton, worsted and silk manufacturing centre, and coal is worked. Pop. 39,479.

NELSON, a river in Canada, the largest in the province of Manitoba. It is an outlet of Lake Winnipeg; leaving the lake at the north end, it first flows north through several lakes to Split Lake, then northeast to Hudson Bay which it enters through Port Nelson. The volume of water it discharges is very large; it is a deep, swift-flowing stream, with many rapids and cascades along its course of about 425 miles. It is navigable for boats to about 130 miles from its mouth and for about 100 miles from Lake Winnipeg.

NELSON, Life of. The 'Life of Nelson' by Robert Southey, frequently referred to as the most perfect short biography in the lan-

guage, is one of the most famous of English lives. Since its publication in 1813 it has gone through edition after edition, and there is little evidence of decline in its popularity. In the face of these facts general readers need to be warned that the 'Life' is great chiefly in the literary sense; it is not an exhaustive and authoritative historical biography. Southey did not to any great extent go to original documents for his materials. The 'Life' is an amplification of the brief sketch of Nelson with which Southey concluded a review of the lives by Charnock, Harrison, Churchill and Clarke and McArthur, in the *Quarterly Review*, February 1810. Furthermore, he was undoubtedly careless in admitting much material from sources none too reliable, and was manifestly unfair in his attitude toward the French. To quote Professor Laughton: "There is no doubt that Southey's artistic skill gave weight and currency to the falsehoods of Miss Williams, as it did to the trash of Harrison, and the wild fancies of Lady Hamilton."

The greatness of the work arises from its human interest: it is a *life* in the truest sense of the word, not a collection of dry facts. Southey was not an expert in naval matters, and fortunately so; he subordinated technical details and concentrated attention upon the plain narration of the events of Nelson's life. The sweep of the narrative, rivaled by few books of adventure, is irresistible; one does not wonder that it has long remained the favorite book of the English school boy. The style is in thorough keeping with the spirit of the narrative. Southey's style, well known as one of the best, if not the best, of English prose styles, in the 'Life of Nelson' is exhibited to greatest advantage. It is simple, pure, limpid—adequate in every way to the task in hand. The danger in writing the life of a man like Nelson is the danger of running into extravagance, of over-emphasizing, of indulging in high-flown rhetoric. This danger Southey successfully avoids. It would be difficult to find a narrative more restrained, more dignified. And the strain with which it closes is a strain in the true Greek manner. The careful student will, of course, supplement the 'Life' by readings from such recent lives of Nelson as those by W. Clark Russell and Admiral A. T. Mahan, but there is no book which can entirely take the place of Southey's great work. It is, in the words of Sir Humphrey Davy, "an immortal monument raised by genius to valor."

WALDO H. DUNN.

NELSONITE. A dike rock consisting of ilmenite or rutile and apatite occurring in Nelson County and other localities in Virginia.

NELSONVILLE, Ohio, in Athens County, on the Hocking River and on the Hocking Valley Railroad, about 60 miles southeast of Columbus. It is in the vicinity of bituminous coal fields, and has a large trade in coal. Its chief manufacturing establishments are car-wheel works, mining-implement shops, foundry and repair shops. The city owns and operates the waterworks and electric-light plant. Pop. 6,440.

NELUMBO, a genus of aquatic plants of the family *Nymphaeaceae*, containing the East Indian lotus (*N. nelumbo*) and the Egyptian lotus (*N. caerulea*). The former serves many useful purposes in the East. The filaments are

there deemed astringent and cooling and are prescribed in burns, piles and menorrhagia; the seeds are given to prevent vomiting, and to children as diuretics and refrigerants. The large leaves are made into bed sheets for fever patients; a sherbet made from the plant is given as a refrigerant in smallpox, etc. The rhizome, stalks and seeds are eaten by the Hindus, and furnish a preparation known in commerce as "Chinese arrowroot." A fibre derived from the stalk is used as a wick for lamps in Hindu temples, the plant being considered sacred. See *Lotus*.

NEMATHELMINTHES, round or thread worms, a phylum or branch of the Metazoa in which are brought together several groups having in common little more than the general external form and appearance. It is really a group of convenience, as closer study reveals such striking anatomical differences between groups that in fact their internal structure has no fundamental likenesses. In the phylum are ordinarily included three main classes: (1) Nematoda, or true roundworms; (2) Gordiacea or hairworms, and (3) Acanthocephala or proboscis roundworms. To these are often added the small and little known groups of the Gastrotricha and Chaetognatha.

All these display an elongated, approximately cylindrical form, and a monotonous exterior. The body is not divided into segments and not provided with appendages.

The Acanthocephala have a roughened surface, at times with imperfect rings, and are carrot-shaped rather than strictly cylindrical. They possess an anterior protrusible proboscis covered with rows of recurved hoods by which the worm attaches itself to the wall of the alimentary canal of the host; for they are exclusively parasitic and so highly modified for a parasitic existence that no trace of an alimentary system has been found in any stage of existence. The species are not numerous. They occur chiefly in fishes, though some species are found in reptiles and birds and a few in mammals, one (*Gigantorhynchus gigas*) being common in the pig. A few rare cases of parasitism in man are on record. The larval stages are passed in insects or worms and they attain the vertebrate or final host when the larval host is eaten. Thus during no part of the life history is the organism free living.

The Gordiacea or hairworms (q.v.) are very uniformly cylindrical with bluntly rounded ends and often slightly colored surface. During early life they are parasitic in the body cavity of insects, chiefly grasshoppers and locusts, whereas the sexually mature adult form is free living in fresh-water bodies. They are often found in large numbers in shallow water along the shores of streams and lakes.

The Nematoda (q.v.) or true roundworms usually taper somewhat toward one or both ends so that they are spindle-shaped rather than cylindrical and at least one end is sharp-pointed. The external surface is colorless, glistening and smooth, though often marked by delicate circular striations. Many species are minute and live free in water, mud and soil. To the latter which are found in incredible numbers is ascribed an important rôle in the formation of fertile soils. The parasitic species are more varied in form and usually larger than the free-living types; they pass commonly some stage

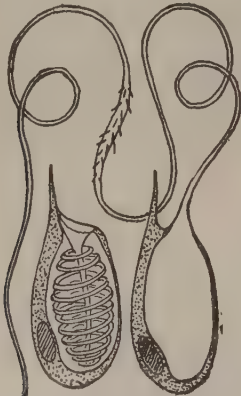
of their life history in the outer world during the period of transfer from one host to another. These free living larval stages resemble closely in size and structure the true free living species.

The Gastrotricha are minute free-living forms that occur among plants or in the mud of the shore or bottom. Most species are fresh-water inhabitants though some are found in the sea. They are not abundant or easily found and are relatively little known.

The Chaetognatha or arrow worms are found in enormous numbers in the surface regions of the open ocean. Their marked transparency and delicate structure make them objects of great beauty under the microscope. Because of their development and of their apparent metameric structure they are now more frequently associated with the annelids or near them rather than with the roundworms as formerly.

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NEMATOCYSTS (Greek *νημα*, thread, *κύστις*, bag, cell), peculiar structures occurring in the *Cœlenterata* (q.v.) and in a few members of other groups of animals (*Turbellaria*, *Nemertinea*, and possibly *Protozoa*) which serve as weapons of offense and defense. They are formed within specialized epidermal cells known as cnidoblasts. In structure a nematocyst is a cell one end of which is drawn out into a long tube, the thread, which is inverted



Two nematocysts; one entire, the other exploded.

into the body of the cell as the finger of a glove, may be turned into the palm. Connected with the cell is a hair-like structure, the cnidocil, and when this is touched the nematocyst "explodes." The thread is forced out, carrying with it the fluid contents of the cell, which in its physiological action is much like formic acid. This is sufficient to kill small animals, to paralyze those of larger size. Some *Cœlenterates*, like the Portuguese man-of-war, have nematocysts which can produce very disagreeable effects on man. Once exploded, a nematocyst cannot in general be used again. New nematocysts are continually being formed. The layer which gives rise to them is not in all cases ascertained. From their structure and action nematocysts are also known as thread cells, nettle cells and cnidæ.

NEMATODA, or true roundworms, a large rather uniform group of animals containing both free and parasitic species. They are slender and often much attenuated whence the common name of threadworms. In length they vary from a few millimeters to a metre, but the diameter is relatively insignificant in all cases. The body is covered by a smooth, tough cuticula that is transparent and often relatively thick. It is very resistant to fluids so that the preservation of specimens is difficult. The outer surface may be marked by fine circular striæ and sometimes carries bristles, hooks, spines or scales, especially near the anterior end, but it is always devoid of appendages and never manifests true segmentation.

A cross section shows that the greater part of the thickness of the body-wall is composed of a massive layer of longitudinal muscles. The body cavity is spacious but not lined by a peritoneal epithelium. It contains the alimentary and reproductive organs. The muscle layer is interrupted at four points by the so-called lines or areas of which the lateral are most conspicuous. They are thickenings of the hypoderm, elsewhere very thin, and appear usually in surface aspect as narrow bands. In some species these lines contain the minute excretory canals as well as nerve cords and ganglion cells. The nervous system is difficult to determine save for a ring commissure that encircles the esophagus; from it nerves pass anteriad and posteriad. Sense organs are present though few in number and simple in type.

The anterior end is provided with the mouth opening, about which is developed a series of lips and often a complicated buccal capsule. These features vary widely in different groups. The alimentary canal is a straight simple tube, starting with a prominent muscular esophagus that opens into a thin walled digestive mid-gut, and terminating in a short, simple rectum. The anus is near the posterior end on the ventral surface.

The reproductive system has the form of a long slender coiled tube which is single in the male and double or Y-shaped in the female. In the former it opens into the rectum, forming a genital cloaca, whereas in the female it has a separate pore which may be in the centre of the body or near either end but has no connection with the alimentary canal. In both sexes the tube has regions slightly different in calibre and structure, corresponding to the germ producing and storing organs in other animals. Around the female sexual pore are found enlargements and near the male orifice papillæ in number and arrangement characteristic of the species. In many forms the tail of the male carries cuticular expansions in the form of wings (alæ) or a caudal bell with ribs like an umbrella, known as the bursa. In the male also one finds one or two, rarely three, chitinous spicules, needle-shaped copulatory organs, that often project from the cloaca.

The true nematodes are oviparous, but in some cases the ova are retained in the uterus so long that development is completed and they hatch out before being extruded so that living embryos are discharged from the uterine pore. All stages are known between the two extremes noted. When the eggs undergo development

externally they are provided with a thick resistant shell, but when they hatch in the uterus the shell is very thin. The development itself is very simple in that there is formed within the shell a minute worm without complex changes in form. In most parasitic species this larval worm enjoys at least a brief period of free existence before it starts upon the parasitic life, and this time is passed in water or mud. From this habitat it is transferred by chance to a new host. This may be the host of the adult or it may pass first into an intermediate host and not reach the final host until later. In some cases the larvæ are discharged into the tissues of the host in which the adult worms live and are transferred to a new host by the agency of a blood-sucking insect like the mosquito, in the body of which the young parasite undergoes certain necessary changes preliminary to its entrance into a new final host. For instances of the complex developmental conditions that enter into the life history of particular species see the accounts under *FILARIA*, *HOOKWORM*, *LOA*, *TRICHINA*.

The Nematoda include species like *Angiostoma nigrovenosum* which lives now free in the mud of a pond and again parasitic in the lung of the frog, as well as consistent free-living species and still others that are highly specialized parasites. Most parasitic species inhabit some part of the alimentary system, but others frequent the lymph or blood system, and there are those that confine themselves to serous cavities and the connective tissues. (See *FILARIA*; *LOA*). No satisfactory system has yet been worked out for classifying the various types of nematodes. A few distinct groups designated commonly as families are recognizable, and in them can be placed the most important and best known genera and species. Among these families are the following:

Anguillulidæ, small transparent free living forms having an esophagus with one or two bulbs at the posterior end. Male with two equal spicules. Female with double uteri, short ovaries reflexed, and few large eggs. The best known forms are the vinegar eel and the paste eel, which are abundant and easily obtained.

Strongyloidea, male has broad, well developed bursa with radial ribs. Buccal capsule usually well developed in both sexes, spherical, with serrate or dentate margin. This group contains a large number of dangerous parasites, among which the hookworms (q.v.) may be cited as representative both in general structure and in parasitic habits.

Filaroidea, very long slender forms with simple esophagus and without conspicuous lip or true buccal capsule. The bursa is replaced by caudal alæ or is entirely wanting. The vulva is far anterior and the eggs hatch in the uterus, so that living young are produced. The Guinea worm, *Dracunculus medinensis*, the African eyeworm (*Loa*, q.v.) and the blood filariæ are important human parasites in this group.

Spiruroidea, much like the *Filaroidea* save that the esophagus is double and the oral margin often has two conspicuous lips. The species are parasitic in lower vertebrates and occur only rarely in mammals.

Ascaroidea, stout bodied, opaque forms of some size, with three lips around the oral opening. One lip is dorsal and two ventral. These

forms are oviparous. Here belong the stomach worm, *Ascaris lumbricoides*, and the pin worm, *Oxyurias vermicularis*, cosmopolitan human parasites known from remote antiquity; and many other species from other hosts.

Trichinellidæ, with very long slender capillary, non-muscular esophagus, and intensive parasitic habit. Of this small group the trichina (q.v.) is a typical representative. The whipworm, *Trichuris trichiura*, is the commonest of human parasitic worms and is spread over the entire earth. It is more abundant in warmer regions where nearly every individual is infested. (See *NEMATHELMINTHES*). Consult Braun, M., 'Die tierischen Parasiten des Menschen' (Würzburg 1915); Fantham, Theobald and Stephens, 'The Animal Parasites of Man' (New York 1916); Geodoelst, L., 'Synopsis de parasitologie' (Bruxelles 1911); Ward and Whipple, 'Fresh Water Biology' (New York 1918).

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NEMATOGNATHI, a group of fishes, the cat fish (q.v.).

NEMATOPHYCUS, a genus of fossil brown algæ, preserved in the early Palæozoic rocks of the eastern United States and Canada, the stems of which were often several inches in diameter. Specimens have also been found in Europe.

NEMCOVÁ, nyěm'tsō-vā, **Bozena** ('BARBARA PANKL'), Czech poet: b. Vienna, 4 Feb. 1820; d. Prague, 21 Jan. 1862. Her reputation was made largely by the collections, 'National Tales and Legends' (1845-46), and 'Slovak Tales and Legends' (1858). Her 'Sebrané Spisy' ('Collected Works') appeared at Prague (with a biographical sketch by Podlipská). One of the best of her original stories from common life was 'Babička' which was published in a German version as 'Die Grossmutter' in Reclam's 'Universalbibliothek.' It was translated into English by Gregor in 1891. Consult Jakubec, 'Geschichte der čechischen Litteratur' (Leipzig 1907).

NEMEA, nē'mē-ā, Greece, a classic valley of Argolis, the site now marked by the village of Nemea, due north of Argos, on the railroad to the Gulf of Corinth. The valley from north to south is from two to three miles long and more than half a mile broad. It possessed a sacred grove, with a magnificent temple to Zeus, and here biennially were held the celebrated Nemean Games (q.v.), one of the four great national athletic and musical festivals of the Greeks. Consult Gardiner, E. N., 'Greek Athletic Sports and Festivals' (London 1910).

NEMEAN (nē'mē-ān or nē-mē'ān) **GAMES**, in ancient Greece, public games or festivals celebrated at Nemea (q.v.). The Argives were the judges at these games, which comprised boxing and athletic contests, as well as chariot-races. The conquerors were crowned with olive.

NEMERTINEA, a class of *Platyhelminthes* (q.v.) of which a few are terrestrial and a few occur in fresh water, but the great majority are marine. As a rule they have a flattened or rounded body without any processes and covered on the outside with cilia. The mouth is on the ventral surface at the anterior end and the

vent at the opposite end of the body. The alimentary canal is straight; in some with enlargements on either side at regular intervals. Above the alimentary canal is a peculiar proboscis which can be everted through an opening above the mouth, by means of which the animal captures its prey, which consists of other animals, largely of worms. There is no body-cavity, the body being solid from the intestine to the outer wall, except for the small tubes of the blood vessels and excretory organs. The sense-organs are the usually present eyes, which may number two or more, what appears to be an auditory organ, and also, in many, grooves upon the sides of the head which are usually regarded as organs of smell. The nervous system consists of a "brain" around the anterior part of the alimentary canal, from which three nerve cords (two lateral and one between the digestive tract and the proboscis sheath) run backward through the body. Some nemertines develop directly while others go through a complicated metamorphosis, assuming first the so-called "pilidium" form (see LARVA), and later casting of part of the body. In most cases the two sexes are in different individuals. The excretory system is much like that of the other Platyhelminthes in the possession of flame-cells. Most nemertines are small, but some reach respectable dimensions. One species on the New England coast can stretch itself to a length of 15 feet or retract itself to two. The largest species (*Lineus longissimus*) may extend to 90 feet.

NEMESIANUS, nē-mě-sī-ā'nūs, **Marcus Aurelius Olympius**, Latin poet of the close of the 3d century B.C., probably a Carthaginian. He won much fame by his verse at the court of Numerianus, who alone surpassed him in composition; wrote on fishing ('*Halieutica*'), sailing ('*Nautica*') and hunting ('*Cynegetica*'), only a part of the last poem being extant; and is supposed to be the author of four pastoral poems found in manuscripts, together with Calpurnius' eclogues, and hence formerly attributed to Calpurnius. The peculiar movement of these pastorals has suggested the theory that the '*Pervigilium Veneris*' is by Nemesianus. All his extant works are edited by Bährens (1879); the '*Eclogæ*' by Schenkl (1885); and English version of the latter by Scott appeared in 1891. Consult Teuffel, W. S., '*Geschichte der römischen Litteratur*' (Vol. III, 6th ed., Leipzig 1913).

NEMESIS, in Greek mythology, the daughter of Erebus and Night. Other accounts make her the daughter of Zeus and Necessity, or of Ocean and Night. She is goddess of retribution, the tamer of the passions, the avenger, the enemy of pride and haughtiness; and she watches over the observance of the honors due to the dead, on which account a yearly festival in memory of the departed was called by the Greek Nemesia. In Rome she was worshipped by victorious generals and gladiators. Nemesis is represented under the figure of a majestic female clothed in a tunic. With the right hand she grasps a part of her garments over her breasts; in her left hand she holds a cup. On coins she appears drawn in a car by dragons, sometimes wearing a mural crown and rarely winged. The great number of coins and gems on which she is found proves her worship to

have been extensive and popular. The seat of her worship was at Smyrna in Ionia, and at Rhamnus in Attica, where there were two temples, one containing the statue of the goddess by Agoracritos, the pupil of Phidias, which is now in the British Museum. Consult More, P. E., '*Nemesis or the Divine Envy*' (in '*The New World*,' New York 1899); Wissowa, G., '*Religion und Kultus der Römer*' (2d ed., Munich 1912); Posnansky, H., '*Nemesis and Adrasteia*' (in '*Breslauer philologische Abhandlungen*,' Vol. V, Breslau 1890).

NEMESIUS, nē-mě'sī-ūs, Greek philosopher: b. in the first half of the 4th century A.D. He became bishop of Emesa in Syria, and has been remembered chiefly through his treatise on '*The Nature of Man*,' which declares the freedom of the will, the supremacy of the spiritual powers, the indestructibility of matter. The book is thought to show some anticipations of the theory of the circulation of the blood. It has been translated into various modern languages. It was edited by Matthæi (Halle 1802). Consult Christ-Schmid, '*Geschichte der griechischen Litteratur*' (Vol. II, Pt. 2, 5th ed., Munich 1913).

NEMI, nā'mē, Italy, a classic lake about 18 miles south of Rome, filling the crater of an extinct volcano, the sides of which are formed partly of basalt and partly of consolidated scoriae. The lake is 1,022 feet above the level of the sea and it has a circuit of five miles. Owing to its beauty, it is accounted the gem of the Alban Mountains and was celebrated by the Latin poets under the name of Lacus Nemorensis or Speculum Dianæ—Diana's Mirror. On the northeast shore near the village of Nemi, a famous temple of Diana was situated, of which modern excavations have yielded interesting remains; remnants of rafts or vessels used in the festival services of Diana and dating from the reign of Caligula, were also recovered from the bed of the lake in 1895. Consult '*Notizie degli Scavi*' (Rome 1895-96); Frazer, J. Y., '*The Golden Bough*' (parts 1-3, 3d ed., New York 1911).

NEMOURS, nē-moor, **Duc de** (GASTON DE FOIX). See FOIX, GASTON DE.

NEMOURS, Louis Charles Philippe Raphael d'Orléans, DUKE OF, French soldier, second son of King Louis Philippe: b. Paris, 25 Oct. 1814; d. Versailles, 26 June 1896. He entered the army in 1826; gained little by the Revolution of 1830, since he had been a favorite with Charles X, who intended to marry him to the daughter of the Duc de Berry; refused the crown of Belgium in 1831; served in the Belgian campaigns and in Algiers, where his bravery won him the grade of lieutenant-general in 1837; became heir apparent by the death of his brother, the Duke of Orleans, in 1842; but was so unpopular that he found it wise not to press his claims in 1848, but to remove to England. He returned to France in 1870, re-entered the army, from whose lists his name was struck by the anti-royalist measures of 1886, and spent his last years in retirement.

NEMOURS, France, a town in the department of Seine-et-Marne, 12 miles south of Fontainebleau on the Paris, Lyon, Méditerranée Railroad and the Canal du Loing. It contains churches dating from the 13th, 15th and 16th

centuries and a fine bridge erected in 1803. The old castle of Nemours, built in the 12th century, is memorable on account of the edict revoking the privileges of the Huguenots, signed here by Henry III, 7 July 1585. Pop. about 5,000.

Nemours, with the surrounding territory, was erected into a duchy in favor of the Count of Evreux in 1404. In 1507 Louis XII bestowed the duchy upon his nephew, Gaston de Foix, who was killed at the battle of Ravenna in 1512. From 1528 to 1689 the duchy was possessed by the house of Savoy. In 1689 it was purchased by Louis XIV, who bestowed it upon the Orleans family. King Louis Philippe gave his second son the title of Duke of Nemours, and the titular dignity is still borne by a branch of the Orleans family. Pop. 4,681.

NENA (nā'na) **SAHIB**. See NANA SAHIB.

NENNIUS, nēn'ī-ūs, British historian: b. in the latter part of the 8th century. He is said to have lived in Wales and to have been the author of the chronicle, 'Historia Britonum,' or 'Eulogium Britanniae,' reaching down to the 8th century. The manuscript, written in Latin, is in the British Museum and the work has been republished several times. The best editions are those of J. Stevenson (1838) and Mommsen, in 'Monumenta Germaniae Historica,' etc. (Vol. XIII, 1898). An English translation by W. Gunn was published in 1819. Ellis speaks of the work as that of "a credulous compiler, though, from the antiquity of his materials, valuable to an inquisitive historian." His work gives the mythical account of the origin of the Britons, the Roman occupation, the settlement of the Saxons and closes with the 12 victorious battles of King Arthur. The writer has preserved valuable fragments of earlier treatises which have been lost. The historical value of his work is not great, but in mythical and legendary matters it has a recognized importance. Consult Zimmer, H., 'Nennius Vindictus' (1893); Gross, C., 'Sources and Literature of English History' (New York 1900).

NEO-DARWINISM. See WEISMANNISM.

NEO-HEGELIANISM, the doctrine of a modern school of philosophy, which has representatives among English, Scottish and American thinkers. They profess their belief in an eternal consciousness, of which the universe is the object; basing their conviction on the theory that in the world of thought consciousness and object are correlatives, and mutually implicated; and that the existence of the physical universe was prior to that of finite consciousness, and this latter is in some way correlated with physiological organisms. The most prominent Neo-Hegelian in England was Green (see GREEN, THOMAS HILL), who may be said to be the founder of English Neo-Hegelianism. Other prominent British Neo-Hegelians are E. Caird, Bosanquet, Bradley and Royce. See HEGEL, GEORG WILHELM FRIEDRICH.

NEO-KANTIANISM, the teaching of those who accept Kant's theory of knowledge, but refuse to acknowledge the doctrine of practical reason as the best guide in working out a metaphysic. Among this school may be mentioned F. A. Lange, P. Natorp and H. Cohen. See KANT, IMMANUEL. Consult any history of modern philosophy.

NEO-LAMARCKISM, the doctrine held by a school of modern naturalists, mainly American, that the results of organic evolution are due mainly to the principles and factors formulated by Lamarck (q.v.) and expounded in the article Lamarckism (q.v.), and not mainly to natural selection as asserted by the Darwinians. The modification and expansion of Lamarck's theories, due to enlarged knowledge, constitute Neo-Lamarckism—a term first applied by Prof. A. S. Packard, who with E. D. Cope and Alpheus Hyatt was among its foremost exponents.

NEO-PLATONISM, the revival and mystical transformation of the Platonic philosophy, mainly through the speculations of non-Hellenic thinkers. The word has, however, two meanings. In the first and historic sense it denotes the metaphysical theories which prevailed during the whole of the third and last period of Greek philosophy; and these theories and their several schools are usually spoken of as three in number: (1) The Jewish-Greek philosophy; (2) Neo-Pythagoreanism (q.v.) and (3) Neo-Platonism proper. In its general sense, Neo-Platonism was a syncretism of Orientalism, Judaism and Hellenism. The favorite subjects of discussion among Neo-Platonists were what they styled the dualistic opposition of the divine and the earthly; God as an abstract conception; contempt of the world of the senses; various theories of intermediate beings, half human, half divine; asceticism and the nature of enthusiasm as expounded in the so-called writings of Hermes Trismegistus (q.v.) and by the Christian Gnostics (q.v.). Near the Neo-Platonists stand Philo (q.v.), Aristobulus, the Essenes and Therapeutæ (qq.v.).

Neo-Platonism in a narrower sense is the philosophy which originated with Plotinus and his school, and not with Ammonius Saccas (q.v.) as an ancient tradition relates. Neo-Platonism was a last attempt made by Alexandrian thinkers to explain the dualism of appearance and reality. This attempt was made by a despairing leap beyond nature and reason; a solution was sought outside rationality, by a sort of intellectual suicide, and the attempts ended in the dreams of passive mysticism. It was taught that if we lose self-conscious thinking, the distinction between subject and object disappears, and if we reach *ecstasy*, we attain "union with God" and in that union all antinomies vanish. If by philosophy we understand rational thinking, Neo-Platonism must be considered a philosophical failure, and as the Neo-Platonist movement was not continued in new developments, it may well be said to represent the exhaustion and dissolution of ancient philosophy.

Its historical movement has three stages. In its first or Roman stage Neo-Platonism was essentially a "scientific" theory. Its main characteristic was the emphasis laid upon knowledge, the object of knowledge being God, and the aim of philosophy to conceive the divine essence immediately and with the innermost activity of the soul. In the second stage of Neo-Platonistic development appeared Iamblichus' systematic theology of polytheism, which distinguished what is usually called the Syrian phase of Neo-Platonism. This theology stood in strong opposition to Christianity. In its

third stage, Neo-Platonism lost its identity and under this name we are presented with a mere scholastic recapitulation, in a dialectic way, of the whole of classical philosophy. This scholastic and historic Neo-Platonism is represented by Proclus (q.v.) who reigned philosophically supreme at Athens until his school was closed by that edict of Emperor Justinian (q.v.) in 529 which was "the official certification of the death of ancient philosophy." In almost all its stages Neo-Platonism was characterized by theurgy, magic and sorcery of all kinds, and Neo-Platonist teachers did not hesitate to call themselves hierophants and to make money by divination. In attempting to repair the ravages wrought in the Greek mind by a despairing Scepticism (q.v.) Plotinus propounded the theory that knowledge transcended reason; that the absolutely true could be comprehended immediately and intuitively, namely, by ecstasy. Such inner knowing was the beholding of "the One" in itself; and a resolving of self into the absolute. The subject could not, it was taught, master the absolute by objective knowledge or through the medium of dialectic.

The Godhead, "the First," "the One," "the Good," is the original Being, incapable of definite characterization, wholly unspeakable and superior to all comparisons; it is "that which stands above being," and is neither thinking, willing, nor desiring. The world emanates from out the Godhead by an eternal, timeless and necessary process, without division of itself or loss of essence. The world, being an effluence or overflowing of the divine, is more or less perfect according to the degree of nearness to or remoteness from its source. Each degree of emanation, however, has for its principle the totality of being. Next to the original "One," reason is the most perfect. It contains in itself the Ideal World and the whole of true and changeless being. Christian Neo-Platonists often identified the reason (*Nous*) of Plotinus with Logos, the second person of the Christian Trinity. That was a mistake. Logos with Plotinus is scarcely more than "law" regarded as "vital force" and in operation resembling instinct. The Johannean Logos is both immanent and transcendent. From reason emanates the World-soul, though reason incurs no change thereby. The World-soul actualizes reason in the outer world; it gives external qualities to sensible matter, which is the last and lowest of the emanations. Matter is itself undetermined, has no quality nor being. The visible universe is only a transcript of the World-soul. Plotinus does not concern himself much about the fact of the imperfections of individual things and the sin which exists in the world. As the World-soul links reason and matter, so do individual souls partake both of reason and sense. Mankind has a supersensible soul, which has pre-existed, and a lower soul which builds up the body. Souls came down from the rational or light-world, which is their real home and retain a recollection of it, hence their longings are always for a return. From these longings come our redemption and our prospective union with Divinity, and the degree of seriousness with which we realize them determines our worth as individuals. Pure sense-perceptions do not help the soul in its soaring which is rather promoted by thought

and reflection. The strongest incentive and most potent force in the elevation of human nature is love of the beautiful, the Platonic *êpos*. Neo-Platonism, together with Neo-Pythagoreanism, which had preceded it, represents an effort of paganism toward reform and reconstruction in order to meet the supernaturalism, monotheism and universalism of the victorious Christianity which was everywhere pushing hard upon pagan thought and religion. In Iamblichus ("the divine" or "the famous hero" as Emperor Julian (q.v.) called him) Neo-Platonism finds expressed its religion, and expressed not so much according to Plato as according to Pythagoras (q.v.). Iamblichus created a fantastic pantheon in order to bring the entire world of gods into a system, in which he co-ordinated all cults, excluding Christianity, which was feared as a rival; but this erudite religion failed to meet "the desire of the nations" or "the spirit of the times." "Any old woman of the Christians," said Augustine, sarcastically, "is wiser than these philosophers."

Neo-Platonism, as represented by Proclus, made a last supreme effort to retain an authoritative position in the world of thought. Proclus attempted to systematize the entire historical content of Greek philosophical thought, and place it upon a coherent and logical basis, but the effort was fruitless. A few feeble echoes of this teaching are perceptible in the writings of some of the Church Fathers, as for instance, Clement and Origen. Subsequent phases of philosophic speculation bear sometimes the imprint of Neo-Platonism. Attempts were made by Ficinus (1433-99), a celebrated Italian scholar, by Pico della Mirandola and other Florentines for its restoration. The English "Cambridge Platonists" in the 17th century also tried to revive it. Thomas Taylor (q.v.) (1758-1835) may be called the last European Neo-Platonist. Consult Guthrie, 'The Philosophy of Plotinos' (Philadelphia 1896); Kirchner, 'Die Philosophiedes Plotin' (Halle 1854); Richter, 'New Platonische Studien' (Halle 1864-67); and the larger Histories of Philosophy, such as those of Ueberweg, Wendelband and Zeller.

C. H. A. BJERREGAARD,
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NEO-PYTHAGOREANISM, a Hellenistic school of philosophy which, after the custom of the times, attached to itself the name of Pythagoras, together with his numerical symbolism, although it drew much more largely from Platonic sources. It was founded in the 1st century B.C. by Nigidius Figulus, a Roman magistrate and its chief exponent was Apollonius of Tyana (q.v.), whose philosophical teachings took the form of a controversy with the Neo-Platonists. Neo-Pythagoreanism coupled the Platonic belief in the existence of real ideas with the theory that these are mental in nature—that is, that they are ideas, in the modern sense, in the mind of God. The consequent dualism between a God purely mental in nature and an absolutely non-mental matter received such an ethical trend as to be strongly suggestive of an Oriental influence, though precedents for such a view may be found among the earlier Greek thinkers and indeed in the works of Plato himself. At any rate, many ideas even more strictly Oriental in char-

acter were incorporated into Neo-Pythagoreanism. These were conjoined with a strong ascetic trend, based apparently on the ethical dualism, yet reminiscent of the Stoic-Cynic tradition. Consult Zeller, 'Die Philosophie der Griechen' (Leipzig 1880-81); Vacherot, 'Histoire critique de l'Ecole d'Alexandrie' (Paris 1846-51).

NEOCENE, in geology, a term used by the United States Geological Survey to include what Lyell called the Miocene and Pliocene periods. The word means "new (or late) recent," and is contrasted with Eocene, "dawn (or early) recent." See TERTIARY.

NEOCOMIAN (Lat. *Neocomum*, Neuchâtel), in geology, a term applied to the lowest marine stages of the Cretaceous system, because of its typical occurrence at Neuchâtel in Switzerland. There and in southern France this formation, consisting of limestones and marls, is as much as 1,600 feet thick. The term corresponds to the English Wealden and lower greensand, and to the German Hils; is little used in America, and in France is used broadly and strictly, Neocomian in the wider sense including the stricter Neocomian (made up of Hauterivian and Valanginian), as well as Barremian and Aptian. Consult Paylow, *Quarterly Journal London Geological Society* (Vol. LIII, 1896).

NEODYMIUM, in chemistry, an element whose existence as a constituent of didymium (q.v.) was recognized by Auer von Welsbach. It occurs in cerite. It has the chemical symbol Nd and an atomic weight of 144.3, and is distinguished from other constituents of didymium by yielding rose-colored salts. Its oxide has the formula Nd_2O_3 . Pure neodymium salts were first obtained by Demarcay in 1898. Metallic neodymium melts at 840° C., has a specific gravity of 6.9, and decomposes water slowly when cold and rapidly at the boiling point. Its properties are much like those of cerium (q.v.). Consult Kellermann, 'Die Ceritmetalle und ihre prophore Legierungen' (Halle 1912).

NEOGENE (Greek, "late-born," "late"), in geology, a term used by Continental geologists to include the Lyellian Pliocene and Miocene, that is corresponding with Neocene (q.v.), as used by the United States Geological Survey.

NEOHIPPARION, a genus of primitive horses found fossil in the Upper Miocene and Lower Pliocene of the western United States. Complete skeletons have been obtained, and show this horse to have been a small pony with slender deerlike legs and three functional toes. It was probably the earliest kind of horse adapted to a grazing life in a desert region, and appears to have been very numerous and represented by two or more species.

NEOLITHIC PERIOD, The. The Neolithic (Greek *neos*, recent, and *lithos*, stone) Period was so named because in it man ground some of his stone tools, especially the celt or ax, whereas, Paleolithic man made only chipped implements. More important differences than these, however, distinguish the cultures of the two periods. Paleolithic man was a hunter and knew nothing of agriculture; he had no domesticated animals, not even a dog; he had not

learned to make pottery and, consequently, cooking as an art had not been acquired. Early in the Neolithic Period, on the other hand, man had domesticated the dog, cow, sheep, pig, horse and goat; he planted and harvested grains of various sorts; he had learned to spin and weave and make pottery.

Transition between the Paleolithic and Neolithic.—The meaning of the rather sharp break between the Paleolithic and Neolithic has given rise to much discussion. With the evidence now at hand one can do little more than speculate on the reasons for the seemingly sudden change in Europe from the old to the new. As the climate of Europe changed and the animals which Paleolithic man hunted disappeared, and as the population became too dense for the supply of food obtained by the chase, other means of securing food necessarily would be sought. Edible seeds would be gathered and stored and some of these, scattered by chance, would grow and methods of cultivating them would speedily be devised. The domestication of animals was probably brought about by rearing the captured young of wild animals such as the sheep and goat, some of which were kept until grown and offspring born. The new requirements of a more sedentary life which would result from this readjustment would lead to the invention of new tools, or the better finish of old ones, and it is not surprising that Neolithic man early learned to grind and polish the edges of his stone axes. There is little evidence that the higher civilization of the Neolithic was developed in Europe, but rather it is probable that tribes of Neolithic people who had made progress in some other continent migrated to Europe and either absorbed the Paleolithic inhabitants or destroyed them. If the Paleolithic inhabitants were absorbed peaceably by the new immigrants, the amalgamated population would necessarily adopt the mode of living best suited to the altered conditions of the environment, i.e., Neolithic methods. "The gradual disappearance of the reindeer and other mammalia would henceforth necessitate a complete change in their manner of living. The nomadic hunter would soon sink into the herdsman, and the mechanic would readily lay aside his roughly chipped tools for those with finely ground and polished edges. On the other hand, should a few cave shelters in one or two favorite localities continue to be inhabited after the arrival of the Neolithic tribes on the scene there might be few traces of amalgamation to be found." (Munro). It is evident that the newcomers would learn something from the inhabitants among whom they settled and that certain of their tools and methods of making tools would be acquired and retained in the new civilization.

Some authorities hold that the last phase of the Paleolithic, the Azilian (see PALEOLITHIC PERIOD), nearly bridges the gap between the two periods. If the inhabitants of Maglemose (Great Peat Bog) on the Island of Zealand, Denmark, were Paleolithic people the gap is even more nearly filled. This station is a peat bog several hundred yards from the old shore of a lake which, on geological grounds as well as on the evidence of the flora and fauna, is shown to be older than the kitchen middens or shell heaps, which are generally considered to

le the oldest works of Neolithic man. One remarkable feature of the Maglemose remains is that the huts of the people were built on a huge raft or floating island. Many chipped flint implements have been found but none showing any trace of polish. No pottery has been discovered but many objects made of bone and staghorn, such as daggers, fish-hooks and harpoons.

Kitchen Middens or Shell Heaps.—It is generally agreed that the shell refuse heaps, so well preserved in Denmark, were made by man near the beginning of Neolithic times. Some of the kitchen middens are as much as 10 feet thick, more than 900 feet long, and from 100 to 200 feet wide. They are composed almost wholly of shells, with a few bones of fishes, birds and mammals, some fragments of pottery and a few flint implements. Everything in the heaps was brought to the spot by man. The most abundant species of shell-fish in the mounds are the oyster, the cockle (*Cardium edule*), the mussel (*Mytilus edulis*), and the periwinkle (*Littorina littorea*). Of these shell fish the oyster has disappeared from the neighboring waters, and the cockle and periwinkle are much reduced in size. Among the bones of wild birds which occur are those of the duck, goose and wild swan. The fact that the wild swan visits Denmark only in the winter is probably evidence that these ancient Neolithic fishermen did not migrate from one part of the country to the other at different seasons.

The flint implements of the kitchen middens consist of long flakes, 8-13 inches in length, some of which were used for knives; triangular axes, none of which are ground on the edges, awls and the so-called pick. Bone and horn tools, and, for the first time in man's prehistory, fragments of pottery also occur. The making of pottery was a momentous discovery for primitive man, since by its use he was enabled to cook a greater variety of foods and to render others more digestible and palatable. It is to be noted that polished flints are absent in these early Neolithic deposits. Sites of huts inland have also yielded potsherds and unpolished stone implements but no polished flints. The similarity of some of the tools to those of the kitchen middens indicates that these remains are of the same age. The term Campignian has been given to these remains, which are probably contemporaneous with the Kitchen Middens.

Lake Dwellings.—During the greater part of the Neolithic Period huts erected on piles driven into the mud of the shallow waters of the larger lakes of Switzerland were inhabited by man. The lake villages were connected with the shores by draw bridges and the inhabitants used large canoes dug from trunks of big oak trees. Lake dwellings were more common in Switzerland than in other parts of Europe, but Neolithic man also built them in Denmark, Austria, and other countries. Lake dwellings were also used in Europe by men of the Bronze Age, and even at the present time houses built on piles driven into the mud of lakes and other bodies of water are occupied by the natives on the estuaries of the Amazon and Orinoco rivers by natives of New Guinea, Central Africa, Borneo and elsewhere.

A great deal is known of the life of the

Neolithic lake dwellers because of the excellent preservation of their implements and household utensils in the mud and peat of the lake bottoms, where they fell after the destruction of the dwellings by fire or where they were lost or thrown from the platforms upon which the wattled huts were built. Stone axes with wood or staghorn handles, arrowheads, barbed harpoons of staghorn, fish hooks and needles of bone, and wooden utensils such as tubs, spoons, and plates have been unearthed. Cloth was made of wool and flax, and fish nets and fish lines of flax.

The pottery shows that the lake dwellers made utensils of clay of sufficiently good quality to withstand fire as is indicated by the soot which still coats the bottoms of some of them.

The lake dwellers cultivated wheat, barley, millet, and flax as is shown by the presence of these cereals in the mud among the piles. Loaves or cakes of unleavened bread made from wheat and millet have been discovered, and show the approach to a modern mode of life. Stable refuse on the lake bottoms beneath the ancient huts indicates that horses, sheep and cattle were domesticated and were stabled in the lake dwellings. The advantage of lake dwellings to Neolithic man consisted largely in the protection they afforded to their possessors because of their easily defended positions.

Burials.—The Neolithic people honored some of their dead by burying them with their most precious possessions under mounds of earth or stone, called barrows or tumuli. In Great Britain some of the barrows are 200-400 feet long and 60-80 feet wide and generally contain one or more chambers constructed of huge slabs of stone. In Great Britain there are two forms of the barrow, the long barrows which contain skeletons with long-headed or dolichocephalic skulls, and the round barrows which contain short-headed or brachycephalic skulls. Some barrows contain a single skeleton whereas others were family or tribal cemeteries. In Denmark a single tumulus contained 70 burnt interments. Tumuli were also erected in the Bronze Age and many beautiful bronze implements have been discovered in them.

Dolmens are structures formed by great stone slabs set on edge and capped with one or more slabs forming a table-like structure. The size of some of these roof stones and the difficulty of placing them in position is realized when it is known that some of them weigh as much as 40 tons. Some of the dolmens were formerly covered with earth and stones which have since been removed either by man or by the natural process of erosion.

Classification.—An entirely satisfactory classification of the Neolithic in Europe has not yet been made, but that of Montelius for Sweden seems to be well established. It is based on the variations in form of the chipped and polished ax heads or celts which were gradually evolved or introduced and upon geological evidence. Beginning with the most recent deposits the classification is as follows:

Stage IV (Youngest). Axes of the thick or broad-headed type with relatively flat sides and nearly square cross-section at about the middle. Axes with shaft holes. Exquisitely chipped, broad-bladed, flint daggers with a narrower portion for a handle. In some places the burials were in stone cists.

Stage III. Axes about the same as in Stage IV. Narrow-bladed flint daggers of beautiful workmanship. Graves with covered passages.

Stage II. Axes of the small or thin-necked type, almost rectangular in form and with strongly arched sides and square angles, Age of Dolmens.

Stage I (Next to Campignian and Kitchen Middens in age). Axes of the pointed-necked type, either rough hewn or polished. Triangular in cross-section.

Climate and Geography.—The climate of Switzerland during Neolithic times seems to have been nearly, if not quite, as it is now as is shown by the seeds and fruits which have been preserved in the mud and peat under the lake dwellings. The wild species do not differ from similar species in the same region to-day and the cultivated grains are unlike those now grown in Switzerland in size only. The larger size of our cultivated cereals is doubtless the result of many years of selection.

The physical geography of Europe during Neolithic times did not differ greatly from that of to-day. Great Britain was separated from Europe by the English Channel as it is now. The fact that the cockles, mussels and periwinkles of the shell heaps of Denmark are of full ocean size whereas those of the present Baltic are only about one-third the normal size is proof that the water has been freshened since then and indicates that the connection between that sea and the ocean has been decreased in width or depth by the elevation of the bottom and land near its entrance to the Atlantic. Raised beaches also prove that the coast of southern Norway has been raised about 225 feet since the beginning of the Neolithic Period. As one passes south along the coast of Denmark the Kitchen Middens gradually approach the sea-level until in southern Jutland and Schleswig-Holstein they disappear altogether and are not found again until the coast of Belgium is reached. It is probable that men made Kitchen Middens along the shores south of Denmark, but that a lowering of the land has caused them to be covered with water. This belief is confirmed by the dredging of implements of Campignian Age near Koldin at a depth of 10 or 12 feet. Notwithstanding these minor differences the climate and geography of Europe during the Neolithic was very similar to those of the present.

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NEON. See LIQUEFIED AND COMPRESSED GASES.

NEOPHYTE (Greek, "newly planted or grafted on"), originally applied to those newly initiated into the Eleusinian or other ancient Greek mysteries, of whom Plato says "there are many wand bearers (the wand being the badge of the initiated) but few mystics." The catechumens who had been just baptized were so styled in the early Church. These newly made Christians were considered less likely to stand firm against paganism than their older and more experienced brethren. Hence the term was slightly tinged with disparagement. Saint Paul forbade the ordination of the neophyte or novice (1 Tim. iii, 6), and the 3d Council of Arles (524) decreed that a year's probation was necessary for candidates for holy orders among the newly baptized. Yet Ambrose was elected bishop of Milan (374) when he was but a catechumen and was consecrated soon after his baptism. Newly converted pagans or disbelievers are still styled neophytes by Roman Catholic missionaries and Gregory XIII established a college at Rome (1622), the Propaganda, in which they might be educated and trained to preach to and convert the people of their own land.

NEOPLASMS. See TUMOR.

NEOPTOLEMUS, nē-ōp'tōl'ē-mūs (also called PYRRHUS), in Greek legend, the son of Achilles and Deidamia. Taken to Troy by Odysseus, he was one of the band who captured the city by means of the wooden horse. He slew Priam and took to himself Andromache, the wife of Hector. He afterward went to Epirus, where he married Hermione, in consequence of which Orestes, her former lover, killed him at Delphi.

NEORNITHES, nē-ōr'ni-thēz, or **EUORNITHES**, a sub-class of the class *Aves* (birds) embracing all known birds, fossil or recent, since the Jurassic Period, as distinguished from another sub-class *Archæornithes*, which contains, so far as yet known, only the archæopteryx (q.v.). The sub-class *Neornithes* may be divided into three sub-divisions, namely, (1) *Ratitæ*; (2) *Odontolcæ*; (3) *Carinatæ*.

NEOSHO, nē-ō'shō, Mo., city, county-seat of Newton County, on the Kansas City Southern, the Missouri and Northern Arkansas and the Saint Louis and San Francisco railroads, about 170 miles southwest of Jefferson City and 140 miles south by east of Kansas City. It was settled in 1839; in 1868 was incorporated as a town and received its city charter in 1878. It is near the lead and zinc mining region of Missouri. The chief manufacturing establishments are machine-shops, flour mills, foundry, agricultural implement works, repair shops and furniture factory. There is located here a government fish hatchery which occupies 34 ponds. It is the seat of the Scarritt Collegiate Institute (M. E. South) and has a high school, elementary schools and a public school library. The city owns and operates the water-supply system. Pop. 3,968.

NEOSHO, a river which has its rise in Morris County, Kan., in the central part of the State. Some of the small streams which form the head-waters have their sources near short streams that flow north into the Kansas River.

The Neosho flows south by east and enters the Indian Territory at the northeast corner. It continues an irregular course, mainly southeast, for a distance of about 40 miles; then turns southwest, which course is continued to its junction with the Arkansas River at Fort Gibson. Its whole length is about 400 miles. Some of the cities on its banks are Council Grove, Emporia, Burlington, Iola, Humboldt, Erie and Oswego, all in Kansas.

NEOTENY. See *PÆDAGENENSIS*.

NEOTROPICAL REGION, or **NEOGÆA**, one of the primary faunistic divisions in the zoogeographical scheme of Wallace and Sclater, embracing South America, Central America, as far north as the highlands of northern Mexico and the West India Islands. It is perhaps the most sharply defined and separable of all the "regions," but shows some extraordinary affinities with Australasia; hence some students of the distribution of animals have united it with those parts of the world in a still more comprehensive "province," called the Notogæic, in contrast with the Northern hemisphere as the Holarctic or Arctogæan province. It is characterized by the broad-nosed monkeys, the vampire-bats, the many peculiar edentates, the absence of antelopes, sheep, goats, horses and oxen, the presence of a fairly large marsupial fauna, including deprotodont forms, several peculiar families of birds, the American ostrich, the dipnoan *Lepidosiren* and very many other peculiarities. See *ZOOGEOGRAPHY*.

NEOZOIC (Greek, "late life"), in *geology*, a term introduced by Edward Forbes, but never in common usage, to include the Mesozoic and Cenozoic, between which he argued there was no such distinction as between them on the one hand and the Palæozoic on the other. The word is sometimes used as an equivalent of Tertiary and sometimes as synonymous with Cenozoic.

NEPAL, nè-pāl, **NIPAL**, nè-pāl', or **NE-PAUL**, Asia, an independent kingdom, on the southwest slope of the highest part of the Himalaya range, north of India, bounded on the north by Tibet, on the east by Sikhim and on the south and west by Bengal and the United Provinces of Agra and Oudh, British India. It lies between lat. 26° 25' and 30° 17' N., and long. 80° 6' and 88° 14' E.; is 500 miles long with a maximum breadth of 150 miles and has an estimated area of 54,000 square miles. The main portion of the country is a table-land from 3,000 to 6,000 feet above sea-level. Within its boundaries are the highest mountains in the world, Everest, Dhawalagiri, and on its eastern border, Kinchinjunga. From the mountains the land gradually descends southward, forming four distinct terraces, differing in climate and vegetation. The Terai or southern lowland, well wooded and extensively cultivated, is traversed by numerous small streams. The most important rivers are the Karnali, the Gandak and the Kusi, all of which rise in Tibet and force their way through the Himalayas by deep and precipitous gorges to join the Ganges. The climate is on the whole temperate, except in the most elevated northern districts, where it is very cold. Magnificent forests of sal, sisoo and toon trees stretch along the declivities of the lower hills into the adjacent plains. The forests higher up exhibit a greater variety, gradually assuming more and more of an Al-

pine character. The principal products are rice, wheat, barley, pulse, potatoes, sugar-cane, buckwheat, hemp, cotton, tobacco and madder. In the mountainous parts a valuable article of cultivation is a large species of cardamom, and in other places ginger is grown to a considerable extent. Pasturage is on the whole scarce and indifferent. The sheep and goats, however, have fine wool. Horses are imported from Tibet. The wild animals are elephants, black bears of great size, hogs, hog-deer, foxes, jackals and a few tigers. Fish abound in the streams of the Terai. The manufactures of Nepal are confined chiefly to two kinds of coarse cotton cloth, called khadi and changa, of which the dress of the middle and lower classes of the people is made. Articles in copper, brass and iron are also manufactured in various places; likewise bells of a kind of bell-metal called phul, but considered inferior to those of Tibet; and also a very strong paper, remarkably well fitted for packages. Wood-carving and pottery are important industries, but appear to have declined in recent years. The trade of Nepal is chiefly carried on with British India and Tibet. From the former it imports Bengal cottons and muslins, silks and raw silk, carpets, English cutlery, etc.; and from the latter Chinese silk stuffs, paper, drugs, gold and silver, sheep, musk, skins of the musk-deer, etc. Its chief exports are the natural products of the country. Exports in normal years aggregate about 48,000,000 rupees and the imports about half that sum. Iron, lignite, copper, lead, zinc and gold are found and mining is carried on in a small way.

The government of the country is a military oligarchy with a maharaja as the nominal head, but a Prime Minister as its real ruler. The latter is assisted by a council, the members of which are chosen by him. The ruler acknowledges a certain amount of dependence on the Chinese government, but is in more real dependence on British authority. A British Resident and a small body of British troops are stationed at the capital, Khatmandu, and British influence is gradually increasing. This is evident in the more humane code of laws now in operation. The foreign relations are controlled by the British Indian government. Revenue is obtained from taxes on land, mines, forest products and monopolies, also from customs. There is a good army of 45,000, consisting mostly of Gurkas, who are able fighters. The population of the country is estimated at over 4,000,000. The inhabitants are chiefly Newars, a race probably of Mongolian and Chinese origin; the dominating race is the Gurkas (q.v.). In the east there is a considerable mixture of Hindus and Bhotias, the latter of Tibetan stock. Other tribes of Nepal are the Limbus, Lepchas, Bokras, Kirantis, Murmis and Tharus. The languages spoken are of the Tibet-Himalayan branch of the Indo-Chinese languages. Parbatya is the common tongue of intercourse. It is written in the Nagari character. The Newars have a language peculiar to themselves. The prevailing religion is Hinduism, but there are also some Buddhists. There is complete religious liberty. Education is in the hands of the clergy and is in a backward state. The majority of the population are illiterate. The upper classes send their children to the institutes of higher learn-

ing in British India. Most of the domestic servants are slaves. The country was formerly possessed by numerous independent rajahs, and extended west to the Sutlej; Hiuen Tsang, a Chinese pilgrim, mentions a ruler of the 7th century, Anuvarma. Harisinha-Deva, rajah of Simraungarh, invaded and occupied Nepal in 1324. But about the middle of the 18th century the rajah of Ghurka began to extend his dominions by conquest, in which he and his successors were so successful that in less than 50 years they had conquered the whole of Nepal and made themselves kings of that territory. Subsequently (1816) a large portion of the kingdom was cut off by the British, who reduced its western limit to the river Kali instead of the Sutlej. By the Kot massacre in 1845 Jung Bahadur made himself master of the country and proved a firm but beneficent ruler; he aided the British during the Indian Mutiny in 1857; at his death in 1877 he was succeeded by his brother who reigned until his assassination in 1885, when he was succeeded by Dhiraj Pirthvi Bir Bikram. The latter died in 1911, and the throne devolved upon his son, Tribhubana Bir Bikram.

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NEPENTHE, ne-pen'thē (Greek, *nē*, a negative prefix, and *penthos*, sorrow), a magic potion or drug which was fabled by the poets to banish the remembrance of grief and to cheer the soul. The invention was attributed to the Egyptians. It was given to Helen in Egypt and has been variously identified with opium or some preparation of hemp.

NEPENTHES, a genus of pitcher-plants (q.v.).

NEPHELITE, or **NEPHELINE**, a native silicate of aluminum and sodium, of the formula $\text{Na}_2\text{Al}_2\text{Si}_2\text{O}_8$, crystalizing in the hexagonal system and also occurring in massive forms. It exhibits various colors and has a vitreous lustre, a hardness of from 5.5 to 6 and a specific gravity of about 2.6. It occurs in recent eruptive rocks, notably at Mount Somma, Vesuvius and at Hot Springs, Arkansas. Leucite, a similar mineral, is found in the same sort of place and contains potassium in place of sodium.

NEPHELIUM, a genus of fruit-trees. See **LITCHI**.

NEPHI, nē'fī, Utah, city, county-seat of Juab County, on the San Pete Valley and the

San Pedro, Los Angeles and Salt Lake railroads, about 80 miles south of Salt Lake City. It is in a high valley in which there are a number of good farms. The chief products of the surrounding country, all of which contribute to the prosperity of Nephi, are farm products, salt, gypsum, lumber and livestock. The city operates an electric-lighting plant and a modern water-supply system. Pop. 2,759.

NEPHOSCOPE, nēf'ō-scōp', an instrument for determining the apparent velocity and motion of clouds. It is in the form of a horizontal mirror, with compass-points or degrees drawn on the mirror, or on the surrounding frame; with an adjustable sighting piece placed above the mirror. The sighting-piece serves as a fixed point for viewing the cloud shadow as it moves away from the centre of the mirror.

NEPHRECTOMY, nē'frēc-tō'mē, the excision or removal of a kidney. In cases of tuberculosis, calculi, multiple abscesses, pyonephrosis, hydronephrosis, sarcoma, wounds, tears and ruptures of the ureters, this operation may be called for. The removal of a single or horseshoe kidney is considered a fatal operation. Before removing a kidney it is necessary to ascertain whether the remaining organ is capable of excreting its due amount of urine. Abdominal nephrectomy (anterior nephrectomy) is the excision of a kidney through an incision in the abdominal wall; lumbar nephrectomy the most common method (posterior nephrectomy), an excision, through an incision in the loin.

Nephrorrhaphy, nephropexia, or nephropexy is the fixation of a movable kidney by sutures.

NEPHRITE. See **JADE**.

NEPHRITIS. See **CIRRHOSSIS**; **KIDNEYS**.

NEPHROTOMY, nē'frōt-o'mē, incision of a kidney, an operation deemed necessary by the surgeon when it has been ascertained by exploration with the aspirator-needle or otherwise that the kidney is the seat of any condition or disease which endangers the life of the patient. It is resorted to for the removal of calculi (nephrolithotomy), of tumors and for relieving congestion.

NEPHTHYS, nēf'this, in Egyptian mythology, a deity, sister of Osiris and Isis, wife of Typhon, and mother of Anubis by Osiris. Some consider her as the symbol of the Egyptian coast on the Mediterranean; others as the personification of the five intercalary days of the Egyptian year, in which point of view they are called her children by Mercury, the Sun and Saturn; or as a protector of the dead from evil influences. This meaning comes from the legend of her mourning the loss of Osiris with her sister Isis. Consult Budge, E. A. T., 'The Gods of the Egyptians' (Vol. II, London 1904).

NEPIDÆ. See **FRESH-WATER INSECTS**.

NEPIGON, or **NIPIGON**, a lake in Canada, in the northwestern part of the province of Ontario; about 35 miles north of Lake Superior. It is 813 feet above Superior; about 60 miles long and 45 miles wide; its outlet is Nepigon River, which flows south and enters Lake Superior through Nepigon Bay. Area, 1,730 square miles. The coast line is remark-

ably rocky and irregular, in some places forming lofty headlands; the total length of coast line is nearly 580 miles. It has a number of small wooded islands. Several streams enter the lake, and in the vicinity are a large number of small lakes, all of which, together with Nepigon, once formed a very large lake. The lake is a favorite place for sportsmen as it is well stocked with fish.

NEPOMUK, Johann, yō'hān nā'pō-mook, patron saint of Bohemia: b. Pomuk; about 1340; d. Prague, 20 March 1393. He rose to be a high ecclesiastical dignitary, and was put to death at the order of King Wenzel IV of Bohemia by being thrown into the Moldau River. Differences as to Church policy and other reasons, often conflicting, are assigned for this procedure. But the most authentic account, compiled (1670) originally by Bohuslav Balbinus, a Jesuit, narrates the story as follows: According to Balbinus, Nepomuk obtained the degree of magister at Prague, eventually became almoner of King Wenzel and confessor to Queen Johanna and, after imprisonment and torture, was put to death for refusal to divulge certain matter of the confessional. Balbinus dates the martyrdom in 1383, but the best sources make the time as above given, 10 years later. Hajek of Labocan conjectured (1541) that there were two Johns and this idea was assumed by Balbinus; but Dabrowski established (1787) the fact that there was but one. Abel ('Die Legende vom heiligen Nepomuk' 1855) presented the curious theory that John of Nepomuk was really the development of the Protestant hero, John Huss, into a Catholic saint. But this is altogether without foundation. Previous to his canonization by Pope Benedict XIII in 1729, Nepomuk had already been venerated as protector against slander and danger by water. His day, 16 May, is still observed in Bohemia as a time of high festival. Consult Frind, 'Der geschichtliche Johannes van Nepomuk' (2d ed., 1871); and for the various contemporaneous accounts and the questions as to the existence of two persons of this name consult article 'John Nepomucene' in the 'Catholic Encyclopedia' (New York 1910); also 'Nürnberger in Jahresbericht der schlesischen Gesellschaft für vaterländische Kultur' (1904).

NEPOS, nē'pōs, Cornelius, Roman historian: b. Upper Italy, about 100 B.C.; d. about 24 B.C. His earliest writings consisted of verses and three books of 'Chronica.' With the exception of a geographical treatise, his remaining works were directed toward the study of manners, customs and character. Such are the five books of 'Exempla,' supposed to have been an account of the men who stood as types of the virtues of earlier Rome. Such, too, were the elaborate biographies of Cicero and Cato the Elder. But the most comprehensive of his publications was the 'De Viris Illustribus' ('Of Illustrious Men') in probably 16 books, in which the lives of foreigners and of Romans were juxtaposed in a parallel arrangement. Of this there are extant the portion 'De Excellentibus Ducibus Exterarum Gentium' ('Of Prominent Foreign Generals') and the biographies of Cato and Atticus. The lives of Atticus and Cato have been uncontestedly assigned to Nepos, but until the edition of Diony-

sus Lambinus (1569) the 'De Excellentibus Ducibus' was supposed to be the work of a certain Æmilius Probus. Lambinus' verdict, based on both historical and stylistic grounds, has been almost universally accepted. The style of Nepos is too colloquial; his matter is often lamentably inaccurate; but the essays are in general well arranged and fair in their judgments. There are several good editions by Nipperdey (rev. by Lupus 1879), by Lindsay (New York 1895); Flagg (ib. 1895) and others. Consult Schanz, M., 'Geschichte der römischen Litteratur' (Vol. I, part II, 3d ed., Munich 1909).

NEPOTISM, a system or custom practised by several of the earlier popes of granting high honors, dignities, offices, pensions and the like to their family relations, generally their nephews; hence family favoritism of any sort.

NEPTUNE, (1) in astronomy, the most distant planet of the Solar system, its mean distance from the sun being 2,795,998,000 miles, and its least distance from the earth 2,629,000,000 miles. The eccentricity of its orbit is .00872; its inclination to the plane of the ecliptic is 1° 47'. The apparent diameter is about 2' 7". The real diameter is estimated at about 36,000 miles, and it seems to have very little polar compression. Its mass is about 16¾ times that of the earth. The largest telescopes give us little information as to whether or not it has belts. A satellite of Neptune was discovered by Lassell of Liverpool in 1846. It is peculiar in revolving from east to west. Neptune revolves round the sun in 164.6 years. The discovery of Neptune was an interesting piece of deduction based upon a known disturbance of the motion of Uranus. Leverrier, a Frenchman, proved that this disturbance could only properly be ascribed to some other, as yet unlocated, heavenly body, and his computation of its probable situation led to its discovery by Galle of Berlin, on 23 Sept. 1846. Airy of England also computed its location about the same time. (2) In Roman mythology the god of the sea; son of Saturn and Rhea, and brother of Jupiter and Pluto. He is variously represented; sometimes with a trident in his right hand, a dolphin in his left, and with one of his feet resting on part of a ship; at others in a chariot drawn by sea-horses, with a triton on each side. See POSEIDON.

NEPTUNE, Temple of, the name of two ancient structures, one at Paestum in Lucania, and the other on the Campus Martius in Rome. The latter was erected by Agrippa 26 B.C. It was destroyed by fire 80 A.D., but was restored by Hadrian.

NEPTUNIAN THEORY (Lat. *Neptunus*, god of sea), in geology the view advanced by Werner (q.v.) that geological change is due entirely to the influence of water, the earth in the beginning having been covered with water, which hold rock-material in solution. This hypothesis, also styled Diluvian Theory, was opposed by the Vulcanians, who held the igneous or so-called Plutonic theory. It is now recognized that though perhaps most rocks are of sedimentary origin, igneous rocks also form a large part of the crust of the earth. See GEOLOGY.

NERAC, nā-rāk', France, a town, capital of an arrondissement in the department of Lot-et-

Garonne, 16 miles southwest of Agen, on the precipitous banks of the Baise. In its old castle, now a mere ruin, Henry IV, of whom there is a bronze statue in the town, spent part of his youth, and at an earlier period Calvin and other reformers found an asylum with Margaret of Valois, queen of Navarre. The town has manufactures of coarse woollens, ship-biscuit, corks, coaches, cloth, beer, brandy, and trade in wine, grain and hemp. Pop. 6,300.

NERBUDDA, nēr-būd'dā, or **NARBADA**, nār-bā'dā, India, a river which rises in the Malkal range, 3,493 feet above sea-level, in the north of the Central Provinces, flows first west and northwest across the Amarkantak plateau, then west, inclining gently to the south, and after forming part of the boundary between the Central Provinces and Indore, falls into the Gulf of Cambay, after a course of about 800 miles. In the wet season it rises in some places 25 feet, and in others 70 feet above its lowest level. Though much obstructed by shelves and cataracts, it is navigated by boats to the falls of Daree, about 250 miles from its mouth. To the Hindus the river is a sacred stream, almost equal to the Ganges in sanctity. It is regarded as a meritorious act to walk from the sea to its source and back again along the banks of the river. There are valuable coal and iron beds in the valley near Hoshangabad, and a railroad skirts the river from Barhanpur to Sihora.

NEREIDS, nēr'ē-īdz, in Greek mythology, were sea nymphs, daughters of Nereus and Doris. They were 50 in number, and they had, like their father, the gift of prophecy and the power of assuming different shapes. They were specially the nymphs of the Mediterranean, and were distinguished on the one hand from the Naiads or the nymphs of fresh water, and on the other hand from the Oceanides or nymphs of the ocean. Few of them figure in legend as individuals, among them principally is Thetis, mother of Achilles. In art they are represented as observing the contests between sea-deities, and a favorite portrait is that of the Nereids bringing the armor forged by Hephaestus to Achilles.

NEREIS, a marine annelid, one of many species, scattered throughout the world, of polychaet worms (see *ΠΟΛΥΧΕΤΑ*), of the family *Nereidae*, which contains the most highly organized of this group of animals — "the highest type of *Annulata*" according to Packard. Their bodies are visibly annulated, flat and scaly. A distinct head is present, provided with a retractile proboscis, which is usually armed with teeth or jaws. Eyes and tentacles are borne on the head. The locomotive appendages are very fully developed, and the respiratory or breathing organs, in the form of tuft-like branchiae or gills of rudimentary nature, are borne on the dorsal aspect of the body-segments. The sexes are separate, the eggs are probably laid in masses between tide-marks, and the young at first appear as surface-swimming ciliated bodies, but the stages of development have not been traced. The posterior segments of certain species of *Nereis*, when they contain generative products, become markedly unlike the anterior segments, and the animal comes to be known as a *Heteronereis*. This was formerly supposed to be a distinct genus. A typical and numer-

ous species on the Eastern American coast is *Nereis virens*, which lives between tide-marks in holes in the mud. It secretes a viscid fluid lining its hole, up which it moves, pushing itself along by its bristles and ligulae. At night probably, during the breeding season, they leave their holes and swim at the surface of the water. Some of these nereids are commensals. *N. bilineata* and *N. succinea* inhabit the tubes of a species of *Teredo*, and *N. costae* is found in the cavities of sponges. Consult Packard, 'Zoology' (1897); Arnold, 'Sea Beach at Ebb Tide' (1901).

NEREUS, nēr'ē-ūs, in Greek mythology, a divinity of the sea, the progenitor of the Nereids (q.v.). He is represented as an old man, with a wreath of sedge, sitting on the waves with a sceptre in his hand. Although represented as always friendly to mortals and to gods, one memorable contest is preserved in tradition. Hercules had to wrestle with him, while he changed shapes many times, in order to learn the way to the Garden of Hesperides.

NERI, nā'rē, **Filippo de'** (known in English as Saint Philip Neri) founder of the order of Oratorians (q.v.): b. Florence, 22 July 1515; d. Rome, 26 May 1595. He was of noble family with rich connections, but his only aim in early life seemed to be that of self-discipline and the pursuit of learning. He deliberately sacrificed the favor of a rich uncle, who wished to make his nephew heir to his fortune, by secretly leaving him (1533) and taking up his residence at Rome as private tutor in a gentleman's family. He sold his books in 1538 and gave the price to the poor, and ever afterward devoted himself to the sick and to pilgrims. In 1548 he established the Fraternity of the Holy Trinity for the succoring of the sick and pilgrims, founding the hospice which later became one of the finest at Rome. He did not enter the priesthood until 1551 and in 1574, with Cæsar Baronius and other priests, he founded the Oratorians of which he was styled "Father" up to 1592. His congregation received the approval of Gregory XIII in 1575. He was the most popular saint in Europe since the days of Francis d'Assisi and of unprecedented independence and originality in his life and utterances. Göthe has styled him "a saint with a sense of humor." His motto was "spernere mundum, spernere se ipsum, spernere se spem." (Despise the world, despise self, despise if despised). He was canonized in 1622, and in 1726 the day selected for his festival was the anniversary of his death. His letters (1751), poems (Rime Oneste, Vol. VIII), have been published. Consult Gallonio, 'San Filippo dei Neri'; Reiching, 'Leben des heiligen Philippo de' Neri' (1859); Barnabei, G., 'Vita di San Filippo dei Neri' (in the 'Acta Sanctorum'); English translation of Bacci's 'Life' by F. W. Faber (London 1847; rev. ed., 2 vols., Saint Louis 1903); the modern biography by Cardinal Capecepatro (Naples 1879, English trans., 2d ed., London 1894); Faber, F. W., 'Spirit and Genius of St. Philip Neri' (London 1850); Wiseman (Cardinal), 'Panegyric of St. Philip Neri' (ib. 1856); 'Maxims and Councils of St. Philip Neri' (Dublin 1890).

NERINE, a genus of plants of the family *Amaryllidaceæ* (q.v.). The 10 species, which are all South African, are bulbous-rooted, have

narrow leaves which die down during the spring months, and leafless scapes which appear in late summer surmounted by umbels of strikingly beautiful six-parted flowers varying from scarlet through all tints to white, and seemingly covered with hoar frost. The most commonly grown species is *N. sarniensis*, the Guernsey lily. The bulbs should be planted in autumn in the greenhouse and given plenty of water and plant food until the leaves turn yellow when both may be gradually withheld, the pots laid on their sides, and the bulbs allowed to mature. In late summer, when the plants show signs of life, water may be given.

NERNST, nĕrnst, Walther, German physicist: b. Briesen, West Prussia, 25 June 1864. He was educated in the leading universities of Germany and in 1889 became lecturer in chemistry at Leipzig. In 1891 he was called to the chair of chemistry at Göttingen where in 1895 he established an institute for physical chemistry. His invention of the Nernst incandescent electric lamp has made him a prominent figure in the electrical world. He has written 'Theoretische Chemie' (1898); 'Ueber die Bedeutung elektrischer Methoden u. Theorien für die Chemie' (1901). See ELECTRIC LIGHTING.

NERNST LAMP. See ELECTRIC LIGHTING.

NERO, Lucius Domitius Ahenobarbus (after his adoption by the Emperor Claudius called Claudius Cæsar Drusus Germanicus), 6th Roman emperor: b. Antium (Latium), 37 A.D.; d. 68 A.D. He was the son of Gneius Domitius Ahenobarbus and Agrippina, the daughter of Germanicus. His adoption was due to the marriage of his mother with the emperor. Soon after, when only 16, he married Octavia, daughter of Claudius and Messalina 53 A.D. Agrippina wished to secure the succession to her own son to the prejudice of Britannicus, the son of Claudius. In this she succeeded, and Nero became emperor on the death of Claudius in the year following 54 A.D. His tutors were able men, Burrus, the prefect of the Prætorian guards, and the philosopher Seneca (q.v.). For a short time he gave a promise of reigning well and allowed himself to be guided by his instructors, but it was not long before he gave himself to the greatest excesses and cruelty. His first crime was the poisoning of Britannicus, 55 A.D., whom Agrippina, having quarreled with her son, threatened to raise to the throne in place of Nero. He next caused Agrippina herself to be put to death, 59 A.D. The most distinguished victims of his cruelty, beside Britannicus and Agrippina, were his instructor Seneca, the poet Lucan, and his wives Octavia and Poppæa Sabina. "My predecessors," said he, "did not know the rights of monarchy. People may hate me, if only they fear me." During his reign, in 64 A.D., a great conflagration took place at Rome, which lasted for six days and seven nights, and when thought to have been extinguished, broke out and burned two days more. During this fire the most beautiful monuments of art and of history were burned to the ground. Nero was commonly suspected of being the originator of the fire, with a view of having a real representation of the burning of Troy; and although this suspicion was admitted by Tacitus to be without

evidence and is regarded by modern scholars as almost incredible, it was so generally entertained at the time that Nero did his utmost to transfer the guilt of this action to the Christians, whom he caused to be cruelly persecuted for it throughout the empire. He caused the burned part of the city to be rebuilt in a manner more splendid and magnificent than before. The most remarkable of his buildings was the palace which he erected for himself in Rome, known as the Golden House. Several conspiracies, formed against him in Rome, ended in the destruction of the conspirators themselves. He aspired to distinguish himself as a poet, actor, philosopher, musician and liberal patron of the arts. At last the revolt of Galba, his governor in Spain, succeeded. The Prætorian guards declared for Galba, and the Senate pronounced against Nero sentence of death. The tyrant anticipated the punishment which awaited him through requesting death by the sword of an attendant. Consult Baring-Gould, 'The Tragedy of the Cæsars' (Vol. II, 1892); Tacitus, 'Annales' (XIII-XVI); Suetonius, 'Nero'; Schiller, 'Nero' (Berlin 1872); Henderson, B. W., 'Life and Principate of the Emperor Nero' (Philadelphia 1903).

NERO, Golden House of. See GOLDEN HOUSE OF NERO.

NEROLI, a perfume, extracted from the flowers of a small Italian orange tree. It is an essential oil, obtained by distillation from the orange blossoms.

NERTCHINSK, nĕr-chinsk', Siberia, a town in the Transbaikalia Territory, on the Nercha, near its mouth in the Shilka, 570 miles east of Irkutsk. Although comparatively small it is an important trading centre for Russians, Mongols, Turcomans and Tunguses, and has a considerable export trade in the gold, silver, lead, tin and zinc of the surrounding mining region. Pop. about 11,000.

NERTHUS, nĕr-thūs, in German mythology, a goddess, regarded as representing the earth. Her shrine has been supposedly discovered at Rügen.

NERVA, 13th Roman emperor: b. Narnia, Umbria, 8 Nov. 3 A.D.; d. 25 Jan. 98 A.D. He occupied posts of trust in the reigns of Vespasian and Titus. He became emperor at an advanced age, after the assassination of Domitian, 96 A.D. through the aid of Parthenius, chamberlain of the imperial palace, and Petronius Secundus, commander of the Prætorians. Nerva was a man of cultivated mind, with some poetical talent. His reign was beneficent. He recalled exiles, allowed no senator to be put to death, abolished several oppressive taxes, observed a strict economy for the relief of the poor and tolerated Christianity. But he was unable to put down the violence and insubordination of the Prætorian soldiers. Seeing, perhaps, that an element of greater energy was needful, he adopted, as successor, Marcus Ulpius Trajanus (see TRAJAN), then commanding an army in Germany, whom he made co-reign. Consult Merivale, 'History of the Romans under the Empire' (1865).

NERVAL, nār-vāl, Gerard de (properly GERARD LABRUNTE), French author: b. Paris, 21 May 1808; d. 26 Jan. 1855. He was educated at the Lycée Charlemagne, and made one

of the first renderings (1828) of Goethe's 'Faust.' In his 'Poésies allemandes' (1830) are to be found translations from other German authors, such as Schiller, Uhland and Heine. He was a collaborator on various literary periodicals; wrote verse, including 'Elégies nationales et satires politiques' (1827); a few dramas, among them 'L'Alchimiste' with Dumas; and several volumes of prose, such as 'Scènes de la vie orientale' (1848-50), and 'La Bohème galante' (1855).

NERVII, nêr'vî-i, an ancient people of Gaul, famous for the stand they made against Cæsar's advance in 57 and 54 B.C. They submitted to the Romans in 53 B.C.

NERVOUS DISEASES, disorders arising either from actual changes in the structure of nerve-fibres or nerve-centres, or from some irregularity of nerve-function without gross structural change. Thus nervous diseases may be due to inflammation or degeneration of nerve-substance; to the pressure on some part of the nervous system by tumors, effused blood or other fluid; to the death of some part by the cutting off of its blood supply, etc.; to accident or injury due to internal or external poisons or to violence; or they may be the result of lowered nervous action as a part of general bad health. It is customary to speak of organic and functional diseases of the nervous system, meaning diseases in which structural changes are demonstrable, and those in which no such alterations can be seen by appropriate instruments of precision. While such a difference is perfectly valid from the practical point of view, from the more scientific standpoint no such distinctions can be maintained save on the most general grounds. A much more useful classification is to subdivide nervous diseases into (1) Vegetative, (2) Sensori-motor and (3) Psychical Nervous Disorders. By vegetative nervous disorders is meant interferences with the functions of the vegetative or sympathetic nervous system. This includes a vast group of disturbances of the functions of the viscera of the body, including endocrinopathies, or diseases of the endocrine glands.

Among the more important of these endocrinopathies may be mentioned acromegaly, exophthalmic goitre, myxedema, Addison's disease, various types of idiocy and imbecility, and a great variety of defect states in general.

Sensori-motor nervous diseases include diseases of the peripheral nerves, of the cranial nerves, of the spinal cord, of the mid-brain and cerebellum and of the brain itself. This group includes the great majority of so-called organic nerve diseases.

Psychical nervous disorders may be roughly grouped into three large classes — the neuroses and psychoneuroses, the psychoses and the defect states of various types.

Nervous diseases are extremely widespread in the community. It has been estimated that one in every 300 of the population is afflicted with some one of the psychoses; one in every 500 has epilepsy, and it is common belief that the neuroses and psychoneuroses are on the increase. About one adult individual in every 10 has some form of a neurosis or psychoneurosis, mild or severe, as the case may be. Diseases of the nervous system are naturally increasing with the increasing population. Whether this

is a relative increase or not is not definitely proven. So far as the psychoses are concerned, there seems to be little doubt that they are not only relatively but absolutely increasing. With respect to this latter belief, however, it should be remembered that the increase in the material comforts afforded patients suffering from psychoses is tending to encourage the community to send their semi-dependent members to institutions and thus escape the individual cost of their care. This makes an apparent increase in the proportion of psychoses, for many cases in this manner enter into statistics which would not otherwise be counted. The complex conditions of modern civilization are causative in bringing about a certain amount of breakdown of the nervous system, and the keen competition for subsistence and for luxuries also tends to increase these evils.

Nervous diseases present a greater diversity of symptoms than disease of any other organ-system of the body. Over 200 divisions have been made, and this number is subject to constant revision. The nervous system is the most highly developed and most intricate part of the body; hence nervous diseases present a greater complexity than any others. At the same time, so far as nervous diseases are concerned, their accurate determination is a matter of very precise knowledge. This gives to the study of them a peculiar fascination. Nervous diseases are further characterized by their extreme severity. Other organs of the body, when diseased, recover their functions in a comparatively short time. Nerve-function, when disturbed, recovers very slowly. Chemically, nervous tissue is extremely complex and much time is necessary to reconstruct it after injury. This is particularly true for mental diseases. Years and months are necessary for recovery, when weeks and days are occupied in the restoration of non-nervous structures. Economically, nervous diseases are of serious effect, frequently depriving the community of wage-earners without eliminating them, so that they become burdens; and they continue to swell their own ranks by the added stress they cause to the community which must support them. The great majority of chronic invalids are those suffering from nervous ailments. Idiots, imbeciles, the insane, epileptic, paralytic and criminal make up a large class of parasites. The study of economic conditions due to disorders of nervous structures is of wide and practical import. It is the largest and most important chapter in social economics.

One of the most important agents in reducing the amount of nervous disease is hygienic living, and a greatly increased amount of general information bearing on the part played by alcohol and other poisons in the development of nervous affections. It is highly desirable that in the primary schools, high schools and colleges, more attention should be paid to the education that fits people better for the conditions with which they are to struggle in after years. Physical exercise, gymnastics, open-air play, nature-study, general rules of hygienic eating, of hygienic clothing and the general principles of preventive medicine should enter into the curriculum of every school for both sexes. All this is being provided for wisely in most of the communities of the

United States, and there is every reason to suppose that coming generations will be much better fitted physically to stand nervous stress than their predecessors.

Textbooks on nervous disorders are numerous. A few of the more important recent works are here mentioned. Reference works: 'Jahresbericht über die Fortschritte in der Neurologie und Psychiatrie,' the most important bibliographic work published. Nothnagel's 'Specielle Pathologie und Therapie' contains the most recent series of monographs bearing on nervous disorders. Broudel's 'Traité de Médecin' is one of the best recent French collections. Albutt's 'System of Medicine' is the best of the recent English systems. Valuable individual works on diseases of the nervous system are those of Gowers, Dejerine, Oppenheim and Jelliffe and White. On mental disorders Ballét's 'Traité de Pathologie Mentale' (1904) is one of the most comprehensive. Kraepelin, Weygandt and Ziehen are German authors in favor; White is an American authority; Maudsley, Mercier, Clouston and Bevan Lewis are among the foremost English writers of a generation past; Bianchi, in Italy, and Muratow, in Russia, are other well-known authors on nervous diseases. Consult Jelliffe and White, 'Diseases of the Nervous System' (1919). See BRAIN; MENTAL DISEASE; NERVOUSNESS; NERVOUS SYSTEM, EVOLUTION OF THE; NEUROSIS; NERVOUS SYSTEM, TRAUMATIC AFFECTIONS OF THE; PSYCHIATRY; PSYCHOSIS.

NERVOUS SYSTEM, Evolution of the.

The nervous system is that part of the body which has developed most particularly the function of adapting the different organs of the body to their environment. It is the great regulator of all the physiological processes. It may be said to consist of two parts, that portion which has to do with the reception of impulses from without, in general spoken of as the sensory nervous system, and that portion which, in response to the incoming impulses, causes some form of adaptation in answer. Such adaptations are often of a muscular character, and the motor-nervous structures are concerned in bringing about such relationship. The human nervous system is fundamentally arranged on this plan, but while theoretically so simple in organization, practically and anatomically it is an extremely complex and complicated series of structures. This complexity is the result of untold ages of development; but a study of the nervous system in a number of the lower forms of life, as well as the study of the various nerve-structures of man himself in their development from the fetal stage, has enabled the student of the human nervous system to trace the gradual steps of its evolution.

Plants are considered not to possess any nervous structures, yet the protoplasm responds to many forms of stimuli in much the same manner as the protoplasm of more highly developed living things. In a few plants, Venus' fly-trap, the sensitive plant, etc., there are found certain cells in the midribs of the leaf and in the stem, in which the protoplasm differs from that of other plants. They do not possess special nervous structures, but they are cells in which the protoplasm seems to possess special nervous conductive properties. In many of the lowest animals no known nervous structures

have been found, but even in the very simplest animals the prototypes or forerunners of human nerve-structures are known to occur. In these animals the simple nerve-unit or neuron is found. In its simplest form this neuron consists of a strand of nervous tissue, a nerve-fibre, in some portion of which an enlargement or nerve-cell (so called) occurs. From the nerve-cell (or station, as it were) the fibre usually passes out in two directions, becoming attenuated in its passage and, branching or not, finally terminates in extremely fine processes (dendrites), which in different animals widely vary. One branch of this neuron is usually found in the periphery of the animal body, and may be spoken of as the incoming or sensory part of the structure; the other is frequently distributed to the muscles of the body. As the animals rise in the scale of complexity this most primitive condition becomes modified, and a neuron of distinctly sensitive nature develops, which is brought in contact by the end-filaments of the neuron-branches with a similar motor neuron.

Such simple arrangements are found in animals of the very lowest organization, polyps, sponges, etc. In higher animals collections of these neurons form ganglia. These ganglia, at first isolated, become co-ordinated and grouped until as in the insects, for instance, a double chain of ganglia is found from in front of the mouth to the anus, arranged along the abdomen. These ganglia are connected by cables of nerve-fibres, and to and from each ganglion sensory and motor fibres pass, and thus the entire nervous system is brought into co-ordination. In thought it is but a step from the ventral double chain of ganglia in the insects to the solid spinal cord of the mammals with its ganglionic enlargements, constituting the medulla and brain (see BRAIN), but it has taken many ages to bring about this integration. Theoretically, the nervous structure of the lowest mammals, *Amphioxus* and *Petromyzon*, are of the simplest type, a trifle more advanced than the insect double chain; but in the study of the nerve-structures of these lowest forms glimmerings of the complex nervous system of man are to be found. The homologues of the much diversified and complex spinal cord and brain in man are present in the primitive conditions in these animals.

While the development stages of the growth of the nervous system to its present complexity may be thus summarized, the details of the different forms are intricate, and only on philosophical grounds can they be thus described. In the lowest *Infusoria* there are few if any nerve elements known. In the bell-animalcules (*Vorticella*, *Stentor*, etc.), a mixed form of neuromuscular cells is found. These possess the combined functions of these two types of tissue. In the sea-anemones and polyps similar nervous structures are found and small ganglionic masses are present. Starfish possess a comparatively complex nervous system. Each arm of the starfish has a small ganglion near the mouth, and a nervous cord passing down the arm. The ganglia are farther connected by special nerve-fibres, bringing about an integration of nervous impulses. In the mollusks (snails, oysters, clams, etc.), the nervous system consists of a ring of ganglia surrounding the esophagus; one above is larger and by some is

spoken of as a brain, but it is not homologous with the brain of mammals in any sense. Communicating fibres pass to the foot and to the breathing apparatus. In the worms the nervous system is still more complex. An enlarged double bilateral ganglionic mass at the head of the animal constitutes the brain; special offshoots pass to nervous structures in the eyes on each side; double cords pass backward, connecting the brain with paired ganglia, which may be fused into one mass or may be separated and connected by commissural fibres. From the ganglionic enlargements fibres pass out to the periphery of the body. This form of nervous system represents in skeleton what the more complicated mammalian system is to become. It is bilateral and is segmented, or metameric. The bilateral character of the mammalian nervous system remains throughout, with but slight fusion; the metameric character, however, undergoes many changes by the fusing together of ganglionic masses and their later distortion. The separate ganglionic mass in the worms entails greater individual independence. Thus if the head of a centipede be cut off, the legs will still cause the animal to run. Ants, flies and butterflies will move about aimlessly for some time after the head is cut off. The head-ganglion in the ant is much more complex than in many other insects, showing in some measure by its structure the more highly developed character of this animal's "brain-ganglion."

The transition from lower to higher types of nervous system is found in one of the lowest of the vertebrates, the *Amphioxus*. In the lower forms the ganglionic masses and their connecting cords are located for the most part in the lower or ventral portion of the body, and the ganglia and fibres are distinct. In the vertebrate type the nervous system becomes dorsal, and the ganglia and fibres become fused into a long cord, or cerebro-spinal axis, which lies protected in the bony cavities of the skull and spinal cord. Certain accumulations of ganglionic centres occur and give a varying form in the different animals, and throughout the entire cerebro-spinal axis there runs a small cavity. In the head, or cephalic end, the brain is located, the ganglion-cells, or gray matter, being usually situated on the outside of the mass, the connecting and collecting fibres, white matter, on the inside. In the lower or cord portion, the gray masses come to lie on the inside of the structure and are partly surrounded by the fibres (see SPINAL CORD). The ganglionic masses in the cord remain isolated, but much shifted in their position, coming to assume in the highest types the character of rods or pyramids of gray matter embedded in the cord. From the entire nerve-axis fibres pass out and are regularly paired, bringing all parts of the body into close nervous contact by intercommunicating nerve-fibres. In *Amphioxus* only the foreshadowings of the arrangements in higher vertebrates may be seen, but the work of Edinger, Kupfer, His, Retzius and others has shown that most of the structures of the higher animals are found in this low animal in their simplest forms. In the fishes the brain-hemispheres begin to show more advanced stages. The olfactory nerves and bulbs are very prominent. The optic lobes are small, and the presence of a cerebellum is only indicated. In the amphibians, frogs, toads,

salamanders and the reptilians, snakes, etc., the hemispheres are prominent, and a certain degree of complexity of their minute anatomy is evident. The olfactory lobes are still very large, the cerebellum is very poorly developed and the spinal cord is extremely simple in structure. The pyramidal tracts are not yet characteristic, but fibre-systems are present, passing from the brain to the cord. The spinal cord remains, however, a somewhat independent organ. In the fishes a sensory spinal fibre-system is probably found. With the birds the more characteristic higher-type brain begins to show itself. Its hemispheres have convolutions resembling somewhat in type those of higher forms. The cerebellum is well developed, and shows the characteristic histological structure of more highly evolved animals. The spinal cord has well-marked pyramidal motor tracts and a differentiated sensory tract. Finally in the mammals practically all of the structures of the human brain are present, although great variations in the size and complexity of the different parts are to be noted. The brain of man differs from that of the lower animals not so much in the matter of size or weight, although it is relatively large and heavy, as by reason of the almost infinite number of connecting or association fibres. These bring all parts of the nervous system into relation, and permit of the endless variety of thought-constructions that go to make up man in his social conditions. In man, moreover, the hemispheres become relatively much larger than the other parts of the brain, and by reason of their many fissures and convolutions make very wide areas in which countless nerve-cells develop. These hemispheres lie over the other parts of the brain. Throughout the entire animal series a certain evolution in localization takes place. Functions which in lower forms are generalized, and can be assumed by any part of the nervous system, in higher animals become specialized, and are relegated to certain particular organs. Thus it is found that in animals in which the sense of smell is extremely important large olfactory lobes are present; and conversely, animals so situated as not to possess certain organs do not develop certain nervous structures. The eyeless animals of caves have usually small optic lobes; the footless dolphins show small pyramidal (motor) tracts in their spinal cords, etc.

In the nervous system are illustrated very thoroughly the general principles of evolution as seen in its broadest aspects, and the development of the richly convoluted and highly complex brain is the index of the superior mental power of the human race. Consult Beaunis, 'L'Evolution du Systeme Nerveux' (1890), which gives a simple account of the general structural changes in the nervous system throughout animals; Parker, 'The Elementary Nervous System' (1918); Cajal, 'The Nervous System' (trans. by Azoulay); Koelliker, 'Handbuch der Gewebelehre des Menschen' (1896), for minute anatomy. For the most comprehensive works on the human nervous system, Dejerine, 'Anatomie du Systeme Nerveux' (1900); Van Gehuchten, 'Anatomie du Systeme Nerveux'; Barker, 'The Nervous System'; Winkler, 'Manual of Nervous System'; Jelliffe and White, 'Diseases of the

Nervous System' (1919). See ANATOMY; BRAIN.

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NERVOUS SYSTEM, Traumatic Affections of the. Accident and injury play a large rôle in the development of affections of the nervous system. The Great War has given rise to an enormous number of these traumatic disturbances. These forms of disease, or disorder, may be grouped under two general heads, organic affections and psychogenic affections, the dividing line between some forms of each being very obscure. Affections of the peripheral nerves are among the commonest of the organic accidental injuries. Thus, pressure of a crutch under the arm, the use of the crutch being necessitated by a broken leg, often produces a paralysis of the muscles of the arm. Other forms of peripheral palsies result from wounds of the arm and forearm whereby a nerve is cut, either by an instrument that penetrates the skin or by a splinter of bone from a fractured limb. Paralysis of one half of the body (hemiplegia) sometimes follows severe injury to the head. Such injuries frequently result from football accidents, from falls during drunkenness, from collisions, from shell explosions, from bombs, from machine gun bullets, being thrown from a horse or vehicle, etc. Fractures of the spinal column often result in death, due to injury of the spinal cord; and if death does not result immediately, paralysis of the entire body below the site of the fracture (paraplegia) results. Lesions of the nervous system resulting from gunshot injuries are very common in times of war and constitute a very important chapter in military surgery. Such injuries usually cause either paralysis of different parts of the body, resulting from division of the nerve-fibres, or severe neuralgic pain due to irritation of the sensory nerves. Occasionally epilepsy is caused by accidental injury to the head, especially injury to the child's head during birth. One of the most interesting chapters in the history of traumatic affections of the nervous system is that of "traumatic neurasthenia," or "traumatic neuroses." These have been frequently classified under the head of "spinal concussion," "railway spine," "Erichsen's disease," etc. During war times they are called shell shock, or war neuroses. The most characteristic features of this affection were pointed out by Charcot, who allied it with neurasthenia and hysteria; and at the present time it is usual to speak of three classes of these conditions: (1) affections of a purely surgical nature; (2) traumatic hysteria; (3) traumatic neurasthenia. In a severe railway accident, for instance, any one of these forms may be present, and combinations of two or three are not unusual. The neurasthenia which may arise from such accidents is of a nature precisely similar to neurasthenia due to other causes. It is characteristic, however, that many of these neurasthenics recover when damages are collected from the railroad; some, however, persist and there is no doubt that the affection is a real one in most instances, and not simulated. At the same time, it should not be forgotten that many people grossly exaggerated their symptoms; moreover, there are certain parasites in the com-

munity who make it a business to sue railway and other corporations on the basis of alleged traumatic disease. Hysteria resulting from traumatism is of the same nature as ordinary hysteria, and is governed by the same general laws of this disease when due to other causes. It is important to emphasize the fact, not only to the layman, but to the professional man, that traumatic neurasthenia and traumatic hysteria are real diseases, and that their consequences may be serious and disabling. Each case needs special treatment, and in all cases in which litigation occurs there should be thorough investigation by competent medical experts, as well as by trial by jury to determine the degree of disability on its merits. Consult Hamilton, 'Railway Injury'; Jelliffe and White, 'Diseases of the Nervous System'; Bailey, 'Accident and Injury,' and numerous volumes on War Neuroses, all collected in bibliography of the Mental Hygiene Society of New York.

NERVOUSNESS. If one were to ask half a dozen persons calling themselves nervous to define what they mean by their nervousness, he would find it hard to get thereby a general and comprehensive definition, for each would fail in describing his particular variety of nervousness. The nervous business man feels in a perpetual hurry. He is impatient and restless while waiting for his car or for his luncheon. He eats quickly, talks rapidly and when he has a chance to rest he fidgets. At night he tosses and thinks for an hour or two before sleeping; but, instead of thinking consecutively his ideas flash around in a distracting circle that leads to no conclusion. The nervous woman of leisure starts at the slightest noise; she feels bright and like herself during any exciting pleasure, but has the blues and is morbidly depressed when life is dull. She has headaches and moods in which she wants to scream. The overworked nervous student broods over his studies, cannot fasten his attention on his work, and what he has once known well he fears he has forgotten, and he expects to fail in his examinations. The young girl who is nervous about playing or reciting before an audience finds that her heart beats furiously; her hands are icy and stiff, and when she sits down at the piano the notes dance wildly before her eyes. The nervous mother or housekeeper is troubled by her irritability. She is distracted, forgets where she puts things and cannot remember what she started to do. At night she excuses her "good cry" as relief to her nerves.

All such people agree that nerves are the bane of modern civilization, and it seems to be taken for granted that nerves are a new development of the human anatomy. When national comparisons are made, Americans will generally admit, in fact claim, that they are the most nervous of nations. To be nervous seems to imply the possession of a finer sensibility, a greater responsibility in affairs and a more strenuous and enviable mode of living. Hence the afflicted dwell with relish upon their symptoms, with a lurking contempt for such as do not manifest the like.

To have nerve, however, is quite a different thing from having "nerves." Nerve implies the ability to bring all one's powers under control of the will, to keep steady in trial and danger, calm when others are in panic, and buoyant

through any crisis. This modern use of the word nerve and the common supposition that the nerves which play such pranks with man's mind and temper and disposition are all in some way under control of the will illustrates the vagueness of general knowledge concerning the nervous system and its relation to nervousness.

The absolute control of man's nerves is no more a thing of his will than is the growth of a plant. The power that he calls his will is but the steadily directed training of portions of his nervous system to act in a desired way according to certain decisions. The most pitiful sight in life is a man who "has no will," who has noble impulses and high desires with no disciplined nervous machinery to carry them out. The men and women who are known to have that will power which carries them through ordeals, and who are productive in their activities, are those who have been accustomed to "do noble things, not dream them all day long." As all success in life, as well as every pleasure of mind or body, depends on a well-conditioned nervous system, it is a matter of highest moment to know how to preserve, train and care for one's "nerves."

Not every man is born equal in his nervous equipment. Some inherit an excellent nervous system, which they may dissipate with unwise living, or may husband and improve. Others have very little vigor of the nervous system, but by careful training and right living they spend only what nervous force they can spare. With a poor heritage, in the strenuousness of city life, and sharing the prevalent ignorance concerning the nervous forces, a man may feel that by excessive work he is making a brave and noble struggle to succeed, when in reality he is spending his nervous capital, and at 40 will be a wreck.

Every spoken or written word, every plan, every carefully executed order that takes thought, every act of attention and every bit of creative work means direction of energy. Rest, sleep, recreation, and pleasing work enable the nervous system to renew in a few hours all that it has lost, with ability gained to do the same kind of work the next day with less of voluntary effort, and consequently less fatigue.

The slowly accumulating nervous power that shows itself in increased accuracy and judgment makes men successful and prevents nervousness. Too many girls and boys, in their student days, in their social or university careers, in their early business ambitions, are so anxious to succeed quickly that they spend more of their nervous capital than can come back to them in the time allowed for sleep and recreation, until finally they find themselves nervous bankrupts. "Time is money" may well be paraphrased, "nerves are money," and they are also power and success.

In no part of the body are the effects of heredity so marked as in the nervous system, but most conclusions regarding this are based on *post-hoc* reasoning. It can never be shown that, because two highly nervous, excitable or hysterical persons marry, their children must have the same strain; for a healthful environment and good physical and mental training can overcome the tendency to lack of nervous control. Neither can it be assumed that the children of two calm, well-balanced persons, of good nervous force, will grow up to be like

their parents; for disease, overwork and dissipation may ruin the best nervous organization. The chances are, however, that the same environment and training which have helped to exaggerate the nervousness of parents will also surround and affect their children, as it is equally probable that the wise and healthful training which has developed good nervous stock in parents will be passed on to their offspring.

Neurologists term this inborn tendency in the nervous system to give way under stress the neuropathic tendency, or nervousness. They mean that, while no actual nervous disease is inherited, yet under the stress of habits and environment the nervous system fails to meet the demands made upon it. A man with this neuropathic tendency who drinks even moderately usually becomes nervous and less capable, where another might suffer almost no ill effects. Two students may smoke cigarettes incessantly, and one develop shaky muscles, an irritable heart, dyspepsia and nervous breakdown; the other feeling no ill effects. A certain percentage of telegraphers, typewriters, writers with the pen, pianists, tailors, ballet-dancers, etc., develop occupation-neuroses with muscular cramps and consequent disability, by reason of the extra burden put upon a deficient nervous inheritance.

The inheritance of a sound nervous organization means that a child is born with sufficient nervous energy to control its body and not so much as to stimulate it to excess. Perfect health in a mother during pregnancy means a valuable asset for her child's nervous system. Shock, fatigue, infectious disease in the mother may even stop the child's nervous development, and cause the babe to be born an imbecile. A normal infant at birth has the mechanism of its nervous system definitely laid out though wholly undeveloped. All growth comes through repeated experiences, which begin with the first day of life, and on that day the training of the nervous system should begin. Clock-like regularity in the hours of eating and sleeping is the first step in the healthful training of an infant's nervous system. By control of the involuntary start on hearing loud sounds, a child may be so trained as to be spared much nervousness when he grows up. Parents, by word and example, should teach their children to work with concentrated attention in spite of distracting sounds. It is the total lack of training that makes it impossible for so many nervous people to inhibit their reflex actions. They tremble, shudder, start, exclaim, are disturbed in their work, wakeful at night, simply because they have always allowed their nerves to respond to trifling stimuli, instead of inhibiting the responses. All mechanical actions, all brain actions tend by repetition to become automatic. The muscle-worker rarely suffers from nervousness. But in the brain-worker the establishment of new connections bring great nerve-tire. So the expenditure of nervous energy in forming new nerve-connections, receiving new impressions, etc., tends to make the most agreeable occupations exhausting. Let it be remembered by the older generations, and taught to the younger, that the training and directing of nerve-force are vitally important to health and efficiency, and that the great workers achieve their ends by that very quality of well-directed

energy which, if dissipated, degenerates into nervousness. See PSYCHONEUROSES; NERVOUS DISEASES.

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NESBIT, něz'bit, E. See BLAND, EDITH NESBIT.

NESR, in Arabian mythology, an idol in the form of a vulture, worshipped by the tribe of Hemyer.

NESS, Loch, lõh nēs, Scotland, a lake of Inverness-shire, on the line of the Caledonian Canal. It is long and narrow, stretching southwest and northeast about 22 miles, with a fairly uniform breadth of about a mile and a maximum depth of 780 feet. Its northeastern extremity is about six miles from Inverness. Fort Augustus is situated at its southwest end. It occupies the centre of the valley of Glenmore and is enclosed by steep and often finely wooded hills, about 1,000 feet high. The outlet is by the Ness into the Moray Firth.

NESSELRODE, nēs'sěl-rō-dē, Karl Robert, COUNT, Russian statesman: b. Lisbon, 14 Dec. 1780; d. Saint Petersburg, 23 March 1862. His father was Russian Ambassador to Portugal, and the son also, at an early period, entered the diplomatic service, and in 1807 was made councillor of the Russian embassy at Paris. He succeeded in detaching Russia from the Austrian alliance and was present at the important conferences between Napoleon, Alexander I and the German princes, at Erfurt in 1808. He gained immense influence over Alexander's mind; was made chancellor of the empire, and dictated its foreign policy; followed the emperor to France in 1814 and signed the Quadruple Alliance; and took part in the Congress of Vienna. He was one of the chief formers of the Holy Alliance, which made Russia virtually supreme in Europe. He became Minister of Foreign Affairs in 1816 and took part at the congresses of Aix-la-Chapelle, Troppau, Laibach and Verona. Nesselrode's influence was considerably limited under Nicholas I and he strove in vain to avert the war which broke out in 1853. After the accession of Alexander II and the signing of the Treaty of Paris in 1856, Nesselrode retired from the Foreign Office, but continued in the Chancellorship, and also held a seat in the Ministerial Council. His autobiography appeared in 1866.

NESSUS, nēs'ūs, in Greek mythology, a centaur whom Hercules ordered to carry his wife, Deianira, across a river. The centaur ill-treated the woman, and Hercules shot him with a poisoned arrow. Nessus, in revenge, gave Deianira his tunic, saying whomsoever she gave it to would love her exclusively. Deianira gave it to her husband, who was poisoned and, after enduring agony, threw himself on a funeral pile and was consumed.

NESTOR, Russian monk and author, of the 11th century. He was of the Cave Monastery at Kiev, and wrote an account of the martyrs Boris and Gleb, and a 'Life' of Theodosius, a former abbot of his monastery. For a long time he was regarded as at least the original author of the so-called 'Chronicle of Nestor,' the most important of the early authorities for

Russian history, but later investigations have proved the supposition erroneous. The 'Chronicle,' perhaps the work of Abbot Silvester, gives an account of Slavonic history in the form of annals for the period 850-1110 A.D., the last 40 years being from a contemporary viewpoint. For the preceding time, use is made of the Byzantine historians, the Bible, the Apocrypha, traditions, biographies and legends of saints and the records of monasteries, etc. There are various translations into German by Schlözer (as far as 980 only); in his 'Russische Annalen' (1802-09); into French by Léger (1884).

NESTOR, in Greek legend, one of the heroes at Troy distinguished for his great age, experience and wisdom as well as for his mild and persuasive eloquence. These are the qualities Homer has attributed to him in the 'Iliad.' He was the son of Neleus, king of Pylos, and was born in Gerenia, in Messenia. He succeeded his father as king of Pylos. In his youth and manhood he distinguished himself by many bold exploits, and early acquired the reputation of a prudent counsellor and persuasive orator. Though he had lived through two generations when the expedition to Troy was undertaken he nevertheless took part in it, and conducted the forces under his command in 20 vessels to Troy. On account of his extreme age he did not take a personal action in the encounters before the city. The part which is attributed to him in the 'Iliad' is that of an experienced counsellor. He had several sons and daughters, but they are not distinguished in history. After Nestor had outlived three generations he died quietly at Pylos, where, in the time of Pausanias, the inhabitants pretended to distinguish his dwelling and his grave.

NESTORIAN MONUMENT, a famous archaeological stela, known locally as "Ching-chiaopi," erected in 781 A.D. at Sian-fu (q.v.) in northwestern China. It records the introduction of Christianity in the Celestial kingdom by Nestorian missionaries in A.D. 631, under the name of the "Luminous Doctrine." This celebrated tablet was erected at the zenith of Nestorian Christianity in China. It disappeared during the political and religious upheaval under the Emperor Wu-tsung about 845, which laid the city in ruins, and also marked the decline of Christianity in China, although in the 13th century Marco Polo refers to Chinese Christians as still maintaining their faith. In 1625, workmen digging in the Chang-ngan suburb uncovered the valuable record and it was restored by Father Semedo, S.J. The first translation of the inscription was published by Father Kircher, S.J., in 1636. Doubts as to its authenticity raised, among many others by Voltaire and Renan, and the charges of a "pia fraud"—a pious fraud, laid to the Jesuit brotherhood, were disproved by Père H. Havret, S.J., in his exhaustive work, 'La Siècle chrétienne de Si-ngan-fou' (1895). The stela, which is 10 feet high and weighs two tons, was re-erected embedded in a brick niche, and long stood as one of a row of five memorial tablets, exposed to the atmosphere, in the enclosure of a ruined temple. About 1891 a shed was built above it, but in 1907 the priceless monument was entirely unprotected when the Danish explorer, Fritz von Holm, visited Sian-fu to try



Photograph presented by Dr. Frits von Holm

THE ORIGINAL NESTORIAN MONUMENT OF A. D. 781

The picture represents the monument as it now stands, protected and under roof as a result of THE HOLM-NESTORIAN EXPEDITION TO SIAN FU, 1907-1908, in the "Peilin" ("stone coppice") of Sian-fu near the south gate. The priceless monument was practically exposed to wind and weather from A. D. 1525, when it was found, till 1907, when the Danish explorer, Dr. Frits v. Holm, M.R.A.S., visited it and had a limestone replica made. The tablet is 10 feet high and weighs two tons. The replica is in the Metropolitan Museum of Art in New York city

and procure the tablet in the interest of science, In this he was unsuccessful, but he obtained a perfect limestone replica, which was brought to New York and placed as a loan in the Metropolitan Museum of Art. In 1917 it was placed in the Lateran Palace, Rome. The local mandarins caused the original tablet to be removed to the 'Peilin,' an historical museum of stone records near the south gate of the city, where it now stands safely protected under roof.

The inscription consists of more than 2,000 characters, Chinese and Syriac or Estrangelo. It records (a) an abstract of Christian doctrine; (b) the arrival in 631 of Nestorian missionaries; how in 636 they were allowed to settle at Ch'ang-an, the ancient name of Sian-fu; that in 638 an imperial decree was issued stating that Olipán, described as a Persian priest from Tats'in, bearing sacred books and images had arrived in 635; that he had presented a form of religion which his majesty the Emperor T'ai-tung, an eminent ruler, had closely examined and had found to be satisfactory in every particular; that henceforth it would be permissible to teach this new doctrine within the boundaries of the empire. The establishment of a church and monastery to be served by 21 priests, built in the "Ining fang—the court of justice and peace," was authorized. The emperor's portrait was to be placed in the church. A description of the emperor's virtues and of the work of the church is added. The Syriac portion which brings the tablet to a conclusion gives the name of the reigning Nestorian patriarch, Man Hanan Ishua, that of Adam, bishop and pope of China, the names of the clerical staff and of 67 persons, including 61 in Chinese, the majority designated as priests. Consult Holm and Carns, 'The Nestorian Monument' (Chicago 1909); Legge, J., 'The Nestorian Monument of Hsi-an-Fu' (London 1888); Parker, E. H., 'Studies in Chinese Religion' (London 1910); Yule, H., 'Cathay and the Way Further' (2 vols., London 1866); William, S. W., 'The Middle Kingdom' (London 1883); Williamson, A., 'Journeys in North China' (London 1870).

NESTORIANISM, the theory of the Incarnation of Jesus Christ taught by the Nestorians or followers of Nestorius. Nestorius was a presbyter of Antioch who in 428 was made patriarch of Constantinople and was charged with teaching that there were two persons in Jesus Christ, of which one is the word of God, and the other the man Jesus, and that Mary his mother ought not to be styled mother of God (Theotokos) but mother of Christ (Christotokos). Cyril, patriarch of Alexandria, accordingly accused him of teaching the dual personality of Christ, a view which was formally condemned and anathematized by the Third Council of Ephesus, 431. He was deposed, driven from one place to another and died in obscurity in 440. The controversy lasted for two centuries. In 435 the Nestorians who had organized themselves into a church in Syria took refuge from the persecutions of the Orthodox church in Persia, Mesopotamia and Arabia, assuming the title of Chaldean Christians. At the Council of Seleucia (498) the Persian Church clearly formulated this dogma in opposition to the teaching of the Catholic Church. These views flourished in Antioch, Edessa and Nisibis and their adherents were

the fosterers of learning in history, philosophy and medicine and under the Arabian domination were often raised to high posts in the government. It spread even to China where a monument of the 7th century bears testimony of its existence. The Moslems treated the Nestorians with much toleration, probably as a means of keeping up a division of Christianity in the East. Nestorianism reached its most important period in the 13th century when it numbered 25 archbishops and about 200 bishops. The Catholicus was an important rival of Rome. With the fall of Bagdad in 1258 the Catholicus, as the head of the Nestorian Church is called, was driven from place to place, church organization was disrupted and discipline was maintained with ever-increasing difficulty. Tamerlane in the 14th century desolated the Nestorian Church throughout almost all Asia so that only a remnant escaped to the mountains of Kurdistan. Under Popes Alexander III, Innocent IV and Nicholas IV some attempt was made in the 16th century to effect a union with the Roman Church in consequence of which the United Nestorians separated from the main body of the Chaldean Christians. These separatists (Uniat) are numbered at some 100,000, with 150 churches and 150 priests. They acknowledge the primacy of Rome but use a Greek liturgy and retain clerical marriage. Their patriarch has his see at Diarbekir, Asiatic Turkey. They are usually called Uniat-Chaldeans. The Non-United Nestorians in Mesopotamia, Persia and Syria celebrate the sacrament of baptism and the Lord's Supper but do not teach Transubstantiation; they number some 150,000 souls with about 300 churches, 12 bishops and about 250 priests. The Nestorians of India are called Christians of Saint Thomas; in 1599 a little more than half their number acknowledged the primacy of the Roman see. These Uniat number about 200,000. The India Non-Uniat number about 150,000 at the present time. Consult Assemani, 'Bibliotheca Orientalis' (Vol. III, Rome 1728); MacLean and Brown, 'The Catholicus of the East and his People' (London 1892); Hore, A. H., 'Students' History of the Greek Church' (ib. 1902); Adeney, W. F., 'The Greek and Eastern Churches' (New York 1908); Schaff-Herzog, 'Encyclopedia of Religious Knowledge' (Vol. VIII. ib. 1914); Wace and Piercy, 'Dictionary of Christian Biography and Literature' (Boston 1911); Badger, 'The Nestorians and their Ritual' (2 vols., London 1852); Rae, 'The Syrian Church in India' (1892).

NESTORIUS. See **NESTORIANISM**.

NESTS OF BIRDS. See **BIRDS**, **NESTS OF**.

NET, an open fabric made of hemp, jute, flax and sometimes of cotton and other fibres. The open spaces are called meshes and in order that these may retain their shape and size the fibres of which the net is made have to be knotted at the intersections. Nets were formerly made only by hand, but an ingenious kind of loom has for many years been in use by which the operation of netting can be performed mechanically. Nets are used for a great variety of purposes, but chiefly for fishing. The three chief kinds of nets used in fishing are the seine, the drift-net and the trawl. The first two are very long in proportion to

their breadth and differ from one another only in the manner in which they are employed. The seine has a line of corks along one of its long borders and a line of leaden weights along the other; so that when the net is thrown into the water it assumes a perpendicular position. The drift-net is not loaded with lead, but floats in the water. The trawl, again, is dragged along the bottom by the motion of the boat. Nets are also used to catch birds and animals, to protect crops from birds, the blossoms of trees from frost, etc. Wire nets or netting is also used for domestic purposes.

NETHERLANDS, Kingdom of the, frequently called **HOLLAND**, a northwestern European country with a north and western coastline of 470 miles on the North Sea, its eastern frontier bounded by Germany and its southern by Belgium. It comprises the northern and smaller half of the numerous provinces formerly combined under the name **NETHERLANDS** or **LOW COUNTRIES**, part of which is now included in Belgium. It received its general English name of **HOLLAND** from its coastal provinces North and South Holland. From north to south the country has an extent of 150 miles, with a breadth from west to east of 120 miles throughout and a total land area of 12,582 square miles.

Political Divisions.—The Netherlands at the present day has nearly the original limits of the Seven United Provinces in the 16th century. The modern provinces are given in the accompanying table:

PROVINCES	Area in sq. miles	Population 1916
North Brabant.....	1,920	699,838
Gelderland.....	1,939	707,898
South Holland.....	1,131	1,599,164
North Holland.....	1,066	1,244,499
Zeeland.....	707	243,698
Utrecht.....	525	320,913
Friesland.....	1,243	380,526
Overijssel.....	1,295	426,010
Groningen.....	881	355,154
Drenthe.....	1,028	196,505
Limburg.....	847	409,022
	12,582	6,583,227

The duchy of Luxemburg (q.v.) was under the sovereignty of the king of Holland, until the death of William III in 1890 dissolved this union. The most densely peopled province is South Holland (981 per sq. m.), and the least densely peopled is Drenthe (144).

Topography and Physical Features.—The Netherlands forms the most characteristic portion of the great plain of northern and western Europe. From the middle of Belgium, a few miles northeast of Brussels, the country becomes a dead level, extending in monotonous sandy flats through Hanover, Jutland, Holstein and with little interruption through Prussia into Russia. The lowest part of this immense level and that which has most recently emerged from the sea is the country lying between the mouths of the Schelde and Ems. Within this distance the Rhine, joined by the Maas, Yssel and other rivers, enters the sea through a number of arms and sluggish, winding channels. This delta in early ages was evidently liable to

perpetual change of form, as new mud-banks were deposited, old channels being blocked up and new ones formed. In addition to this the river floods, in forming a domain of alluvial deposits, had to contend with the sea, which washed away the accumulations of mud or covered them with sand, according to the vicissitudes of weather and season. The soil of the Netherlands shows everywhere the proofs of this struggle between the ocean and the river, in the alternation of salt and fresh water deposits. It therefore became a problem of existence with the early inhabitants to secure the natural permanence of their territorial possessions, by embankments high and strong enough to protect them under ordinary circumstances from the waves; by windmills on the embankments—a characteristic feature of Dutch landscapes—they worked the pumps which drained the enclosed lands. In consequence, the Netherlands has the appearance of an artificially constructed country, some portions of which are 16 feet below the surface of the sea and nearly all too low for natural drainage. The whole country is divided by dikes, some of them 60 feet high, which protect portions of land from the sea, lakes or rivers. These enclosed lands are called *polders*. On the chief dikes are roads and canals also joining the rivers, the canals generally large enough to be navigable. There are no mountains nor rocks in the Netherlands, which is popularly described as a country without mountains, wild trees or natural springs. The only heights are the sand-hills, about 100 to 180 feet high along the coast of Holland; and a chain of low hills, of similar origin, perhaps, which extend from the middle of the province of Utrecht into Gelderland.

The principal coast features are the wide estuaries of the Schelde and of the Maas, the latter receiving the waters of the Rhine; north of the Maas the Zuider Zee, which was formed by an irruption of the sea in the beginning of the 13th century and now covers an area of 1,200 square miles. Between the mouths of the Maas and the entrance of the Zuider Zee, a distance of 75 miles, the coast is chiefly formed of sand-hills or dunes, frequently 180 feet high, dreary and sterile to the last degree; and separating, with their broad band of irreclaimable desert, the low fertile meadows on the one side from the waves of the ocean on the other. In a line with these dunes, stretching beyond the mouth of the Zuider Zee, runs a chain of islands, namely, Texel, Vlieland, Terschelling, Ameland, etc., which seem to indicate the original line of the coast before the ocean broke in upon the low lands. The coast of Friesland, opposite to these islands, depends for its security altogether on artificial embankments. The Lauwers Zee, a deep bay on the confines of Friesland and Groningen, also owes its origin to an irruption of the ocean; and again the Dollart, a gulf at the mouth of the Ems, between Holland and Germany, was formed about half a century later than the Zuider Zee and by a similar convulsion, which is said to have swept away 70 villages and 100,000 people. From the left bank of the Ems extends the Bourtang morass, a vast and irreclaimable peat marsh, partly in Germany, partly in Holland; the Peel, a marsh of like nature but less extent, lies near the left bank of the Maas,

on the east side of North Brabant. The work of reclaiming the waste is constantly going forward; in the provinces of North and South Holland alone about 90 lakes have been drained. The principal of these was the Lake of Haarlem, the drainage of which, begun in 1839, was completed in 1852. The draining of large portions of the Zuider Zee has been begun.

Hydrography.—The chief rivers of the Netherlands are the Rhine, Maas, Schelde, Yssel, Vecht and Hunse. The Rhine is above half a mile wide where it enters the Netherlands; it soon divides, the south and principal arm taking the name of Waal and uniting with the Maas, while the north arm, communicating with the Yssel, takes the name of Leek; a branch from it named the Kromme (crooked) Rhein, winds by Utrecht to the Zuider Zee, while another very diminished stream called the Old Rhine flows from Utrecht by Leyden, to the sea at Katwijk. The Maas, entering the Netherlands from Belgium, receives the Roer; of the Schelde only the mouths, the east and the west, or Old Schelde, lie within the Dutch boundary. The Yssel and Vecht, flowing from Germany, both enter the Zuider Zee by mouths at no great distance asunder. The Hunse, rising in the Bourtang Marsh, flows through Groningen to the Lauwers Zee. The canals of the Netherlands are collectively more important than the rivers. The chief is the great ship canal, 26 feet deep and 197 wide, from Wijk, on the North Sea, to Amsterdam, and connected by locks with the Zuider Zee, opened in November 1877. This great canal shortens the distance between Amsterdam and the sea to about 15 miles. The North Holland Canal allows large ships to pass between Amsterdam and the Helder, a distance of 40 miles, so as to avoid the intricate navigation of the Zuider Zee; the Winschoten Canal, also for ships, 18 miles long, connects the Dollart with Groningen; the Damster-Diep, of equal magnitude, runs from Groningen to the sea at Delfzijl; another canal connects Harlingen, on the Zuider Zee, with Groningen; the Nieuwer Sluis unites Utrecht with Amsterdam, while the latter city also communicates with Rotterdam. The Dutch canals are much used by passengers and the slowness of the trekschuyts or boats is compensated in some measure by their punctuality. In winter their frozen surface offers convenient roads to skaters and they are then traveled over with greater speed.

Climate.—The climate is extremely humid, changeable and disagreeable; violent winds, with varying temperature, frequently blow from southwest or northwest and heavy sea-fogs are driven in which injure vegetation. The mean average annual temperature is 50° F.; 35° in January and 65° in July; the average annual rainfall is 26 inches. The winter is severe and the sky is almost always overcast and troubled. The bright days hardly exceed 40 in the year. Low fevers visit the marshy districts in autumn, but the dry cold of winter restores the peasant's health. Although the climate is to strangers cheerless and depressing, its prejudicial effects on health are counterbalanced by good food and clothing and habitual cleanliness; the Dutch give particular attention to these domestic safeguards, and, not-

withstanding the ungenial climate in which they live, longevity is not rarer among them than elsewhere.

Agriculture, etc.—Horticulture and agriculture have been developed to a high degree of perfection, although the latter holds a subordinate place in rural industry. The soil consists chiefly of alluvial deposits. Wheat, of excellent quality, is grown only in favored portions of the south provinces. Rye, oats and buckwheat, with horse-beans, beet, madder and chicory, are more common crops; and tobacco is cultivated in the provinces of Gelderland, South Holland and Utrecht; flax in Zeeland and the environs of Dortrecht, and hemp, oil-seeds and hops in various parts of the kingdom. Culinary vegetables are cultivated on a much larger scale for home use and also for the exportation of the seeds, which form an important article of Dutch commerce. Dutch agriculture atones in thoroughness for what it lacks in extent. The farmers are highly skilled and to them many of the chief improvements in modern agriculture are due. The culture of flowers and especially of flowering bulbs has long been one of the most important industries of the country and is of ever-increasing importance. The chief centre of this industry is Haarlem and every year large quantities of bulbs of all kinds are exported to foreign countries. It is in stock, and dairy produce in particular, that the rural industry of the Netherlands shows its greatest strength. Their horses are remarkable for size and strength and much sought after; and in the number and excellence of their horned cattle the Dutch stand equally high. The poultry-yard is also to the Dutch farmer a source of wealth. Bee-culture is likewise actively carried on, especially in Gelderland and Drenthe. The quantity of cheese and butter brought to market is enormous. About 2,100,000 acres are under culture, nearly 3,000,000 are pasture land, over 150,000 are devoted to gardens and orchards, some 620,000 are forest, about 1,500,000 are uncultivated heath, fully 300,000 are water and morass and about 125,000 acres are occupied by dikes and roads.

Manufactures and Commerce.—Manufactures have never held a very important place, though the linen of the Dutch Netherlands has long held the first rank. The manufacture of woolen cloth centres in Leyden, Utrecht and Tillburg. The distilleries of Schiedam are well known; Gouda supplies tobacco-pipes, the best of their kind; and the same praise may be bestowed on the leather, the refined sugar of the Dutch, the pottery, bricks, tiles, glassware and many other articles intended for Continental use. Ship-building and the manufactures subsidiary to that industry are largely carried on in many places. Coal is mined in the province of Limburg, the mines chiefly belonging to the state; 2,262,148 tons were extracted in 1915, valued at \$7,510,000. The commerce with the Dutch possessions in the East Indies, particularly Java, is of great and continually increasing importance. The total exports of home produce and imports for home consumption, inclusive of bullion and specie, in a normal year were, imports \$1,632,500,000; exports \$1,285,000,000. The trade is chiefly with Great Britain and Germany.

Shipping, Navigation and Fisheries.—The mercantile navy of the Netherlands numbers 786 vessels of 40 tons and upwards; 406 steamers of 716,192 and 380 sailing vessels of 44,473; making a total tonnage of 760,665. The vessels entered in 1917 were 2,184 of 5,260,832 tons; cleared, 2,186 of 5,078,379 tons. The herring, oyster and other fisheries of the North Sea employed 6,151 vessels of all kinds, manned by over 23,800 seamen. The oyster fishery yields over 1,900 tons annually, while the value of the herring fishery is estimated at \$1,273,085.

Railways, the Post Office, Telegraphs, etc.—The total length of railways in the Netherlands is over 2,382 miles, which belong to private companies. The railways yield an annual revenue of \$40,101,250; the expenditure is \$30,772,920. The post office is well organized and also yields a revenue in excess of the expenditure. The length of state telegraph lines in operation is about 5,172 miles. The canals have a length of 2,000 miles (see paragraph on *Hydrography*).

Money, Weights and Measures.—The guilder or florin, value 40 cents, is the chief denomination of money. Ten-guilder gold pieces are coined, but silver is chiefly in circulation. The French metric system of weights and measures has been adopted, the principal names being— the kilogram or *pond*, metre or *el*, gilometer or *mijl*, are or *verkanste roede*, hektare or *bunder*, stere or *wisse*, litre or *kan*, and hektolitre or *vat*.

Government, Finances, etc.—The kingdom of the Netherlands, as now constituted, is a constitutional monarchy. The executive power lies wholly with the sovereign, who shares also in the work of legislation with the States-General. These consist of two chambers—the upper with 50 and the lower with 100 members—who assemble for deliberation and dispatch of business at The Hague ('Sgravenhage'). The members of the upper chamber are elected by the provincial states from among the most highly assessed inhabitants of the various counties; the others are elected by ballot, at the rate of one deputy to every 45,000 souls. The government is strong and the administration in every department is simple and economical. The revenue of the Netherlands during the last few years has averaged about \$56,000,000 per annum and the expenditure about \$58,000,000. The debt of the state amounts to about \$485,000,000, the interest on which forms the largest branch of the expenditure. The chief items of revenue are yielded by the excise and direct and indirect taxation. The army comprises some 150,000 men on a war footing, but only about 30,000 altogether in peace, and 1,500 officers. It is formed partly by conscription and partly by enlistment. Substitution was abolished in 1898. The army of the East Indies is about 42,000 strong. The navy comprises 7 first-class iron-clads and 5 cruisers, besides a number of gun-boats, 36 torpedo-boats, training-ships, 9 submarines, a submarine depot ship, 2 mine layers, etc.

Colonies.—In addition to her European territories the Netherlands possesses a wide extent of colonies and dependencies in Asia and America, with which she carries on extensive commerce and which contribute materially to her greatness. Her chief Asiatic colonies are the Dutch East Indies (q.v.) comprising Java,

Sumatra, part of Borneo; Celebes and part of New Guinea, with Banca, Bali, Lombok, Sumbawa, Flores and other islands in the Malay Archipelago; while in America she possesses Surinam or Dutch Guiana, and the West Indian islands of Curaçao, Saba, Saint Eustatius, etc. Estimated area, 782,863 square miles; pop. about 34,000,000.

Ethnology.—The stock to which the people belong is the Teutonic, the great majority of the inhabitants being descendants of the old Batavians. They comprise over 70 per cent of the population and are chiefly settled in the provinces of North and South Holland, Zeeland, Utrecht and Gelderland. The Flemings of North Brabant and Limburg and the Frisians, inhabiting Friesland, Groningen, Drenthe and Overijssel, form the other groups.

Population.—As given in the paragraph *Political Division* the total population in 1916 was 6,583,227, of whom 3,270,859 were males and 3,312,167 females.

Education.—In respect of education the Netherlands occupy a high place among the nations of Europe. In 1857 a non-denominational primary instruction law was passed and in 1878 this law was supplemented by another containing more stringent regulations with the view of making primary education more general. In 1900 instruction was made obligatory. An act passed in 1889 diminished public instruction and encouraged private instruction, which is now supported by the state. The cost of public primary education is borne jointly by the state and the communes, the former contributing to teachers' salaries and being responsible for one-quarter of the cost of founding or purchasing schools. Above the primary schools are the middle class, secondary and classical schools, a polytechnic institution at Delft, special colleges for agriculture, horticulture, etc. There are four public universities, namely, at Leyden, Utrecht, Groningen and Amsterdam, and also a private university.

Religion.—A majority of the inhabitants belong to the Reformed Church and Roman Catholics also are numerous. The members of all religious denominations possess, by the Constitution, perfect liberty of conscience and social equality. The number of Protestants is over 3,068,000; of Roman Catholics, about 2,000,000; Jews, 104,000; other religions, 18,000; persons not belonging to any religious body, 115,200. The Reformed Church is Presbyterian in government, while the Roman Catholics are ruled by an archbishop and four bishops.

History.—The south portion of the Low Countries belonged at the beginning of the Christian era to Belgic Gaul. (See GAUL). The north portion, inhabited by the Batavians and Frisians (q.v.), formed part of Germany. The south portion as far as the Rhine was held by Rome up to 400 A.D., after which it came under the rule of the Franks, as did also subsequently the rest of the country. In the 11th century the territory comprised in the present kingdoms of Belgium and the Netherlands formed a number of countries, marquisates and duchies corresponding more or less with the modern provinces. By the latter part of the 15th century all these had been acquired by the Duke of Burgundy and passed to the house of Hapsburg on the marriage of the daughter of Charles the Bold of Burgundy

HOLLAND



1 Bridge and Palace of Industry, Amsterdam

2 The Fishpond at The Hague

to the son of the Emperor Frederick III. On the abdication of Charles V in 1556 they passed to his son Philip II of Spain (q.v.). In consequence of religious persecution in 1576 Holland and Zeeland openly rebelled and in 1579 the five north provinces—Holland, Zeeland, Utrecht, Guelders and Friesland—concluded the celebrated Union of Utrecht, by which they declared themselves independent of Spain. They were joined in 1580 by Overijssel and in 1594 by Groningen. After the assassination of William of Orange, 10 July 1584, Maurice became stadtholder (governor). His victories at Nieupoort and in Brabant, the bold and victorious exploits of the Dutch admirals against the navy of Philip II, the wars of France and England against Spain and the apathy of Philip II, caused in 1609 the Peace of Antwerp. But Holland had yet to go through the Thirty Years' War before its independence, now recognized by all the powers except Spain, was fully secured by the Peace of Westphalia. In the middle of the 17th century the United Netherlands was the first commercial state and the first maritime power in the world, and for a long time maintained the dominion of the sea. The south provinces alternated between the rule of Spain and Austria till 1797, when they came under the power of the French Republic. In 1806 Louis Napoleon became king of Holland, but in 1810 it was incorporated with the French Empire. In 1814 all the provinces both of Holland and Belgium were united by the Treaty of Paris to form the kingdom of the Netherlands. This arrangement lasted till 1830, when the south provinces broke away and formed the kingdom of Belgium. King Willem I attempted to reduce the revolted provinces by force but the great powers intervened, and finally matters were adjusted between the two countries in 1839. The king abdicated in 1840, and was succeeded by his son Willem II (1840-49), he being again succeeded by his son Willem III, whose reign on the whole was uneventful. Slavery was abolished in the Dutch West Indian possessions in 1863, slave-owners receiving compensation. In 1873 the Dutch began a war with the Acheenese of Sumatra, and hostilities have lingered on ever since. In 1887 the Heemskerk Liberal ministry passed a bill amending the Constitution.

On 23 Nov. 1890, the king died, and was succeeded by his young daughter, Wilhelmina Helena Pauline Maria, under the regency of her mother, the Queen-dowager Emma. The year 1892 was marked by serious disturbances among the unemployed, and in 1893 the Socialists carried on a vigorous propaganda. In 1896 the franchise was extended by a new bill, which received the regent's assent. Besides the unsuccessful war against the people of Acheen, in Sumatra, the Dutch in 1894 had to face also a revolt in the island of Lombok. A Dutch force met with a serious disaster here, but soon afterward General Vetter re-established the authority of the Netherlands. In 1898 Queen Wilhelmina attained her legal majority, and formally took up the reins of government. The most notable event of 1899 was the meeting of the great Peace Conference at The Hague. (See HAGUE COURT). In 1900 primary education was made compulsory by law. In February 1901, the queen married Prince Henry of

Mecklenburg-Schwerin. In 1908 there were difficulties over Curaçoa with Venezuelans, who seized four coast defense vessels. The affair was arbitrated in 1909 by the return of the vessel, and by Venezuela paying an indemnity of \$4,000. In 1913 the Coast Defense Bill appropriating \$5,000,000 for fortifying Flushing created European discussion, it being rumored that the project was instigated by Germany as a move against an English landing in the event of war. After the outbreak of the European War in 1914 the position of Holland was one requiring continuous vigilance against violations of its neutrality. It was distinguished by magnanimous assistance and charity extended to its oppressed Belgian neighbors, and by belligerent demands that strained perilously near rupture points. (For these events see WAR, EUROPEAN—NEUTRAL STATES IN THE). Consult Amicis, 'Holland' (1893); Barker, 'Rise and Decline of the Netherlands' (1906); Bernard, 'La Hollande Géographique, Ethnologique, etc.' (1900); Boulger, 'Holland and the Dutch' (1913); Hayard, 'In the Heart of Holland' (1880); Meldrum, 'Holland and the Hollanders' (1880); Motley, 'The Rise of the Dutch Republic' (1858), and 'History of the United Netherlands' (1869); Torchiana, H. A. V., 'Holland, the Birthplace of American Political, Civic and Religious Liberty' (1915); Van Loon, 'Fall of the Dutch Republic' (1913); id., 'Rise of the Dutch Kingdom 1759-1813' (1915); Wharton, 'Holland of To-Day' (1912).

NETHERLANDS, Language, Literature and Science of the. The literary language of the kingdom of the Netherlands is in English called Dutch, but by the people themselves is called *Hollandsch* or *Nederduitsch*, that is, Low Dutch. This name it receives in opposition to the *Hochdeutsch* or High Dutch, the literary language of modern Germany. Closely allied to the Dutch, so closely indeed as to be distinguished from it only by some orthographic and other minor differences, is the Flemish (*Vlaemsch*) language, spoken partly in the kingdom of Holland, but mainly in the Belgian provinces of East and West Flanders, Limburg, Antwerp and South Brabant. (See FLEMISH LANGUAGE AND LITERATURE). Both languages belong to the Low German group of the Teutonic or Germanic branch of the Indo-European family of languages. The two languages, or rather dialects, are in fact in their early history identical and the term Flemish is applied, on the one hand, to the original form of both dialects and to the literature produced in it before it separated into these dialects; and on the other hand to that one of the two dialects which is still spoken in the parts above mentioned, and to the literature produced in it. It is only in this latter application of the term that the Flemish language and literature can be noticed separately. The non-literary Low-German dialects spoken in the Netherlands may be divided into the Frisian, an idiom which is gradually disappearing (it has a small literature—see FRISIANS); the Guelders dialect, or the so-called Lower Rhenish; the Groningen dialect, to which also belongs the Over-Yssel dialect, bearing a considerable resemblance to the German.

The common parent of the modern Dutch and Flemish was at one time supposed to be a development of the Old Frisian, but the general

view at the present day appears to be that the characteristic forms of the language of the Netherlands are at least as old as those of the Old Frisian, and that both languages are separate developments of a still older original. The Dutch language resembles the German in its vocabulary and syntax, but is considerably simpler in its accidence. Its vowel sounds are broader than those of the Germans, and its gutturals harsher. It possesses the same power of forming compound words from native materials as the German, and even to a greater extent, for while the German frequently borrows adjectives (for example) from foreign sources to correspond to nouns of native formation, the Dutch has for the most part such adjectives paronymous with the nouns. Thus the Germans may use the word *Wissenschaftslehre* for philosophy, but are obliged to adopt *philosophisch* for philosophical; while the Dutch have *Wijsbegeerte* and *wijsgeerig*, both of native origin.

The oldest literary monument of the language of the Netherlands is, as far as can be ascertained, an ordinance of the town of Brussels dated 1229, although it is possible that a few of the poems which have come down to us, particularly 'Reinaert de Vos' (Renard the Fox) may belong to the second half of the 12th century. In the latter part of the 13th century the language was brought to a pretty high point of literary cultivation by Jacob van Maerlant (born 1235), author of the 'Spiegel Historiæ,' but not long after his date the language began to decay, owing to the introduction of French forms, words and idioms through the Burgundian domination (1363-1477). A few literary societies, called *Rederijkerskamern*, appear to have striven against this result, but their efforts were not rewarded with any success until the struggle with Spain at the close of the 16th century produced a reaction among the population of the Netherlands in favor of their native language, a reaction which, however, proved permanent only in the northern Protestant provinces, which eventually succeeded in throwing off the Spanish yoke, and which now form the kingdom of the Netherlands. The chief specimens of the language belonging to the period intervening between Maerlant and the reaction at the close of the 16th century are the civic laws of Antwerp (1300), a few chronicles such as that of J. Van Clere and a translation of Boethius by Jacob Velt of Bruges (15th century).

The leaders in the restoration of the language of the Netherlands, or as we may now call it Dutch, to the dignity of a literary medium were Dirk Volkertszoon Coornhert and Philips van Marnix, both distinguished also as statesmen who took a leading part in all the political and theological conflicts of the day. Coornhert (1522-90) was a poet and dramatist as well as a prose-writer; but while in his poems and dramas he rises little above the *Rederijker* of his time — of a society of whom at Amsterdam he was a member — his numerous prose works are still looked upon as works of merit. Marnix (1538-98), although inferior to the former in purity of language, obtained even greater renown by his 'Bijenkorf der heil Roomsche Kerche' (1569, often since reprinted and translated into foreign languages). One of these two (it is uncertain which) is also the author of the national song 'Wilhelmus van Nassauwen.' The efforts of these men were entirely successful so

that before the final conclusion of peace (1648) the golden age of the Dutch national literature, which fills up the greater part of the 17th century, had begun. Energy, independence, vivacity and elevation of sentiment characterize the more important writers at the beginning of this period, among whom Hooft and Vondel hold the first place. Pieter Corneliszoon Hooft (1581-1647) brought the prose style to a high degree of excellence, and Joost van den Vondel (1587-1679), the greatest of Dutch dramatists, performed the same service for the language of poetry, and made it peculiarly fit for the expression of the sublime. Jacob Cats, familiarly known in Holland as 'Father Cats' (1577-1660), on the other hand, confined himself to the sphere of every-day life. His verses are marked by a careless ease, sometimes even slovenliness; but his language is pure, a circumstance of some importance, since after the termination of the war, when the mind of the people had become toned down from the high pitch to which it had been raised by their struggle for freedom and independence, he became the special favorite of his countrymen, and had thus a large share of influence in determining the character of the national language. Among the other leading names in pure literature belonging to this period are those of Constantyn Huygens (1596-1686), father of the celebrated mathematician, a satirist, epigrammatist and didactic poet; Jacob van Westerbeaen (died 1670) and Jan Van Hemskerck (died 1656), both erotic poets, the latter author of 'Minnedichten,' in imitation of Ovid, and also of a poetic romance entitled 'Bataavsche Arcadia'; Dirk Kamphuisen (died 1626), a celebrated hymn-writer. No department of literature received more attention than the drama during this period, and several authors who afterward distinguished themselves in other fields began their literary career as dramatists. Among these were Brandt (died 1685), who was also an historian and epigrammatist; Ondaan (died 1692), a political writer and lyricist; and Antonides van der Goes (died 1684), celebrated as a lyricist chiefly on account of his poem 'De Ijstroom' in which he sings the praises of Amsterdam. The principal writer of comedies was Bredero (1585-1618), whose language is that of the lowest of the people.

With the sinking of the national spirit which followed the conclusion of peace the national literature also began to decline, and its decline was hastened by its falling under French influence, to a great extent in consequence of the large influx of French Huguenots after the revocation of the Edict of Nantes (1685). In the crowd of feeble imitators of French originals which the 18th century produced in Holland, there are but few that can be singled out either as having kept themselves more or less free from that baneful influence, or as having shown unusual ability in what they performed under it. Among the former are the nature-poet Hubert Corneliszoon Poot (died 1733), the lyricist Jan van Broekhuysen (died 1707), and Pieter Langendijk (died 1756), a writer of comedies; among the latter Lucas Rotgans (died 1710), author of a number of dramas and a tedious epic entitled 'Willem III,' Arnold Hoogvliet, Sijbrand Feitama, Nicolas Simonzoon van Winter (died 1795), and the brothers Van Haren.

During all this period, however, the language

had maintained its purity almost uncorrupted, and again swept itself quite free from foreign taint when the literature took a more healthful development in the last quarter of the 18th century. The immediate cause of this change was the occupation of the Dutch with German literature, at that time energetically rising into prominence; and the change was assisted subsequently by their becoming acquainted with English literature, and by the internal commotions and the dangers from without, which quickened the national spirit. The change was first discernible in the lyric poetry. Jacob Belamy (1757-86) and Rijnvis Feith (1753-1824) show most plainly in this branch of poetry the influence of the Germans, while Pieter Nieuwland (1764-94) formed himself more after the ancients. Willem Bilderdijk (1756-1831), admirably gifted by nature, acquired by study and practice a wide knowledge of literature and a rare command of language, and shone in all departments of poetry, but was unable to breathe into his works any originality, owing to his rigorous adherence to the pedantic rules of Boileau, which prevented his rightly appreciating English and German literature. J. F. Helmers (1767-1813), a poet of more warmth than Bilderdijk, won great applause by the descriptive poem 'De Hollandsche Natie,' in which he glorifies his native country. The pleasing Hendrik Tollens (1780-1856) was as a lyricist the avowed favorite of his country, and his 'Overwintering der Hollanders op Nova-Zembla' is regarded as the best descriptive poem in the Dutch language. Among the others whose productions have met with more or less acceptance are Cornelis Loots, Adriaan Loosjes, Ad. Simons, the original and humorous A. C. W. Staring van den Wildenborch, Bilderdijk's disciple and eulogist Isaak Dacosta, by birth a Portuguese Jew, and J. J. L. ten Cate, an able translator of foreign poetry. An important service was rendered to the literature of his country by Jacob van Lennep (1802-68), who, incited by the example of Scott and Byron, introduced romanticism, and successfully repressed French classicism, by his masterly treatment of native tales and historical subjects in narrative poems. His chief followers are A. Bogaers, H. A. Meyer, B. ter Haar and N. Beets. The dramatic productions of this period are comparatively insignificant. Prose, which since Brandt had sunk very low in Holland, was first raised again by Justus van Effen in his *Hollandischen Spectator* (1731-35), an interesting periodical in imitation of the English *Spectator*. The orthography of the Dutch language was very unsettled formerly; but a uniform system vigorously opposed by Bilderdijk and others was adopted in the schools in 1804. About the beginning of the 19th century Van der Palm, De Borch, Siegenbeek and others acquired more or less distinction as historians; but the prose of Holland continued to be characterized by a somewhat strained rhetorical style till it was freed from its fetters by Geel and Van Lennep, the latter of whom wrote novels in language at once refined and popular. The novelists who rank next to Van Lennep are Oltmans (pseudonym Van den Hage), Mrs. Bosboom-Toussaint, Mulder, Hofdyk, Adele Opzoomer (pseudonym A. S. C. Wallis), Dekker, Daum (pseudonym Maurits), Van Rees, etc. Maarten

Maartens writes his novels both in English and Dutch. Besides these novelists by profession the dramatist Schimmel has done good work in the department of the historical novel, and the poet N. Beets has published, under the title of 'Camera Obscura,' a series of sketches and tales illustrative of Dutch life overflowing with wit and humor. The list of recent Dutch prose writers also includes Weitzel, Lange, J. ten Brink, Gorter, Huet, Fruin (the Dutch Motley), Vosmaer, Vissering, Pierson, Keller, the youthful poet Perk (1860-81), Emants, Kloos, Netoscher, Verwey, Pol de Mont, Couperus, Schaepmann, Borel, Van Hulzen, Van Eeden, Helene Swarth-Lapidoth, Van Deyssel, De Koo and Steijn Streuvels.

Dutch Science and Scholarship.—The Dutch on the whole can point to higher names in the various branches of scholarship and science than in that of pure literature, a circumstance which is no doubt partly due to the greater ease with which the results of such labors can become known and appreciated in translations than those of pure literature. Gansfort and Agricola in Groningen were among the first who distinguished themselves as divines and scholars. Erasmus of Rotterdam made far greater progress. A still greater genius, Hugo Grotius, in the beginning of the 17th century devoted himself simultaneously to philology and antiquities, poetry, history, philosophy, theology and jurisprudence in all its branches. The northern provinces were long destitute of a university; that of Louvain, in Brabant, served for all the Low Countries. But the University of Leyden, founded in 1575 by Prince William I, soon exerted a beneficial influence over the whole united Netherlands. Men like Scaliger, Lipsius, Daniel and Nicolas Heinsius, Gronovius, Spanheim, Arminius, Drusius, Coccejus, and others, made this university famous over all Europe. Universities were also founded at Franeker in 1585, at Groningen in 1614, Utrecht in 1636 and Harderwijk in 1647, and their competition with the University of Leyden was very advantageous to science. Toward the end of the 17th century Huygens, Leeuwenhoek, Zwammerdam and Hartsoeker distinguished themselves in natural history and astronomy; Alb. Schultens, Tiberius Hemsterhuis, Lambert ten Kate and Hermann Boerhaave in medicine; and a series of distinguished men flourished, particularly at Leyden. Utrecht had its Wesseling, Duker, Drakenborch and Saxe. Among the jurisconsults Mathaeus, Huber, Noot and Voet are distinguished. The cultivation of the Dutch language was especially promoted by Lambert ten Kate, Sewels, Zeydelaar, Kramer and Van Moerbeek. In philology, history, geography, mathematics, natural philosophy and medicine, the Dutch distinguished themselves in the highest degree, and their contributions to civil and public law are very valuable. They have always had men of the first distinction in ancient classical literature. From these notes it will appear that efforts have been made to adopt the language to elevated purposes, and that they have been crowned with success. The prose of the Dutch has little euphony and elegance, but it is well adapted to express practical truths in a simple and popular manner. It would undoubtedly have acquired greater perfection if their philosophical and other writers had not often

made use of a foreign language. Erasmus, Lipsius, Grotius, Wyttenbach and others wrote in Latin, and Francis Hemsterhuys in French. As with philosophy, so also with history. The sciences have flourished in the northern provinces, and kept pace with the progress of the times; but this is not the case in the southern provinces. The study of the law and of general jurisprudence is in a flourishing condition, and medicine has its notable exponents. The Dutch excel in mechanics and hydraulics. Consult Schneider, 'Geschichte der Niederländischen Litteratur' (1887); Jonckbloet, 'Geschiedenis der Nederlandsche Letterkunde' (1873); Ten Brink, 'Geschiedenis der Noord-Nederlandsche Letteren in de XIXe Eeuw' (1904); Kalf, 'Geschiedenis der Nederlandsche Letterkunde' (Groningen 1906).

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NETHERLANDS, Religious Conditions in. The religious situation of the Netherlands is quite complex. Of the 6,583,227 inhabitants which the census of 1918 reported, over 2,000,000 belong to the Roman Catholic Church. They are found principally in the provinces of North Brabant and Limburg. The Netherland Reformed Church (Hervormd), up to 1795 the State Church, and still receiving financial aid from the government, enrolls about 1,500,000 of the population. While a strong party in this body is strictly Calvinistic, especially the membership in the large cities, an influential element is decidedly liberal and practically unitarian. Both Psalms and hymns are used in public worship. The government of the Church, originally on presbyterian principles, has become considerably collegialistic. The General Synod is the highest Church court meeting annually; subject to it are provincial synods, composed of delegates from "classes" or presbyteries. The local church is ruled by a consistory. The standards of the Church are the Netherland Confession of Faith, the Heidelberg Catechism and the Canons of Dordrecht, but preachers are not bound to adhere to the letter of this Creed.

Connected with the Reformed Church as a particular synod is the *Walloon Church*, originally composed of French Reformed refugees, and at present numbering some 10,000 members. The French language is used in public worship. Liberalism prevails in this body. There are 16 churches and 24 pastors.

In 1834 a number of the stricter Calvinistic people separated from the Netherland Reformed Church, forming the *Christian Reformed Church*, which in 1890 united with the *Low Dutch Reformed Churches* (Doleerend), which in 1886 had withdrawn from the Netherland Reformed Church. They are known as the *Reformed Churches in the Netherlands*. Their official standards are those of the old body, but faithfully adhered to. The Psalms, and a few hymns, are used in public worship. In 1916 the communicant membership was 180,632. There are about 700 congregations, 54 "classes" or presbyteries and 12 particular synods. The General Synod meets every three years. The Theological School at Kampen and the Free University in Amsterdam educate their ministry. The Netherland Reformed Church has arrangements made for this purpose with the universi-

ties of Leyden, Utrecht and Groningen. The *Christian Reformed Church in the Netherlands*, with about 45,000 communicants, is composed of those who refused to enter upon the union of 1890 above referred to. Its theological school is in Apeldoorn. This body is very conservative, which is also the case with the "*Reformed congregations*," numbering some 40 local organizations, many of them in the province of Zeeland. Some "Free Reformed" churches have their chief distinction in using an old version of the metrical Psalms. In church government they are independents.

The *Remonstrant Brotherhood*, originally composed of followers of *Arminius*, condemned at the Synod of Dordrecht, 1618-19, is a pronouncedly liberal body, enrolling 28 churches, served by 29 pastors. Its seminary is in Leyden. The *Evangelical Lutheran Church* is a scion of the Lutheran Churches of Germany, the same as the *Restored Evangelical Lutheran Church*, which in 1791 separated from the older body because of its liberalism. The Evangelical Lutheran Church numbers 48 congregations, served by 60 ministers. Its seminary is in Amsterdam. The Restored Evangelical Lutheran Church (8 congregations and 11 pastors), has a training school for its ministry in Utrecht.

The *Mennonite Church*, or Baptist Society, dates from Reformation days and is of Anabaptist origin. Its 122 congregations are liberal in doctrine. Their seminary is in Amsterdam.

Anglican and *Presbyterian* churches are found in the chief seaports of the Netherlands. In various places are groups belonging to churches of American or English origin, such as Adventists, Baptists, Seventh Day Baptists, Apostolic Believers, Darbists, Irvingites, Moravians, etc.

The *Old-Catholic Church* maintains a separate existence since the time of the Reformation, although it is a dwindling body. In 1784 it numbered 50 churches with 79 priests; at present there are 26 congregations with 27 priests.

HENRY BEETS.

NETHERLANDS SCHOOLS OF PAINTING. The, are comprised in the Dutch and the Flemish schools. The Flemish school was founded by the brothers Hubert and Jan van Eyck, who established themselves at Bruges, and attracted scholars from far and near. They flourished between 1370 and 1445. The Flemish school is distinguished by brilliant coloring; magical effect of the chiaroscuro; carefully labored though often tasteless drawing; a strong yet natural expression, and boldness in composition. Among the scholars of the Van Eycks was Hans Memling, an artist whose works are among the best of the early Flemish school. Among later masters of the same school are Quintin Matsys or Messys of Antwerp (died 1529), Luke of Leyden (died 1533), and wholly in the 16th century Francis Floris (born 1520; died 1570), called, on account of the great influence he exercised on contemporary painting, the Flemish Raphael. Among his scholars were the two Francks, the two Pourbuses, and Mart. de Vos (born 1520). Other painters rather later in time are Spranger (born 1546); Henry Steenwyk, the painter of perspective (born 1550); Denis Calvert; the brothers Paul and Matthew Bri; Van Ort (born 1557); and the

two Pieter Breughels, father and son; Roland Savery of Courtray (born in 1576). After all these came Peter Paul Rubens (1577-1646), the boldest painter of modern times; a man of inexhaustible industry, of gigantic imagination and power of representation, to whom about 4,000 paintings are ascribed. With him the Flemish school reached its acme. Several distinguished painters follow: Frans Snyders (born 1579), whose hunting and animal pieces excel all others in boldness and truth; Josse de Momper (born 1580), a landscape-painter esteemed for his valleys and the distant views which they present; Pieter Neefs, the famous church painter; David Teniers, father and son, noted for their representations of peasants, guard-rooms, tap-houses and all kinds of low life; Gaspar de Crayer (born 1582), who approaches in the expression and coloring of his historical paintings to Rubens; Gerard Seghers, distinguished as a historical painter; his brother Daniel, famous for flower and insect pieces. Jakob Jordaens (born 1594), however, excelled all those who make Rubens their model. Abraham Janssen and his pupil Theodoor Rombouts equal Rubens in coloring, but not in conception. The industrious Luke van Uden executed the landscapes for Rubens' paintings, and his views of the sky at dawn are worthy the study of every artist. Anthony Vandyck (born 1599) obtained the name of the "king of portrait painters." He excelled Rubens in correctness and beauty of forms. Cornelius Schut, for whom Jan Wildens often painted the landscapes, distinguished himself as a historical painter; Adriaan Brouwer acquired fame by his excellent representations of scenes from common life; Jan van der Meer by his pastoral pieces; Anton Francis van der Meulen by his battle pieces; Frans and Jan Milet, father and son, by their landscapes. Besides these there are the names of Jan Bol, Wenceslaus Koeberger, Hendrik Goltzius, Hendrik van Balen, Frans Hals, Willem van den Nieuwelandt, Abraham Diepenbeck, Theod. van Thulden, Gerard Lairesse, Jan Frans van Bloemann, Jan van Cleef, Pieter Eykens, Robert van Oudenarde, Jan Anton van der Leepe, Jan van Breda, etc.

The Dutch school is distinguished for a faithful copying of nature, great finish, good chiaroscuro, skilful disposition of color and delicate penciling; but it is reproached with choosing often ignoble subjects and with incorrectness of drawing. Its founder is Luke of Leyden (born 1494). Its most prominent artists are Otho van Veen, of Leyden (born 1586; died 1634), who deserves mention also as the teacher of Rubens. Abraham Bloemart of Gorkum (died 1647) painted historical subjects, landscapes and animals in good taste. Cornelis Poellenburg of Utrecht (born 1586; died 1663) was peculiarly happy in painting small landscapes with figures. Worthy pupils of his are Daniel Vertange and Jan van Haensberge. Johan Wynants of Haarlem (born 1600) is distinguished as a landscape-painter; and Jan Daniel de Heem, of Utrecht (born 1604; died 1674) for his faithful imitation of flowers, fruits, carpets, vases, etc. The highest place belongs to Rembrandt (1606-69), whose masterly coloring atones for all his defects: In the delineation of common life the following are distinguished: Gerard Terburg of Zwooll (born 1608; died 1681); Pieter van

Laar (1613-73), the two Ostades, and Jan Steen (1636-89); in landscapes, Jan Both of Utrecht (born 1610; died 1650); Hermann Swaneveld of Woerden (born 1620; died 1690). Asselyn (born 1610; died 1680) painted battles, landscapes and pastoral pieces with brilliant coloring and a delicate pencil. Scarcely any painter drew more correctly, colored more beautifully and distributed light more truly than Gerhad Dow or Douw (born 1613; died 1680). John Fyt (born at Antwerp, 1625) was a good painter of beasts, birds and fruits; Gabriel Metz, who worked in the style of Terburg, excelled him in softness of penciling. The landscapes of Benenberg of Utrecht are full of life and freshness. Philip Wouvermans (born 1620; died 1668), the most famous painter of horses, produced battle and hunting pieces, horse-markets, travelers and robbers; and his paintings of all kinds are highly esteemed. The landscapes of Anton Waterloo, for which Weenix executed the figures, are sometimes cold, but please on account of the accuracy with which he represents light playing through foliage and the reflection of objects in water. Berghem acquired the name of the Theocritus of painters; and perhaps Paul Potter is the only one who can dispute the superiority in representing cattle with him. While Ludolf Backhuysen painted storms at sea with an effort as true as it is terrible, Frans Mieris distinguished himself by fine and accurate representations of many domestic subjects and Jan Pieter Slingseland was hardly less accurate. Godfrey Schalcken of Dort excelled in the illumination of night scenes. Excellent market scenes, animals and landscapes were painted by Karel du Jardin. Albert Cuyp and Adriaan van de Velde painted landscapes and animals with almost unequalled perfection. Hobbema is another excellent landscape-painter. For the representations of the beautiful solitudes of nature Jakob Ruysdael is celebrated and for quiet lovely moonlight scenes Van der Neer. No painter has painted more delicately and with more finish, even in insignificant trifles, than Adriaan van der Werf. The flower-painters, Pieter van Hulst of Dort and Jakob van Huysum, are almost unrivaled in this department. Other names are Cornelis Ketel, Bartholomew van der Helst, Albert van Everdingen, Gebrandt van den Hendrik Verschuuring, Maria van Oosterwyk, Willem Kalf, Melchior Hondekoeter, Cornelis de Bruyn, the two Houbraken, Rachel Ruisch, Cornelis du Sart, Jan de Witt, Cornelis Troost, Van Os, Van Spaendonck, Scheffer, Ommeganck, etc. About the beginning of the 19th century the classicism of France had a great influence on the Dutch historical school, as seen in the works of Kruseman, Pieneman, Navez and Van Bree. In genre painting the old models were still followed and good work was done by Jan Kobell and Eugene Verboeckhoven; Scheefhout and Schotel deserve mention as landscape and marine painters. A more natural and correct style followed the fall of the school of David in France, and Louis Gallait, Edouard de Biefve, Gustave Wappers, Nicaise de Keyzer and Hendrik Leys distinguished themselves as historical painters. Florient Willems and Alfred Stevens were genre painters. A. de Kuyff and Xavier de Cock painted excellent landscapes. Among modern Dutch painters were Alma Tadema and Josef

Israel. The former long resident in England, a baronet and member of the Royal Academy, was remarkable for the skill with which he treated subjects selected from states of civilization that have passed away, as from ancient Egypt, Greece and Rome. The genre pictures of Israels, of Bisschop, of Mauve; the marine views of Mesdag, and the fine landscapes of the brothers Maris, are also well known. The artists of the Netherlands are still distinguished by the peculiarities of the two schools, the Dutch and the Flemish. The reproach of an almost exclusive adherence to common reality has been often made to the whole school of the Netherlands, but is confined by some to the Dutch; while the Flemish school, in its more elevated productions, has striven to represent a nobler nature. Both are criticized as somewhat deficient in ideal beauty, but distinguished in the highest degree for faithful imitation of nature. Consult Caffin, C. H., 'Story of Dutch Painting' (New York 1911); Crowe and Cavalcaselle, 'Early Flemish Painters' (London 1872); Hofstede de Groot, 'Catalogue Raisonné of the Works of the Most Eminent Dutch Painters of the 17th Century' (New York 1908); Kugler, F. T., 'Handbook of Painting—German, Flemish and Dutch Schools' (London 1909); Marius, G. H., 'Dutch Painters of the 19th Century' (Philadelphia 1908); Rooses, M., 'The Dutch Painters of the 19th Century' (1898-1905); 'Art in Flanders' (New York 1914); Van Dyke, J. C., 'Old Dutch and Flemish Masters' (New York 1896).

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NETHINIM, in Biblical history, the lowest order of ministers of the temple at Jerusalem. They were hereditary attendants on the Levites in the services of the temple and were to do the more menial part of the work. They enjoyed the privileges of the priestly caste and lived apart on the temple hill. Doubtless they were originally prisoners of war who were dedicated by their captors to menial religious service. It is supposed that the Gibeonites originally held a similar office (Josh. ix, 21-27). At the return from Babylon, 392 of these ministers accompanied Zerubbabel (Ezra ii, 58; Neh. vii, 60), and 220 came with Ezra (Ezra viii, 17, 20); 612 of them in all. Consult Jacobs, J., 'Studies in Biblical Archaeology' (London 1894); McNeile, H. H., in Hastings and Selbie, 'Dictionary of the Bible' (New York 1909).

NÉTHOU, nā-too', Pic de, Spain, the highest point (11,169 feet) of the Pyrenees (q.v.).

NETSCHER, nēts'hēr, Caspar, Dutch painter: b. Heidelberg, 1639; d. The Hague, 15 Jan. 1684. He was taken to Holland in early childhood and as the adopted son of a physician early began the study of medicine, but eventually learned painting from Koster, a still-life painter of Utrecht, and from Terburg (q.v.) at Deventer; he also spent a short time during his student years at Bordeaux, France, but eventually settled permanently at The Hague. He was a genre painter who imitated the manner of Terburg and chose his subjects from aristocratic life. He sometimes, however, painted kitchen interiors and sheep, also portraits. His weakest work consists of small, delicately handled and enamel-like pic-

tures of historical and mythological subjects, which are blemished by mannerisms. Almost every public gallery in Europe contains examples of his numerous works, but the Dresden Gallery is particularly rich in his cabinet pieces, such as his 'Lady at the Harpsichord'; 'The Doctor's Visit'; 'The Harp Player.' The Rijks Museum, Amsterdam, possesses 16 portraits.

NETTEMENT, nēt-män, Alfred François, French journalist: b. Paris, France, 22 July 1805; d. there, 15 Nov. 1869. He was educated at the Collège Rollin in Paris and entered journalism. He founded *L'Opinion Publique* and for his staunch support of the grandson of Charles X he was imprisoned by Louis Philippe after his accession. He wrote 'Histoire de la Révolution de juillet' (1833); 'Histoire de la littérature française sous la Restauration' (1852); 'Histoire de la littérature française sous la royauté de juillet' (1854); 'Vie de madame de marquise de la Rochejacquin' (1858); 'Histoire de la Restauration' (8 vols., 1860-72).

NETTER, Thomas, also called **WALDENSIS**, English Roman Catholic clergyman: b. Saffron Walden, England, about 1377; d. Rouen, France, 2 Nov. 1430. He entered the Carmelite order and was graduated from Oxford, receiving ordination in 1394. He became provincial prior of the Carmelites in 1414 and strongly opposed the Lollard reform movement. He was confessor to Henry V and Henry VI and died while on a mission to Poland for the latter. He wrote 'Doctrinale Fidei Ecclesiæ Catholicæ contra Wiclevistas et Hussitas' and the 'Fasciculi Zizaniorum Magistri Johannis Wyclif' (ed. by Shirley, London 1858).

NETTLE, a plant of the family *Urticaceæ*, having unisexual flowers, the male and female on the same or separate plants: the male flowers with a 4-parted perianth and four stamens; the female flowers with a 2-parted perianth and a tufted stigma; the fruit an achene. The species are herbaceous plants, shrubs or even trees, covered with stinging hairs, which pierce the skin when touched and emit an acrid juice, often causing much inflammation and pain. These hairs are stiff and terminate in a silicious point which penetrates an animal's skin, breaks off and sets free a poison, the nature of which is not understood. When a nettle is grasped in such a way as to press the hairs to the stem no stinging ensues; but the slightest inadvertent touch of some of the species produces very severe pain. The stinging of the native nettles of Europe is trifling in comparison with that of some East Indian species. *Urtica crenulata* is particularly notable for the severity of the pain which it produces, without either pustules or apparent inflammation. The first sensation is merely a slight tingling, but within an hour violent pain is felt, as if a red-hot iron were continually applied, and the pain extends far from the original spot, continues for about 24 hours and then abates, but is ready to return to its original intensity on the application of cold water, and does not cease for fully eight days. Cold water has a similar effect in increasing or renewing the pain of all kinds of nettles. Still more formidable than this species is *U. urentissima*, the devil's leaf of Timor. The two most familiar species throughout America and Europe in waste places

are the small virulent *U. uréns*, and the less venomous common perennial species, the great nettle (*U. dioica*), often abundant, particularly near human habitations. The roots of nettles boiled with alum afford a yellow dye; and the juice of the stalks and leaves has been used to dye woolen stuffs a beautiful and permanent green. The young shoots of *U. dioica* have been much used in some parts of Scotland and other countries as greens and their peculiar flavor is much relished by some, although, in general, the use of them is confined to the poor. They are valuable as antiscorbutics, but are gritty to the taste from the quantity of crystals (cystoliths) contained. Whatever it is that gives nettles their stinging power is dissipated by boiling and drying. The high value of nettles as food for swine is well known to the peasantry of many countries; the great nettle is cultivated in Sweden for fodder of domestic animals; and nettles are also highly esteemed as food for turkeys. The seeds are extremely nutritious to poultry, and are given to horses by jockeys, in order to make them lively when they are to be offered for sale. The stalks and leaves are employed in some parts of England for the manufacture of a light kind of beer called nettle beer. The bast-fibre of nettles is useful for textile purposes. Yarn and cloth, both of the coarsest and finest descriptions, can be made of it. The fibre of *U. dioica* was used by the ancient Egyptians, and is still used in various countries. When wanted for fibre the plant is cut in the middle of summer and treated like hemp. Nettle-cloth, or grass-cloth, is a beautiful fabric made from rhea fibre. The fibre of *U. cannabina*, a native of the south of central Asia, is much used; and from that of *U. whitlavi* both fine lace and strong ropes can be manufactured. The fibre of *U. japonica* is much used in Japan; that of *U. argentea* in the South Sea Islands and of *U. heterophylla*, a widely-diffused Indian species, is of very glossy silky appearance and is manufactured into cloth in Assam. (See FIBRE). The seeds and herbage of *U. membranacea* are used in Egypt as an emmenagogue and aphrodisiac; and somewhat similar properties are ascribed to *U. dioica*. *U. tuberosa* produces tubers, which are nutritious and are eaten in India raw, boiled or roasted. Australia produces a magnificent tree-nettle, *U. gigas*, abundant in some parts of New South Wales, ordinarily from 25 to 50 feet high, but sometimes 120 or 140 feet, with trunk of great thickness, and very large green leaves, which when young sting violently.

Many plants are so called, as the "dead nettles," labiates of the genus *Lamium*; the "horse nettle" (*Solanum carolinense*); and others.

NETTLE-BUTTERFLY, a European butterfly (*Vanessa urticae*), which feeds and lays its eggs on nettles; other butterflies, including American species, have the same habit.

NETTLE RASH. See URTICARIA.

NETTLE-TREE, a tree of the genus *Celtis*, especially in the United States the hackberry (q.v.); and in Europe *C. australis*, commonly planted as a shade-tree in France and Italy.

NETTLETON, nê't-tôn, Alfred Bayard, American soldier and journalist: b. Berlin, Ohio, 14 Nov. 1838. He was educated at Ober-

lin College and entered the Union army at the outbreak of the Civil War, rising from the ranks to be brevet brigadier-general. He studied law after the war and engaged in a journalistic career and in 1890-93 he was Assistant United States Treasurer. He wrote 'Trusts or Competition' (1900).

NEU BRANDENBURG, noi-brân'dên-boorg, Germany, a town of the Free State of Mecklenburg-Strelitz, 16 miles northeast of Neustrelitz, near Lake Tollense. It was founded in 1248, and retains its picturesque mediæval ramparts and gateways. Its chief edifices are the Belvedere Palace and a 13th century Gothic church. It has manufactures of pianos, machines, paper, etc. It was founded by John I, Margrave of Brandenburg. Pop. 12,348.

NEU-LAUENBURG, noi low'ên-boorg, formerly DUKE OF YORK ISLAND, an island of the Bismarck Archipelago (q.v.) off the west coast of New Mecklenburg. Area, about 27 square miles. Pop. about 3,500.

NEU POMMERN, noi pôm'êrn. See NEW POMERANIA.

NEUCHÂTEL, nè-châ-têl, or **NEUF-CHÂTEL**, Switzerland, the name of a canton, town and lake. (1) The canton in the west of the country, bounded by the cantons of Bern and Vaud, the lake of Neuchâtel and France, has an area of 312 square miles. It lies in the midst of the Jura Mountains, four chains of which, running from northeast to southwest, traverse the canton and are separated by elevated, longitudinal valleys. The greater number of the numerous streams which water the canton flow into the Rhine; several are feeders of the Lake of Neuchâtel mentioned below. Chief of the minerals is the asphalt of Val de Travers. Grazing is extensively attended to; wine, absinthe, fruits, hemp and flax are produced. The manufactures are also important; the principal are lace, cotton, clocks and watches; a considerable industry is also carried on in cutlery, mathematical and philosophical instruments, chintz and other cotton stuffs. The famous Neuchâtel cream-cheeses, however, are made, not in this canton as popularly supposed, but in France, at Neuchâtel-en-Bray, a small Norman town, 25 miles southeast of Dieppe by rail. Neuchâtel was an independent principality as early as 1034. After various changes of masters it came into the hands of the old French family of Longueville (1504), which became extinct in 1707. The king of Prussia, as heir of the house of Orange, was then called to the sovereignty by the states of Neuchâtel, and his title was confirmed by the Treaty of Utrecht. In 1806 Prussia ceded it to France and the emperor conferred it on Marshal Berthier, afterward Prince of Neuchâtel-Wagram. By the Peace of Paris it was restored, with additions, to Prussia. In 1814 the principality was received into the Swiss Confederacy and it was the only canton with a monarchical government, which it preserved till 1848. Its last connections with Prussia were broken in 1857. The religion is Protestant (Reformed). The language is French; but German is also spoken. Pop. (1910) 13,128, mostly French Protestants.

(2) The capital, Neuchâtel, is 24 miles west of Bern, on a steep slope above the northwest shore of Lake Neuchâtel. It has an old Gothic

church of the 12th century; many charitable institutions; a gymnasium or college, containing a valuable natural history collection founded by Professor Agassiz, a native of the town, etc. It has various manufactures and an extensive trade. Pop. (1910) 23,505.

(3) The Lake of Neuchâtel (Neuenburgersee), 1,420 feet above sea-level, is 25 miles long, from three to six miles wide, with a maximum depth of 472 feet. The Thiele serves as its outlet and carries its water into the neighboring Lake of Bienne and thence into the river Aar which communicates with the Rhine. The lake is plentifully supplied with fish; steamers ply on its waters between Neuchâtel, Morat, Yverdon, Estavayer, etc. Traces of prehistoric lake-dwellers have been found here. Consult Bachelin, A., 'Neuchâtel and its Environs' (In 'Europe Illustrated,' Zürich 1883); Diacon and Rousselot, 'Guide du canton de Neuchâtel' (2d ed., Paris 1902); Quartier-la-Fente, E., 'Le canton de Neuchâtel: revue historique et monographique' (Neuchâtel 1895).

NEUENDORFF, noi'en-dörf, **Adolph Heinrich Anton Magnus**, American musician: b. Hamburg, Germany, 13 June 1843; d. New York, 4 Dec. 1897. He came to the United States when 12, was educated in the public schools and pursued a course in music. At 15 he made his début as a pianist and the next year he led a chorus and played in an orchestra. In 1864 he was musical director of the German Theatre, Milwaukee, Wis., and in 1865 he conducted the German grand opera in New York. He founded the Germania Theatre in 1872 and managed it for 11 years; he assumed the leadership of the Philharmonic Society of New York in 1878, and later became director of the Metropolitan Orchestra. From 1884 to 1889 he was a concert director in Boston. His wife, Georgine von Januschowsky (1858-1914), was prima donna of the Imperial Opera, Vienna. He lived there from 1893-95, and returned in 1896 to become musical director of the Jewish Temple Emanu-El in New York. Among his compositions are 'The Rat Charmer of Hamelin' (1880); 'Don Quixote' (1882); 'Prince Waldmeister' (1888), etc.

NEUHOF, noi'höf, **Theodor von**, **BARON**, German adventurer, King Theodore I of Corsica: b. Metz, 1686; d. London, 11 Dec. 1756. His father was a Westphalian noble in the French service; the son became page to the Duchess of Orleans; fought in the French and in the Swedish armies; was employed by Count Goertz and then by Alberoni on diplomatic errands; married Lady Sarsfield, whom he deserted, having stolen her diamonds; lost all his property in Law's schemes; went to Florence in 1732; and there intrigued with some Corsican revolutionists, at whose invitation he landed in Corsica in 1736, with arms and equipment furnished by the Bey of Tunis, and was proclaimed king. He was at first successful against the Genoese, who, however, were reinforced by the French during Neuho's absence in Holland; and he was defeated upon his return in 1738. After the withdrawal of the French in 1741, he made several attempts in 1743 to recover his kingdom and in 1749 retired to England, where he was jailed for debt, and was released in 1756, thanks to a subscription raised by Horace Walpole. His son, Col. Frederick Neuho, an English officer, wrote 'Mémoires

pour Servir à l'Histoire de Corse' (1768). Consult Fitzgerald, 'King Theodore of Corsica' (London 1890).

NEUILLY, nè-yē, or **NEUILLY-SUR-SEINE**, sür sän, France, a town in the department of Seine, suburban to Paris, immediately north of the Bois de Boulogne. The fine 18th century level bridge by Perronet, across the river here, is an attractive feature, and the town is noted for its benevolent institutions, parks and a handsome residential section built chiefly on the site of the historic royal castle and park of Neuilly, destroyed during the Revolution of 1848. Neuilly also has factories of several Paris establishments for the production of domestic commodities. Pop. 44,616.

NEUMANN, noi'män, **Franz Ernst**, German physicist and mineralogist: b. Joachimsthal, 11 Sept. 1798; d. Königsberg, 23 May 1895. He studied at Berlin, and became professor at Königsberg in 1828. His work in physics was of the greatest importance and he is reckoned the father of mathematical physics in Germany, and the founder of the modern theory of mineralogy by reason of his studies of the optical relations of crystals. He published a law of electrodynamics different from that of Ampère and from Grassmann's; determined the diffusivity of soils and of metals; and studied the polarization, reflection and refraction of light, induction currents, specific heat, etc. He established the law that the molecular heat of a compound is the sum of the atomic heats of the elements. This law is known by his name. He contributed to various scientific journals. Many of his lecture courses were edited and published by his pupils; among these are 'Beiträge zur Theorie der Kugelfunktionen' (Leipzig 1878); 'Über ein allgemeines Prinzip der mathematischen Theorie induceter elektrischer Ströme' (Leipzig 1892); 'Commentatio de emendanda formula, per quam colores corporum specifi ex experimentis methodo mixtionis institutis computantur' (Königsberg 1834); 'Die mathematischen Gesetze der induceter elektrischen Ströme' (Leipzig 1889); 'Theoretische Untersuchung der Gesetze, nach welchen das Licht an der Grenze zweier vollkommen durchsichtigen Medien reflectirt und gebrochen wird' (Berlin 1837); 'Vorlesungen über mathematische Physik' (Leipzig 1881-94). Consult the biography by Volkmann (1896), and Neumann, L., 'Erinnerungsbilder von seiner tochter Luise-Neumann' (Tübingen and Leipzig 1904).

NEUMANN, John Nepomucene, Roman Catholic bishop of Philadelphia: b. Prachatitz, Bohemia, 28 March 1811; d. Philadelphia, 5 June 1860. He was educated at Budweis and Prague; took orders; came to America as a missionary in 1836; engaged in work near Niagara for four years; in 1840 entered the Redemptorist Order; and became assistant pastor of Saint James' Church, Baltimore, in 1842. He was again busied in mission work in Pennsylvania, Maryland and Virginia; was appointed superior of the Redemptorist Convent in Pittsburgh, where he built the church of Saint Philomena; returned to Baltimore in 1847 as provincial of the Redemptorists in America; established the Sisters of the Holy Cross in this country; and in 1852 became bishop of Philadelphia. He went to Rome in

1854 and assisted in the definition of the dogma of the Immaculate Conception. Bishop Neumann was a man of culture and of administrative ability, and did much for Catholic education in America. Consult the 'Life' by Berger (trans. into English by Grimm, 1884).

NEUMANN, Karl Friedrich, German Orientalist; b. Reichmansdorf, Bavaria, 22 Dec. 1798; d. Berlin, 17 March 1870. He was educated at Heidelberg, Munich and Göttingen, and after travels in India and China (1829-30) from which he returned with a great number of Hindu and Chinese books, was professor of Oriental languages at Munich 1831-52. He was a Liberal in politics, a circumstance which finally cost him the loss of his professorship. Among his many works are 'Mémoires sur le Vie et les Ouvrages de David Philosophe Arménien' (1829); 'Asiatische Studien' (1837); 'Geschichte der Vereinigten Staaten von Nordamerika' (1863-66); 'Hoen Schein, or the Discovery of America by Buddhist Monks' (1874); 'Geschichte des englischen Reichs in Asien' (1857); 'Geschichte der armenischen Literatur' (1836).

NEUMANN, Karl Gottfried, German mathematician, son of F. E. Neumann (q.v.): b. Königsberg, 7 May 1832; he studied at Königsberg, became instructor of mathematics at Halle in 1858, was made professor at Basel in 1863 and at Tübingen in 1865, and from 1868 to 1911 was professor at Leipzig. In 1868 he founded the *Mathematische Annalen*. His publications and special studies have been in the field of mathematical physics (following his father) and in higher analysis. Among his books are 'Theorie der Besselschen Funktionen' (1867); 'Über die elektrischen Kräfte' (1873, 1898); 'Vorlesungen über die mechanische Theorie der Wärme' (1875); 'Untersuchungen über das logarithmische und Newtonsche Potential' (1879); 'Hydrodynamische Untersuchungen' (1881); 'Vorlesungen über Riemanns Theorie der Abelschen Integrale' (1884); 'Allgemeine Untersuchungen über das Newtonsche Prinzip der Fernwirkungen' (1896).

NEUMAYER, noi-mī-ēr, Georg von, German meteorologist; b. Kirchheimbolanden, Bavaria, 21 June 1826; d. May 1909. He was educated at the University of Munich and went to Australia under the auspices of Maximilian II and there founded the Flagstaff Observatory at Melbourne, where he made valuable magnetic observations. He returned to Germany in 1864 and promoted the German-African Company and organized several expeditions to the North and South Polar regions. He was long connected with the hydrographic bureau at Berlin and in 1876 became director of the Marine Observatory at Hamburg. He wrote among other works 'Die Beobachtungsergebnisse der deutschen Stationen im Systeme der internationalen Polarforschung' (with Börgen, 1886); 'Atlas des Erdmagnetismus' (1891); 'Anemometer-Studien' (1897), and 'Auf zum Südpol!' (1901).

NEUMES, nūmz, in music, (1) signs or characters in early music indicating tones or phrases. A large number of these characters were used, being more or less complicated in form and meaning. This was the first step toward a graphic musical notation. (2) Melodic phrases sung to a single syllable, more

particularly at the end of a sentence or clause. (3) Modulation of the voice in singing. See Music.

NEUMÜNSTER, noi'mün-stēr, Germany, a town in the Prussian province of Schleswig-Holstein, on the Schwale, 17 miles by rail southwest of Kiel. It is a well-built, busy manufacturing centre, producing principally woolens, and also leather, paper, ironware, soap, etc. Pop. 34,555.

NEUQUÉN, nā-oo-kāh', Argentina, a territory in the western part of the republic, bounded on the west by Chile and on the east and south by the territory of Rio Negro. Its area is 42,345 square miles. The main range of the Andes Mountains crosses the western part from north to south, and numerous short ranges extend throughout the territory. The Rio Negro and its largest tributaries have their rise in Neuquén, and the Rio Colorado is on its northern boundary. The principal occupations are agriculture, mining silver and cattle-raising. The population is mostly Indians, but since 1884 a number of Chileans have settled in the territory. Pop. about 29,746. The capital is Neuquen (pop. 1,500).

NEURALGIA (Greek *νεῦρον*, nerve + *ἄλγος*, pain), severe paroxysmal pain, either along the course of one or more sensory nerves, or at the place of their distribution. In neuralgia proper no definite lesions are discoverable. Sometimes there is reason to believe that inflammation of the sheath of the nerve is the starting-point. Not infrequently there are well-defined points of tenderness (ascertained by palpation) over the affected nerve, especially where it emerges upon the skin from a bony groove or opening. Sometimes with the pain there is a twitching of adjacent muscles. Radiation of pain, neuralgic in character, to nerve-branches other than those affected is quite common. Dental caries, for example, may produce supra-orbital neuralgia, and uterine disease, occipital neuralgia. Neuralgic pains are described by the sufferers as cutting, burning, boring, lightning-like, crushing, etc. After a neuralgic attack the part affected has a feeling of discomfort and bruising. There is frequently also a sense of exhaustion, with a desire to sleep. If there are repeated attacks of neuralgia, pallor of the skin, followed by intense redness, by hyperæsthesia, or by loss of tactile sensibility in the part affected, horripilation and other evidences of vasomotor disturbances are not uncommon. When involving the facial branches of the fifth pair of nerves (the trifacial nerves) it is popularly called tic-douloureux. There are severe flashes of pain over the eyebrows, in the eyes, nose, lips, chin, teeth, etc.

The presence of neuralgia, especially with repeated attacks, usually indicates a weak state of the general system, which may follow long-continued fevers. It may occur during the progress of various acute affections. The causes of neuralgia are various: poor blood and malnutrition, pressure of a tumor upon a sensory nerve, irritation of the nerve from the swelling of an adjacent part, exposure to cold and wet, fatigue, mental emotion, the abuse of tea, coffee and alcohol, etc. The treatment varies with the nature of the different cases. Hot applications and anodyne liniments are often of value. As the pain is severe, persons

affected are too often tempted to resort to narcotics for relief. Such drugs should not be used without the advice of a physician.

The neuralgias of psychogenic origin, which are especially difficult to differentiate, though they constitute about 25 out of every hundred cases, are subject to mental treatment only. This may be of the dialectic variety as given by Dubois, of the emotional type such as that of Dejerine or recourse may have to be had to a thoroughgoing psychoanalysis. As it is fruitless to treat neuralgias of well-known organic origin with psychotherapy, so it is senseless to attempt to do anything with drugs, surgery, hydrotherapy, electricity or massage, in the case of a patient with a purely psychogenic neuralgia. But the physician should be acquainted as far as possible with psychologic methods, because with a symptom so ambiguous as neuralgia frequently is, the slight opportunity he may have to do something with the patient through the mental method may help in the diagnosis, which might otherwise be for him impossible.

NEURASTHENIA (from Greek *νεῦρον* nerve + *ἀσθένεια*, weakness), a condition of nervous debility or exhaustion; popularly called nervous weakness, nervous prostration, etc. The term is now generally applied to a disordered condition of the nervous system manifested by various symptoms. It was originally used in 1879 by Dr. George M. Beard. Nervousness, so called, is manifested chiefly by undue sensitiveness to external impressions. It frequently precedes or progresses into nervous prostration. The distinction between hysteria (q.v.) and neurasthenia is not always plain, for the two affections frequently merge into one another. Neurasthenia is a neurosis, a functional derangement, usually lasting a considerable time, but generally recovered from under proper hygienic and medicinal treatment. No morbid anatomical changes are at present known. The disorder is caused sometimes by various functional and organic affections of the body, but in these instances there is probably a pre-existing basis of functional perverted action of the nervous system. Neurasthenia so produced is known as symptomatic. When certain symptoms predominate, distinctive terms are sometimes used; for example, in acoustic neurasthenia, symptoms of deafness; in gastric neurasthenia, weak digestive action, gastric pain (nervous dyspepsia); in cardiac neurasthenia, palpitations, irregular action of the heart, præcordial pain, etc., symptoms simulating heart-disease; and in cerebral neurasthenia, despondency, irritability, moodiness, sleeplessness, restlessness and confusion of mind, especially in relation to figures.

Neurasthenia is about as common among men as among women, and occurs usually between the ages of 20 and 50, when worry and work are maximal. Signs of a neurasthenic tendency are sometimes seen in young people (of a neuropathic or neurotic diathesis); namely, oversensitiveness, precocity, insomnia, chorea, somnambulism and night-terrors. In girls especially there are also headache, backache, anæmia and lassitude. Sometimes neurasthenia marks the beginning of mental disease, such as melancholia. The causes of neurasthenia may be classified as predisposing (such as heredity and

a neurasthenic tendency), and exciting or acquired. Mental irritability and the loss of self-control in parents are causes. So also gout, syphilis, rheumatism and chronic alcoholism are conditions that transmit neurasthenic tendencies. Improper mental and physical training of children, and too much coddling are often responsible for the affection. Among the exciting causes are injuries; severe mental and physical work for a length of time beyond the individual's power of endurance; worry, especially if associated with lack of rest, of pure air and of suitable food; and the excessive concentration of the thoughts upon one's self. Neurasthenia is sometimes spoken of as "the American disease." This is nonsense as neurasthenia is more frequent among people who have nothing to do than among those who are busy.

The symptoms of neurasthenia are many and various. The individual may appear to be in perfect health, but frequently has a worried look. There may be irritability of temper, fatigue without adequate reason, poor sleep, with exhaustion on waking, headache, with sense of weight or constriction, impaired memory, want of appetite, constipation, various forms of muscular weakness, muscular tremors and contractions, an uncertain gait, a feeling of weariness, giddiness, pain along the spine (spinal irritation) and in the joints, hyperæsthesia, or paræsthesia (numbness and tickling), sexual emissions and defects of sight and hearing. There is no capacity for sustained work. The recognition of mental and physical weakness causes the individual affected to become self-conscious, to distrust others, to have a feeling of isolation, to prefer solitude, to exaggerate trifling impressions, to dread the dark, and to suspect contamination from food, touch, etc. The chief causes of neurasthenia are acute infectious diseases, which cause a lowered nutrition of the bodily functions and various types of fantasy life, with conscious and unconscious masturbation. This last is the most frequent single cause of neurasthenia.

Treatment of this nervous disorder requires time and care. Treatment of the infectious and toxic types require rest and feeding. The change of the maladjusted sex life of the second type will cure or favorably modify the second type. Consult Jelliffe and White, 'Diseases of the Nervous System' (1919). See **PSYCHONEUROSES** and **NEUROSES**.

NEUREUTHER, noi'roi-ter, Eugen Napoleon, German artist: b. Munich, 13 Jan. 1806; d. there, 23 March 1882. He began his studies at the Munich Academy, continued them at Paris (1830) and going subsequently to Rome (1838) fell under the influence of Cornelius (q.v.). In 1848 he was put at the head of the design department in the Royal Porcelain Manufactory at Nymphenburg, a position which he held until the sale of that establishment in 1856. He was engaged from 1868-77 as professor of design in the Royal Institution of Industrial Art. His brilliant versatility is shown in his skill as a house decorator, etcher, painter and industrial designer. He designed the border illustrations for Goethe's 'Ballads and Romances' (1829-40); he published 'Souvenir du 27, 28, 29 Juillet 1830-31'; and 'Bavarian Shepherd's Song with Illustrations'

(1834). In 1835 he painted scenes from Wieland's 'Oberon' for the royal palace at Munich. For the *édition de luxe* of Herder's 'Cid' he produced 70 illustrations. His etchings after Mottmann's frescoes are admirable, and among his oil paintings are to be found in the Schack Gallery at Munich 'Portia's Dream'; 'The Dying Nun'; 'The Villa Mills'; 'The Villa Malta,' and a scene from 'Hermann und Dorothea.' He also furnished designs for the School of Industrial Art, and decorated the ceiling of the staircase and the cupola of the Polytechnique at Munich with graffito painting.

NEURINE, CHOLINE, or SINCALINE, a basic chemical substance having the empirical formula $C_8H_{15}NO_2$, or the constitutional formula $CH_2(OH).CH_2N(CH_3)_3OH$. It occurs in putrefying flesh, in the fly agaric, in ergot, in beet-root juice and in the actively-growing parts of numerous plants. It may be prepared by boiling pigs' bile or ox-brain with baryta. Neurine is a syrupy body with markedly basic properties and a strongly alkaline reaction. It is not poisonous, but may be converted by oxidation into muscarine (q.v.), to which substance the poisonous qualities of the fly agaric are commonly ascribed.

NEURITIS (N. Lat. from Greek *νεῦρον* nerve + *itis*, a suffix denoting inflammation), inflammation of a nerve. Multiple neuritis is the inflammation of several nerves together. Varying with the cause, neuritis is infectious, toxic, traumatic, leprosy, alcoholic, etc. The disorder may be acute or chronic, primary or secondary. It results from an inflammation, swelling and thickening of the nerve-sheath and its prolongations. They may be associated with inflammatory and degenerative changes of the substance of the nerve. The principal symptoms of the disease are persistent burning pain, more or less severe, and a tenderness in the course of the nerve and at the points of its distribution. These are followed by or associated with muscular weakness or paralysis, numbness—loss of sensibility or hyperæsthesia—and atrophy of muscles. The causes of various types of neuritis are numerous; for example, injury to a nerve, as in dislocations and fractures; extension of inflammation from a neighboring part; poisoning by lead, arsenic, mercury or alcohol, syphilis, cancer, diphtheria and infection. The simpler forms of the disease are usually recovered from, under treatment, in a few weeks, although recovery may be imperfect. In severe forms death may occur in from a week to 10 days, from paralysis of the inspiratory muscles, or after several weeks from exhaustion due to continuous pain and bed-sores.

NEUROGLIA, the connective tissue found in many parts of the nervous system, differing very materially in its general structure from that found in other organs, wherefore it has received its special name. It is also sometimes designated as spider-cells, because of the many-branched processes which the cells possess. See BRAIN; NERVOUS SYSTEM, EVOLUTION OF THE.

NEUROLOGY, that branch of science which treats of the structure and functions of the nervous system. It deals with that system under all its aspects of form and condition, both in health and in disease, but especially with its pathological states, its hygiene and its

medical treatment. See NERVOUS DISEASES; NERVOUS SYSTEM, EVOLUTION OF THE; NERVOUSNESS.

NEURON. See NERVOUS SYSTEM, EVOLUTION OF THE

NEUROPTERA, the order of "nerve-winged" insects, so-called by Linnæus from the abundant supporting rods or "nerves" which ramify in a network throughout the wings. Since its establishment the original largely artificial group has been much restricted by the separation from it of large divisions. Typical *Neuroptera* have two pairs of large, equal, richly netted-veined, membranous wings, strong biting jaws, conspicuous, many-jointed antennæ, a free prothorax and a complete metamorphosis. This order is of relatively slight economic importance, but the 8 or 10 families include many common and interesting American insects. See ANT-LION; CORYDALIS; DOBSON; LACEWING, etc.

NEUROSIS (Greek *νεῦρον*, nerve), an affection of the nervous system indicated by disordered sensation, volition, or mental expression, without any recognized lesion of parts, and sometimes without a discoverable adequate cause. Many abnormal conditions are now considered as neuroses; some of them result from nervous dyspepsia, shown by belching and eructation, by spasm and atony of the stomach, due to increased or decreased peristalsis, etc. Cardialgia and cardiospasm (functional disturbances of the heart) may produce such conditions. They are variously described, and include accident-neurosis, a neurosis following a severe injury; traumatic neurosis, following a severe wound; cyclist's neurosis, following excessive bicycle-riding; alcoholic neurosis, due to overuse of alcoholics; occupation-neurosis (see OCCUPATION, HYGIENE OF), indicated by spasmodic manifestations when attempting to perform movements peculiar to the employment of the individual, as the cramps of writers, telegraphers, musicians, dancers, baseball players, milkers, etc.; angioneurosis, a neurosis of the blood-vessels of a part. Herpes zoster is spoken of as vasomotor neurosis, an exanthematous angioneurosis. Other neuroses are kinesioneuroses, indicated by disorders of motion; aesthesioneuroses, indicated by disorders of the sensory apparatus, thermoneuroses, or vagaries in heat perception, secretory neuroses, and mixed neuroses, including acro-neuroses, or disorders of the extremities, sexual neuroses, or disordered functions of the sexual apparatus, and psychoneuroses, in which mental derangement or disorder is concomitant with the physical disorder. Occupation neuroses are quite common; the usual treatment consists of rest, change of occupation, electric and other massages, douches, etc. As a general rule drugs are administered only when necessary to relieve accompanying neurasthenia. Consult Church and Peterson, 'Nervous and Mental Diseases' (8th ed., Philadelphia 1914).

NEUROTIC. As an adjective, this term signifies having relation to the nerves. Physicians speak of neurotic individuals or subjects, neurotic ulceration, neurotic poisons, etc. As a noun the term was formerly chiefly applied in medicine to any substance—drug or poison—which acts especially on the nervous system, neurotics being classified as cerebral (morphine,

etc.), cerebro-spinal (as aconite), and spinal (as strychnine). This use of the word neurotics has become obsolescent, and the term is now mainly reserved for sufferers from nervous disease or excessive nervous activity.

NEUSATZ, noi'zäts, or **UJVIDEK**, ooy'-vë-däk, Jugo-Slavia, a town in the district of Bács, on the Danube opposite Peterwardein. During the Civil War in 1849 it was stormed and taken by the Imperial troops under Jellachich, and almost destroyed by the fire of the insurgents from the castle of Peterwardein. It was rebuilt and is now a thriving trading and educational centre. It contains the Matica Srbska, which is the most important Serbian literary scientific organization in Hungary. It is the seat of a Greek Oriental bishop. Pop. (1910) 33,089.

NEUSE, nūs, a river of North Carolina, which has its rise in the north central part of the State and flows southeast into the Atlantic through Pamlico Sound. Its mouth is an estuary about 30 miles long, and is 10 miles wide at its mouth. It is about 310 miles long and navigable for about 70 miles. A number of streams flow into the Neuse but it has no large tributary.

NEUSIEDLER SEE, noi'zëd-lër-zä (Magyar Fertő-Tava), Hungary, a lake in the northwest, between the counties of Ödenburg and Wieselburg, 30 miles southeast of Vienna. Its greatest length, north to south, is 23 miles, average breadth five miles; circuit about 60 miles. It is saline and shallow, its greatest depth seldom exceeding 15 feet; on the east side it is lost in the great morass of Hanság. Large quantities of salt crystallize on its shores in summer, consisting of a mixture of common and of Glauber salt. It contains abundance of fish, such as carp and pike, some of the latter being 70 or 80 pounds weight. Its frequent inundations occasioned great damage, till a canal was cut in 1800 to carry off its superfluous waters and discharge them into the Little Raab. The water several times has disappeared almost entirely. The last occasion was between 1865 and 1870, when crops were grown on its bed.

NEUSS, nois, Germany, a town of the Prussian Rhenish province, on the Erft, near its junction with the Rhine, 21 miles northwest of Cologne and four miles west of Düsseldorf. It has several fine churches, that of Saint Quirinus, founded in 1209, being a notable transitional specimen from the Round to the Pointed style. The numerous industrial establishments include flour and oil mills, iron foundries, machine works, woolen and cotton factories, paper mills, etc. Pop. 37,224. The town is the Navaesium of the Romans. In 1474-75 Charles the Bold besieged the town. It was sacked by Alexander Farnese in 1586.

NEUSTADT, noi'stät, or **WIENER-NEUSTADT**, vë'nër-noi'stät, Austria, a town near the Hungarian frontier, on the Kerbach, 31 miles by rail, and by canal, south of Vienna. It retains its mediæval walls and is dominated by the 13th century Babenburg ducal castle, converted in 1752 by Maria Theresa into a military academy and noted for its richly decorated Gothic chapel (1460), the burial place of Maximilian I. Locomotives and machinery,

sugar, woolens, cottons, ribbons, starch, leather, pottery, wire, etc., are among the manufactures. The city was founded in 1192 and was rebuilt after the great fire of 1834. Pop. 32,869.

NEUSTRIA, nūs'trī-ä, or **WEST FRANCE**, the name given in the times of the Merovingians and Carolingians, to the western portion of the Frankish Empire, in contradistinction to Austrasia (q.v.), the eastern portion, the term being derived from *ne* (not) and Austria. The division took place at the death of Clovis in 511. Neustria lay between the Meuse, the Loire and the Atlantic Ocean; after the cession of the northwestern portion to the Normans in 912, the name was applied to Normandy, but soon fell into disuse. (See FRANKS; FRANCE). Consult Longnon, 'Atlas historique de la France' (Paris 1889).

NEUTER, a term—formerly applied in zoology to those animals—represented chiefly among the *Hymenoptera*—in which the characteristics of sex are either present in a rudimentary condition or may not be developed at all. They are infertile females. Their status is given in the accounts, in this work, of ants, bees, wasps, and termites.

NEUTRAL NATION, an American Indian tribe of the Iroquois family, residing in the 17th century on the north shore of Lake Erie. The Aondironon, the Wenrehronon and the Ongniaahronon were some of their constituent tribes. In 1626 Father Daillon tried to convert them to Christianity and was favorably received, but the Hurons spread false reports that he was a sorcerer. The French called them the Neutral Nation because they took no part in the long war between the Hurons and the Iroquois. The Hurons afterward made war on the Neutrals and utterly destroyed them in 1651. Consult Hodge, F. W., 'Handbook of American Indians North of Mexico' (Washington 1910).

NEUTRAL SALTS. See SALTS; NEUTRALIZATION.

NEUTRAL STATES. See WAR, EUROPEAN—NEUTRALS AND THE WAR.

NEUTRAL TINT, *in art*, a pigment used in water colors, of a dull grayish hue partaking of the character of none of the bright colors. It is prepared by mixing together blue, red and yellow in various proportions.

NEUTRALITY, *in international law*, a term applied to the status of a state which maintains an attitude of non-interference in respect to an existing war between other states, rendering neither aid nor service to either belligerent in his military operations. The doctrine of neutrality constitutes a large and increasing part of the existing body of international law, but in ancient and mediæval times it occupied almost no place. Grotius, in the first important treatise on international law ever written, gave but an insignificant place to the subject, whereas in any modern treatise it occupies a place hardly second to the law of peace or of war. Among the states of the ancient world the status of neutrality hardly existed. War rather than peace was the normal state of mankind and when it existed practically all nations participated either as principals or allies. If one nation undertook to pursue a neutral policy it had few rights as

such which any of the belligerents felt bound to respect and consequently it was more often to its advantage to choose an able ally as a means of self-protection rather than to remain neutral.

It was among the flourishing maritime states of the Mediterranean region, during the later Middle Ages, that the modern doctrine of neutrality had its origin, and the first recognition of neutral rights was embodied in a famous maritime code, the "Consolato del Mare," which declared that the goods of a neutral were exempt from capture although found on an enemy's vessel. This wise and liberal rule in time came to be adopted by all the European powers and continued as a generally accepted principle of maritime warfare until superseded by the more liberal rule embodied in the Declaration of Paris of 1856. By the latter declaration, which was acceded to by all the nations of Europe and America except Spain, the United States and Mexico, the principle that free ships make free goods was adopted; that is, the goods of an enemy (contraband of war excepted) under a neutral flag, and neutral goods (contraband excepted) under an enemy's flag, are free from capture. The United States refused to give its adhesion to the declaration for the reason that it was disinclined to surrender the right of privateering, the abolition of which was also one of the provisions of the declaration. The United States assumed this position chiefly because of the smallness of its navy and the consequent disadvantage it would suffer in a war with the larger powers were it prohibited from increasing its naval strength by accepting the service of privateers. The government, however, proposed to become a party to the declaration provided a clause were added exempting private property from capture at sea the same as on land but it was never done and the United States has never formally given its adhesion. But as a matter of practice it has observed the rules of the declaration quite as scrupulously as if it had been one of the signatory powers.

Several forms and gradations of neutrality are or were formerly recognized. It may be *qualified*, as where the neutral state is bound by an interior agreement to furnish one of the belligerents a contingent of troops or a sum of money; or *absolute*, as where the state abstains wholly from interference on the side of either belligerent; or *perpetual*, as in the case of Belgium and Switzerland, whose neutrality and inviolability have been guaranteed by the powers upon considerations which have to do with the preservation of the balance of power among European states; or *armed*, as where several neutrals unite for the purpose of enforcing by armed intervention their views of neutral rights as against the aggressions of belligerent powers. The most notable examples of such alliances were the armed neutralities of the Baltic powers in 1780 and 1800 for the purpose of enforcing against England the neutral doctrine that "free ships make free goods." It should be said that international law no longer recognizes the right of a state to maintain a qualified neutrality. If it is under prior treaty obligation to furnish one of the belligerents with men, money or ammunition, however trifling the quantity, it becomes an ally as soon as it undertakes to carry out the treaty stipulations

and is no longer entitled to be treated as a neutral. During the Franco-German War of 1870 the German government appealed to the government of Great Britain to prohibit the sale of arms or munitions to the French, on the ground of *benevolent* neutrality. Such a theory of neutrality cannot be accepted. Benevolent neutrality is no neutrality at all. It is assistance to the belligerent to which it is accorded.

The obligations and rights of neutrals are determined by the rules of international law, not by those of municipal law. They are now defined by two Hague conventions, Nos. V and XIII of 1907. These conventions contain an enumeration of the duties of both belligerents and neutrals, although it is expressly declared that the enumeration is not exhaustive. In this connection it should be observed that in judging of the violation of neutral duties a distinction is made between the acts of a state and those of individuals. The act of an individual in supplying a belligerent with arms or ammunition or in subscribing to his loans is not considered as a violation by the state of its neutral duties, although it might be a violation of municipal law. It is not sufficient that the neutral treat each belligerent with impartiality; he must abstain from giving aid to either except where the ordinary dictates of humanity require, for what might be equality of treatment in form might in effect amount to assistance to one side only. He must not lend either belligerent money, furnish him with troops or ships of war or any article susceptible of warlike use, or allow his territory to be made the basis of hostile operations or for the organization and equipment of hostile expeditions, or as a recruiting ground for the enlistment of troops, or allow prizes to be brought into his ports and there adjudicated, or allow his subjects to aid in the preparation or organization of a hostile expedition against a friendly power. Troops of a belligerent, which are received in neutral territory, must be interned, and belligerent warships are forbidden to remain in neutral waters longer than 24 hours. Likewise their right to make repairs and to take on supplies of coal and provisions is greatly restricted. In the three rules adopted by the Geneva Arbitration Tribunal in the case of the *Alabama Claims* (q.v.), it was declared to be the duty of neutral governments to use due diligence to prevent the fitting out and departure of such expeditions from their territory, to prevent their ports from being made use of by either belligerent for hostile purposes; and to exercise the same diligence in respect to all persons within their jurisdiction in order to prevent any violations of the foregoing duties. The substance of these rules is repeated in The Hague Convention No. XIII of 1907. On the other hand, it is not a violation of neutral duty to discharge the duties of humanity to either belligerent as by allowing a belligerent vessel in distress to seek shelter in the neutral's port for the purpose of obtaining supplies or undergoing repairs or by furnishing asylum to a defeated and fugitive belligerent force. Nor is it at international law a violation of neutral duty when the citizens or subjects of a neutral government in the ordinary course of trade sell to a belligerent firearms or other supplies which the latter may

wish to buy. Likewise neutral persons may transport by ship to belligerents whatever they may want, subject, of course, to the right of the other belligerent to capture and confiscate such articles as may be deemed contraband of war. These are legitimate acts of trade unaffected by war, and neutral governments are not bound to interfere with them or assume responsibility therefor. Nevertheless, during the European War of 1914-18, the governments of Austria and Germany complained of the action of the American government in permitting the sale and transportation for the use of the Entente Allies of large quantities of arms and munitions. The complaint was based on the view that since Austria and Germany had been deprived through the superiority of the British navy of access to American markets, it was contrary to the spirit of neutrality for the American government to permit the furnishing of supplies to their enemies. It was also argued that the immense proportions which the traffic assumed, giving rise as it did to the creation of new and extensive industries, gave a "new aspect to the doctrine of neutrality." The American government, however, declined to accept this view and the trade in arms and munitions continued without restriction. Article 7 of The Hague Convention (No. V) of 1907 declares that a neutral power is not bound to prevent the export of arms or munitions for the use of belligerents. During the European War of 1914-18 Brazil and several neutral powers of Europe placed prohibitions on such traffic, but in the case of the latter powers the measure was not in pursuance of a neutrality policy but rather for the purpose of conserving their own supply of arms and munitions. Finally it is not a violation of neutral duty for one state to recognize the belligerency of another state at war or of a part of a state in rebellion against the established government. Nor is it a violation of neutral duty to recognize the independence of a revolted people when the revolt has reached such a stage as to give reason to believe that the revolutionists will establish their independence as a fact and maintain it.

The above enumeration of the duties of neutrals indicates in a rough way the *rights* which belligerents are bound to respect in the conduct of their warlike operations. They may be comprehended under the general head of complete immunity from the acts of either belligerent within their jurisdiction. No act of hostility may be committed by either belligerent within neutral territory nor within its territorial waters. Nor may a belligerent move his troops through the territory of a neutral state, although this well-established rule has occasionally been violated, notably by Germany in her invasion of Belgium in 1914. Under The Hague Convention No. V of 1907, belligerents are also forbidden to erect within neutral territory wireless telegraph stations for the purpose of communicating with belligerent forces by land or sea. Fugitive troops fleeing from an enemy may not be pursued in neutral territory nor may an armed vessel pursue and capture an enemy's vessel in neutral waters. As a means of enforcing its neutral obligations, it is customary for states to enact *neutrality laws*, so called, making it criminal for their citizens or subjects to do certain specified acts which are

considered to be violations of neutral duties, but such laws neither increase nor diminish the responsibility of the state enacting them. Consequently the state cannot plead the insufficiency of such laws or inability to execute its laws, in extenuation of its offense if it fails to enforce its neutral obligations. The foundation of the neutrality policy of the United States was laid during Washington's administration, when upon the outbreak of war between England and France Washington after a thorough consideration of our obligation to France, under the treaty of 1778, issued a public proclamation announcing that the United States would remain neutral and warned all citizens of the United States to abstain from giving aid to either belligerent. In the year following Congress passed a neutrality act which as modified in 1818 and again in 1828 constitutes in all essential particulars the neutrality law now in force. Some minor changes were made in 1915 and more recently a number of important modifications have been recommended by the Attorney-General with a view to strengthening the existing laws. These laws make it a misdemeanor for any citizen of the United States to accept or exercise a commission to serve a foreign power in a war against a state at peace with the United States; or to enlist or to induce another person to enlist or to go beyond the jurisdiction of the United States to enlist in such foreign service; or to fit out, arm or augment the force of any armed vessel to be employed in such service; or to provide the means for setting on foot any military expedition against a friendly state. No belligerent vessel is allowed to provide itself with military supplies in the territory of the United States, and the President is authorized to use force to send out of our territorial waters any vessel not entitled to remain therein. The neutrality laws of Great Britain are embodied in the Foreign Enlistment Act of 1870 and besides provisions similar to those contained in the laws of the United States they contain detailed and stringent regulations designed to prevent the building or equipping in British jurisdiction of ships intended to be used in war against a friendly power.

See also articles on INTERNATIONAL CLAIMS AND DISPUTES; GENEVA ARBITRATION; INTERNATIONAL LAW; PARIS, DECLARATION OF. For references consult authorities cited under INTERNATIONAL LAW.

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NEUTRALIZATION, in chemistry, the process by which a solution, originally acid or alkaline, is rendered neutral, or brought into a state in which it is neither acid nor alkaline. If the solution is originally alkaline, it is made neutral by the addition of an acid substance; and if it is originally acid, it is neutralized by the addition of an alkali. A solution of caustic potash, for example, is strongly alkaline and turns red litmus paper blue almost instantly; but if hydrochloric acid is gradually added to it, the alkalinity becomes reduced in proportion to the quantity of acid added, until a state is finally attained in which the solution does not manifest either acid or alkaline properties, and does not affect the color either of red or of

blue litmus paper. It is then said to be "neutralized," the neutralization being due to the fact that the potash has entered into combination with the acid to form a salt (potassium chloride) which is neither acid nor alkaline. If more acid is added than is required to effect precise neutralization, the excess renders the solution acid, and in order to make it neutral again caustic potash or some other alkali must be added. It is often highly important, in chemistry, to effect the precise neutralization of a solution, and a method of quantitative chemical analysis, known as "volumetric analysis," is largely based upon the determination of the quantities of certain standard acid and alkaline solutions which must be added to the given solution, in order to precisely neutralize it. See **CHEMICAL ANALYSIS**.

NEUVILLE, *dè nè-vêl*, **Alphonse Marie de**, French painter: b. Saint Omer, 31 May 1836; d. Paris, 20 May, 1885. While he was for a short time the pupil of Picot, he must be considered largely a self-taught artist developing his talent under the direction of Delacroix. He made his first appearance as a battle painter with his 'Episode in the Crimean War' (1859), followed by 'The Trench of the Mamelon'; 'Zouave Guard' (Museum of Saint Omer); 'Chasseurs Crossing the Tchernaiia'; 'The Battle of San Lorenzo in Mexico.' Meanwhile he was producing numerous illustrations for periodicals and for Guizot's 'Histoire de France.' He served as an engineer in the Franco-Prussian War, and the second period of his artistic activity began. He tickled the vanity and boastfulness of his countrymen by depicting in his glowing and energetic canvases the French as chivalrous heroes, the Germans as barbarians, and became the most popular war painter of "Young France" and the artistic representative of Chauvinism. Among his works with this tendency are 'Bivouac before the Village of Le Bourget' (1872, Museum of Dijon); 'The Last Cartridge at Balan' (1873, familiar through its many reproductions), his panoramas of the battles of Champigny and Rezonville (with Détaillé, 1881, and numerous others frequently reproduced as photographs or engravings and thus widely distributed. He left many aquarelles and drawings which were eagerly bought up.

NEUVILLE, **Jean Guillaume**, **BARON HYDE DE**, French statesman: b. near Charité-sur-Loire, France, 24 Jan. 1776; d. Paris, France, 23 May 1857. He was educated at the Collège Cardinal Lemoine, Paris, and early became an active agent of the exiled Bourbon princes. In 1799 he interviewed Napoleon with the purpose of restoring the throne to Louis XVIII, and later his estates were confiscated; but in 1806 upon his agreeing to exile himself to the United States, Napoleon restored them. With the accession of Louis XVIII in 1814 he returned to France and in 1815 was elected to the Chamber of Deputies. He was sent to the United States as Minister and consul-general in 1816-21 and was then made Ambassador to Portugal, and Minister of Marine (1828). In 1830 he became Secretary of the Navy. He wrote 'An Historical Eulogy of General Moreau,' etc.

NEVA, *ně-vă* (Russian, *nyě-vă*'), Russia, a river which flows from Lake Ladoga, and

after a westerly winding course of 43 miles has its outlet in the Bay of Cronstadt, an inlet of the Gulf of Finland. It is best known as the river on the delta of which Petrograd (q.v.) is built. The river carries to the sea an enormous volume of water from lakes Ladoga, Onega, Ilmen and others equal to that of the Rhine and the Rhône combined; in places it is over 4,000 feet wide, elsewhere narrows to 180 feet, and at one or two points navigation is obstructed by reefs and rapids; it is frozen over during five months of the year. The Neva connects with the Volga by the Ladoga Canal, and thus joins the Baltic with the Caspian Sea.

NEVADA, *ne-vă'dă*, **Emma**, stage name of **EMMA WIXON**, American opera singer: b. Austin, Nev., 1862. She studied in Paris with Marchesi and made her first appearance in opera in London in 1880, as Amina in 'La Sonnambula.' She sang with success in Paris, Italy and in the United States, where she toured in 1885. In 1885 she was married to Dr. Raymond Palmer.

NEVADA, *ne-vă'dă*, popularly known as "the sage-brush State," the name derived from the Spanish *nevada*, signifying "snow-covered": one of the Mountain Division States. It is bounded on the west by California; on the south by California and Arizona; on the east by Utah and Arizona, and on the north by Oregon and Idaho. The sixth in size among the States of the Union, Nevada has an area of 110,690 square miles of surface, 869 of which are water; extreme length north to south, 484 miles, and width, east to west, 321 miles. It lies between the 35° and 45° parallels of latitude, corresponding, on the Atlantic Coast, with the northern boundary of Pennsylvania and the southern boundary of North Carolina. The capital is Carson City.

Climate.—Due to its extreme length north and south and varied elevations, Nevada has a climatic range which is exceeded by but one other State, California. Southern Nevada is semi-tropical; central and northern Nevada, temperate, while certain high valleys and mountain elevations in northeastern Nevada are characterized by extreme winter cold. The atmosphere is clear, dry and almost cloudless. Precipitation occurs chiefly during the winter months and is intercepted largely by the higher mountain ranges. The valleys receive little rainfall.

Topography.—Nevada, for the most part, lies in the Great Basin, a plateau of about 4,000 feet elevation situated between the Sierra Nevada and Wasatch Mountains, none of the streams of which find their way to the sea but empty into inland lakes without outlets or are lost in the sands. A narrow strip along the northern part of the State drains into the Columbia and a portion of the southern part of the State into the Colorado River. There are numerous parallel ranges from 20 to 50 miles apart running north and south through the State, broken by passes, with long narrow valleys between. The valley elevations vary from 1,000 feet, in extreme southern Nevada, to a few valleys in excess of 6,000 feet in the northeastern part. For the most part the valleys are between 4,000 and 5,000 feet elevation. Some of the mountain ranges rise to 9,000 feet. The highest mountain is Wheeler Peak in White

Pine County, elevation 13,058 feet. Other noted peaks are Charleston Mountain, Pilot Peak, Mount Grant, Mount Rose, Freel's Peak, Job's Peak and Mount Jefferson, which are 10,000 to 12,000 feet. Forests are unevenly distributed, with a few areas of commercial forests comprising white and yellow pine, firs, spruces and cedars of great size. In some places the hills are covered with dense growths of juniper, piñon and mountain mahogany. Deciduous native trees comprise the cottonwood, aspen, alder, elder, willow, choke cherry, etc. Aside from the several varieties of sage-brush which clothe the valleys and low hills, there are many native shrubs and bushes and a plant flora remarkable for its varied range. Some of the mountain scenery is picturesque beyond description. The general landscape, however, other than in the comparatively few agricultural valleys, presents great stretches of sage-brush, sandy or alkali wastes, bounded by mountain ranges, the first impression of which is of unutterable loneliness and desolation. This gives place, in time, to the lure of the desert—the sensation of untrammelled freedom in Nature's immensity and delight in the diurnal panorama of the landscape's ever-changing coloration.

Rivers and Lakes.—The rivers are all comparatively small. The Humboldt, 350 miles in length, flows in a southwesterly direction through the northern part of the State and affords the pass through the mountains for the Southern Pacific and Western Pacific railroads. Other important streams are the Truckee, Carson and Walker rivers. The Salmon, Owyhee and Bruneau rivers rise in northern Elko County and flow northerly into tributaries of the Columbia. The Rio Virgin and Muddy rivers, in southern Nevada, flow into the Colorado. A part of Lake Tahoe, one of the most beautiful mountain lakes in the world, is in Nevada. Pyramid Lake, so named from the pyramid-shaped islands of gray stone which rise picturesquely from its deep blue waters, is the largest lake. It is 35 miles in length with a water surface of 390 square miles. Other important lakes are Walker, Winnemucca, Ruby and Washoe. Several of these lakes are remnants of the ancient Lake Lahontan, which in geological times covered a large part of Nevada.

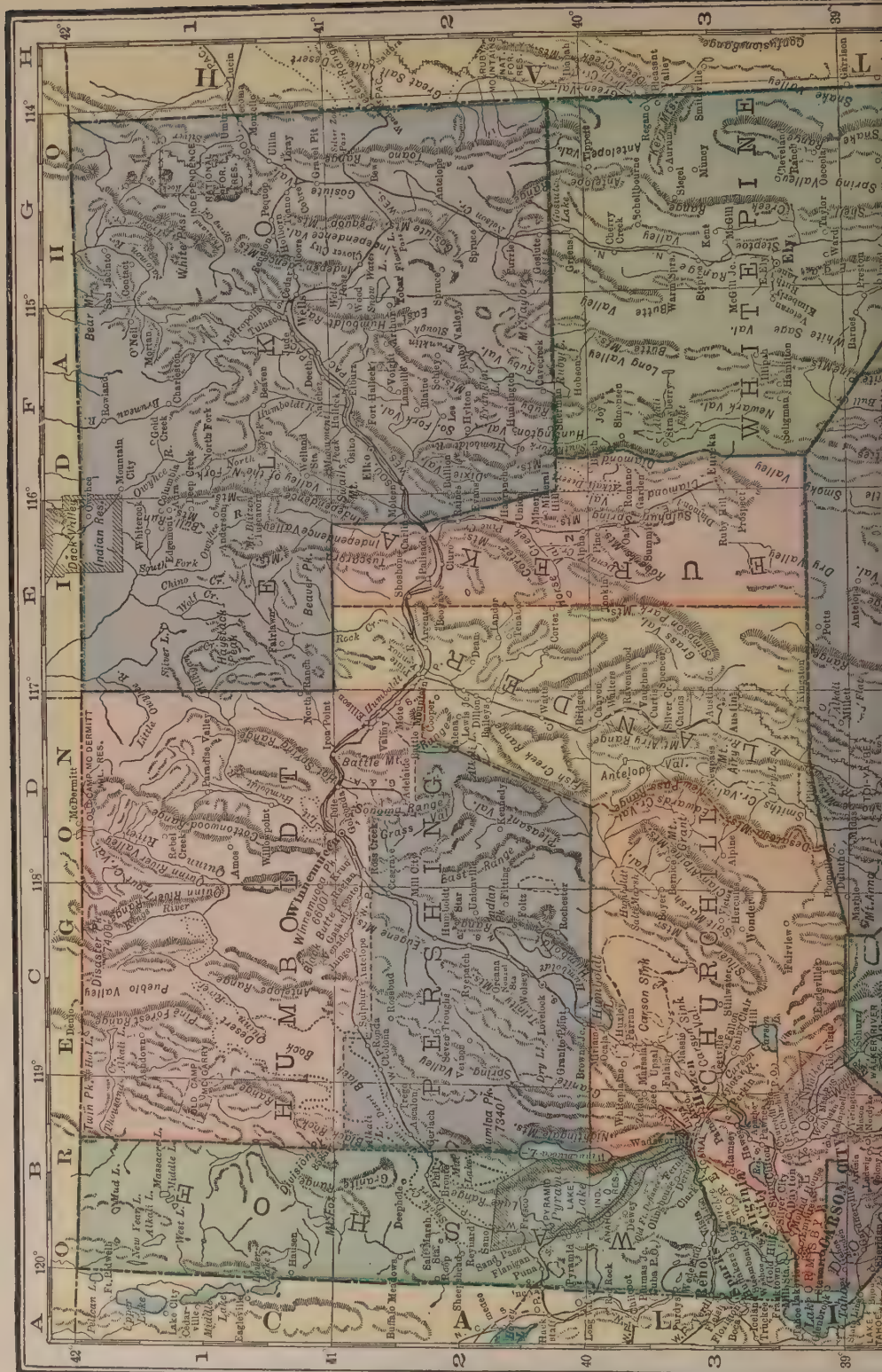
Geology.—The mountains of Nevada show formations of nearly every epoch from the Azoic to the late Jurassic, crumpled and uplifted; ancient erupted rocks which accompanied the Jurassic upheaval; modern eruptive rocks ranging in date from the late Miocene to the Glacial period, and uptilted strata of Cretaceous sedimentaries. The principal rocks are granite, sienite, andesite, dacite, basalt, limestone, slate, sandstone and quartzite. Nevada is one of the most important of the States in the variety, extent and richness of its deposits of precious and valuable metals and minerals. The comparative thinness of the detritus blanket on its mountain slopes has been an important aid to the prospector in discovering the outcroppings of ores.

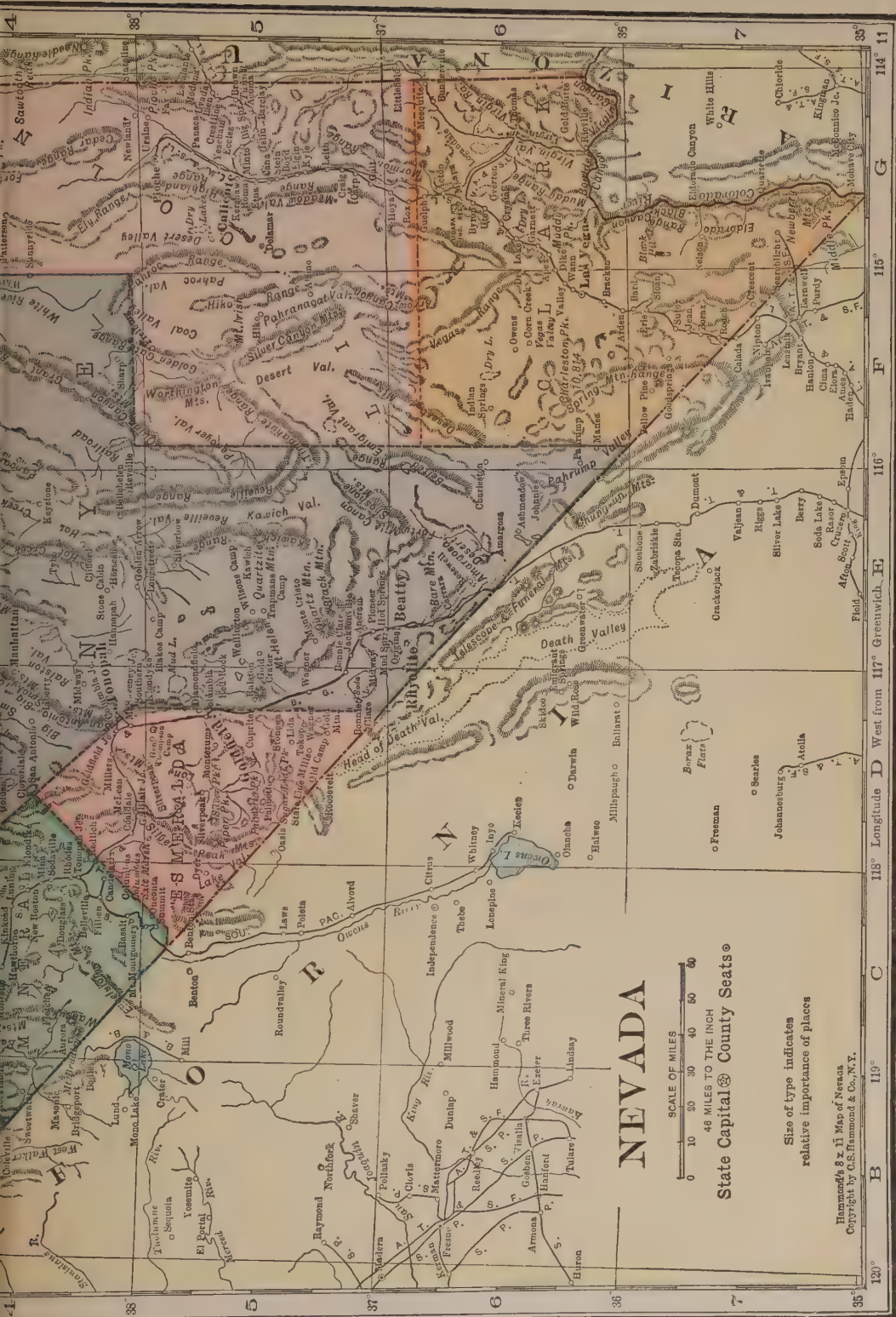
History.—At the time Nevada was organized as a Territory in 1861, the extreme western portion was locally considered a part of California, known as the "Washoe Country," although the civil government was under the jurisdiction of the Territory of Utah. Nevada was first visited by the white man in 1775, when

Francisco Garcés, a Franciscan friar, stopped here on his way to California. Peter Ogden of the Hudson Bay Company in 1825 visited the Humboldt River, which for a time was called the Ogden. In 1826 Jedediah Smith crossed the State from west to east. Irving's 'Bonneville Papers' describes a visit by members of Captain Bonneville's party to Mary's River, now the Humboldt, about this time. Fremont explored parts of the State in 1843-44-45, discovering and naming Pyramid Lake, Lake Tahoe and the Humboldt and Truckee rivers. The first settlement was made by Mormons in 1849, at Genoa, where a trading post was established. Gold was discovered the same year at Dayton, near Virginia City, by William Prouse. Placer mining on this gulch led, 10 years later, to the uncovering of the famous Comstock Lode, the richest deposit of precious metals ever found in the world. A petition for Territorial government was sent to Congress in 1857 and the following year a provisional government was formed at Carson City with Isaac Roop as governor. In 1860 another petition was sent to Congress and the Territorial delegate applied for admission. The Comstock Lode had now been discovered and a rush of miners from California occurred. Emigrants from the East on the Overland Trail across the State stopped to cast their fortunes with the new El Dorado. Other mining discoveries followed in rapid succession. Virginia City became over night a magic city of Aladdin and the "Washoe Country" became the Mecca of the seekers of fortune the world over. At the outbreak of the Civil War the scanty citizens sent loyal troops to the front. In September 1863 an election was held for delegates to form a State constitution, but the proposition was defeated in January 1864. By the close of the Civil War Nevada had produced \$43,000,000 in gold and silver bullion which was of material assistance to the North. The adoption of the 13th and 14th amendments to the Constitution of the United States required the vote of one additional loyal State, necessitating the admission of another State into the Union. President Lincoln's choice fell upon Nevada. On his recommendation Congress, in March 1864 passed an enabling act. In July the constitution was accepted and Nevada became a State, 31 Oct. 1864, the only State admitted during the administration of the martyred President. The first telegram sent across the continent on the completion of the Western Union Telegraph line, in 1864, was from the Nevada legislature certifying the loyalty of the State. To save delay the constitution of Nevada was telegraphed to Congress for ratification under authority of a special resolution. It is significant that at this time California and Oregon were the only other States west of Kansas. In June 1868 the Central Pacific Railroad was completed and the golden spike which connected it with the Union Pacific driven near Iron Point, Nev. Subsequently the divisional point between the two railroads was established at Ogden, Utah. The Sutro Tunnel, designed for draining the Comstock Lode, was completed in 1879, but not before the "Great Bonanza" was substantially worked out. Other important mining camps which flourished during this period were Austin, Eureka, Aurora, Hamilton, Treasure City,

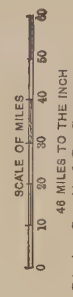
NEVADA

Alamo, (F5)-----	211	McGill, (G3)-----	2,846
Arden, (F6)-----	100	Manhattan, (E4)---	401
Atlanta, (G4)-----	24	Mason, (B3)-----	150
Austin, (D3)-----	666	Mesquite, (G6)----	361
Battle Mountain, (D2)-----	602	Metropolis, (F1) --	291
Beatty, (E6)-----	115	Mina, (C4)-----	611
Bunkerville, (G6)---	273	Minden, (B4)-----	420
Caliente, (G5)-----	541	Mizpah, (G2)-----	150
Carlin, (E2)-----	673	Montello, (G1)-----	464
CARSON CITY, (B3)-----	1,685	Mountain City, (F1)-----	94
Cherry Creek, (G3)-----	327	Nelson, (G7)-----	81
Columbia, (E1)-----	16	Overton, (G6)-----	380
Contact, (G1)-----	120	Owyhee, (E1)-----	100
Crescent, (F7)-----	25	Palisade, (E2)-----	312
Currie, (G2)-----	100	Panaca, (G5)-----	318
Dayton, (B3)-----	300	Paradise Valley, (D1)-----	200
East Ely, (G3)-----	699	Pioche, (G5)-----	595
Elko, (F2)-----	2,173	Pioneer, (E4)-----	44
Ely, (G3)-----	2,090	Pyramid, (B2)-----	150
Empire, (B3)-----	100	Rawhide, (C4)-----	49
Eureka, (F3)-----	708	Reipetown, (F3)---	100
Fallon, (C3)-----	1,753	Reno, (B3)-----	12,016
Farrell, (D2)-----	100	Rhyolite, (D6)-----	14
Franktown, (B3)---	120	Rochester, (C2)---	133
Gardnerville, (B4)---	800	Round Mt'n., (E4)---	371
Genoa, (B3)-----	222	Ruby Valley, (F2)---	214
Gerlach, (B2)-----	150	Ruth, (G3)-----	1,312
Gillis, (C4)-----	100	Schurz, (C4)-----	49
Glenbrook, (A3)---	100	Searchlight, (G7)---	161
Golconda, (D2)-----	288	Sheridan, (B4)-----	110
Goldfield, (D5)-----	1,558	Silver City, (B3)---	100
Gold Hill, (B3)---	207	Silverpeak, (D5)---	78
Goodsprings, (F7)---	356	Sparks, (B3)-----	3,238
Hamilton, (F3)-----	62	Stillwater, (C3)---	394
Hawthorne, (C4)---	244	Sweetwater, (B4)---	119
Hiko, (F5)-----	103	Tonopah, (D4)-----	4,144
Hill Top, (E2)-----	44	Tuscarora, (E1)---	241
Horn Silver, (D5)-----	18	Unionville, (C2)---	70
Imlay, (C2)-----	237	Verdi, (A3)-----	442
Jarbridge, (F1)-----	258	Virginia City, (B3)---	1,200
Las Vegas, (G6)-----	2,304	Wadsworth, (B3)---	403
Lee, (F2)-----	150	Wells, (F1)-----	521
Lida, (D5)-----	63	Whiterock, (E1)---	58
Lovelocks, (C2)-----	1,164	Winnemucca, (D2)---	1,934
Ludwig, (B4)-----	45	Wonder, (C3)-----	82
Lund, (G4)-----	290	Yerington, (B4)---	1,169
Luning, (C4)-----	144		





NEVADA



State Capital @ County Seats

Size of type indicates
relative importance of places

Hammond's 8 x 11 Map of Nevada
Copyright by C.S. Hammond & Co., N.Y.

Gold Hill, Tuscarora, Candelaria, Belmont and Tybo; producing silver, gold and lead. Silver mining was the principal industry. With the fall in the price of silver, due to the Demonetization Act of 1873, mining suffered a decline which continued until the discovery of Tonopah by Jim Butler, in April 1900. At this date the population of Nevada had reached its lowest ebb, 42,335 people. With the decline of mining, however, more attention began to be given to the possibilities for agriculture. It was found that the soils of the valleys were exceedingly fertile and produced profitable crops under irrigation. Canals were constructed to divert the waters of the streams upon the lands until the limit was reached which could be reclaimed without the conservation of waters flowing to waste during the non-irrigation season. This necessitated expensive impounding dams and canal systems. The United States Reclamation Act of 1902 was designed to supply Federal aid for such works, in many instances involving millions of dollars. The first reclamation enterprise undertaken was the Truckee-Carson project in Nevada, which has involved an expenditure in excess of \$7,000,000. While but a comparatively small part of the land area of the State is susceptible of cultivation, due to limitation in quantity of flow of the streams, and this in great part is dependent on the progress of water-storage enterprises, it was early discovered that native forage plants grow in abundance on the public domain, afforded grazing for cattle and sheep. The range livestock industry thus rapidly developed, supplying not only a home market for forage crops produced on the farms but giving definite direction to the general trend of agriculture, namely, to the production of forage crops and livestock. Agriculture thus became responsible for a permanent, instead of ephemeral, industrial population and State development. It is the foundation of the prosperity of the present most important towns: Reno, Fallon, Elko, Winnemucca, Lovelock, Gardnerville, Minden, Yerington and Las Vegas. The population had increased to 81,875 in 1910, and decreased to 77,407 in 1920. Reno is the metropolis, population 12,016.

Political History.—The following executives have served as governors of Nevada:

James W. Nye*	Republican	1861-1864
H. G. Blasdel	"	1865-1870
L. R. Bradley	Democrat	1871-1878
John H. Kinkead	Republican	1879-1882
Jewett W. Adams	Democrat	1883-1886
C. C. Stephenson†	Republican	1887-1890
Frank Bell†	"	1890
R. K. Colcord	"	1891-1894
John E. Jones†	Silver Party	1895-1896
Reinhold Sadler†	"	1896-1898
Reinhold Sadler	"	1899-1902
John Sparks†	Silver-Democrat	1903-1908
D. S. Dickerson†	"	1908-1910
Tasker L. Oddie	Republican	1911-1914
Emmet D. Boyle	Democrat	1915-1922
J. G. Scrugham	"	1923-

* Territorial governor.

† Died in office.

‡ Acting governors.

William M. Stewart and James W. Nye were elected to the United States Senate at the first session of the legislature, in 1864. The former, including an intermission of 12 years, 1877-1889, served as United States senator from Nevada until 1907, a span of 42 years, the longest from beginning to termination of senatorial service in the history of Congress. John E. Jones, Republican, elected in 1873, to succeed

Senator Nye, served continuously until 1903, 30 years, when he was succeeded by Francis G. Newlands, Democrat. The latter was re-elected in 1909 and again in 1915. On his death in 1917, Charles B. Henderson, Democrat, was appointed to fill the vacancy. Other United States senators from Nevada were William M. Sharon, Republican, and James G. Fair, Democrat, elected successively during the 12-year interim in the service of Senator Stewart. George S. Nixon, Republican, who in 1907 succeeded Stewart, was subsequently re-elected but died in 1914. William H. Massey, Republican, was appointed to the vacancy, but was defeated at the ensuing election by Key Pittman, Democrat, who was re-elected in 1916. Following the Civil War and until the silver issue dominated all other political questions (1892-96), Nevada was a safe Republican State. The new Silver party included both Republicans and Democrats and for four successive elections swept the State. The older parties then revived, the Democratic party absorbed the majority of the Silverites and remained in power until the election of 1904 when the State went Republican. Four years later it swung to the Democratic column. At present Nevada may be regarded as quite evenly divided politically. A constitutional amendment giving suffrage to women was adopted in 1914. Under the Initiative and Referendum section of the State constitution a "bone-dry" prohibition law was initiated and voted on in 1918. The State joined the Prohibition ranks on 25 Nov. 1918.

Government.—The State is governed by the original constitution of 1864, as since amended. The most important amendments provide for the initiative and referendum and equal suffrage for women. The legislature convenes biennially the third Monday in January of the odd years, and is composed of a senate of 16 members and an assembly of 37 members. Regular sessions are limited to 60 days; special sessions to 20 days. Assemblymen serve two years, senators four. General elections occur on the first Tuesday after the first Monday of even years. The executive department consists of a governor, lieutenant-governor, secretary, treasurer, comptroller, superintendent of public instruction, surveyor-general, attorney-general and State printer, who serve for four years. There is a Supreme Court, District Courts and justices of the peace. Members of the Supreme Court are elected for six years, district judges for four years. A system of county, township and municipal government is established by the legislature. Cities may be incorporated under special charter. State institutions comprise the University of Nevada and hospital for mental diseases, at Reno; orphans' home, penitentiary and State printing office, at Carson, and home for juvenile delinquents at Elko. Taxation is under the supervision and control of a State tax commission which has direct assessment of public utilities and livestock and general powers of equalization. Water rights are under the control of a State engineer. Employees in all hazardous industries are protected by insurance assessed by a State industrial commission against such enterprises. A railroad and public service commission regulates the tariffs on interstate railroads and other public utilities.

Education.—The public school system is

supported in part from interest on the proceeds (\$3,220,000) of the sales of Federal lands granted to the State for educational purposes, and by direct taxation. The University of Nevada, in addition, receives Federal aid from the Hatch, Adams and Smith-Lever funds. The valuation of university and public-school property is in excess of \$3,000,000. Within recent years expensive modern school buildings have been erected, which will compare favorably with those found elsewhere. Education is compulsory. In 1918 the number of children of school age was 14,762, enrolment 13,915, and average daily attendance 10,884. Rural schools are provided wherever five or more pupils are found in a district. There is a high school in each county. Teachers are well paid and high standards maintained with respect to qualifications. In 1917 there were 439 regular enrolled students in the university and 148 special and short-course students, total 587. The number of men students during the war decreased by reason of enlistments. There is a State Normal School connected with the university and branch normal schools in several counties. The public school system is controlled by a State board of education, a State superintendent of public instruction and five deputy district superintendents. Manual training, home economics and agriculture are taught in the high schools. The agricultural extension division of the university (Smith-Lever) conducts State-wide educational work in agriculture and home economics.

Churches.—The strongest denominations in the State are the Roman Catholic, Protestant Episcopal, Christian Science, Methodist Episcopal, Mormon, Congregational, Presbyterian and Lutheran. Churches of all denominations are found in Reno, including the seat of the bishopric of the Protestant Episcopal Church. In the other towns, usually two or more Protestant churches and the Roman Catholic are represented, according to sect and numbers of the various communicants.

Banking and Finance.—In the State, in 1922, there were 23 State banks and 11 national banks, with combined resources aggregating \$38,031,000. Reno is the principal banking centre, having two national and four State banks; resources, over \$15,000,000; bank clearances for the 12 months ended 30 Sept. 1921, \$37,384,000. The total bonded debt of the State in 1922 was \$1,699,000. The total assessed valuation of property, real and personal, \$214,000,000, an increase of over 233 per cent in 10 years, in part due, however, to increased valuations under the Tax Commission Act of 1913. Treasury receipts in 1922-23 were \$3,700,126; disbursements, \$3,612,733.

Transportation.—Nevada is crossed by three transcontinental railroads, the Southern Pacific and Western Pacific in the northern part and the Los Angeles and Salt Lake in the southern. Branch roads extend to all the principal towns and mining camps. The total operating mileage is 2,325, with 425 miles of sidings.

Commerce and Industries.—In 1910 there were 177 industrial establishments; capital invested, \$9,807,000; value of products, \$11,887,000, and number of employees, 2,670. A very substantial increase has since taken place. The principal articles of manufacture include rail-

road cars, lumber and timber products, flour and grist, packing-house products, beet sugar, chemicals, confectionery, machinery, plaster, dairy products, etc. Cheap hydro-electric power, generated on the Truckee River and other streams, is distributed by wire lines throughout western Nevada for lighting and industrial purposes.

The 1919 census of manufactures reports 166 establishments, engaging 3,563 persons, of whom 136 are proprietors and firm members, 308 salaried employees and 3,119 wage earners. The primary horse power employed to operate these establishments is 19,874; the capital invested aggregates \$16,834,561; the cost of materials, \$16,490,617; the value of products, \$22,874,311, leaving the value added by manufacture \$6,383,694. The amount paid in wages and salaries was \$4,905,687—salaries, \$587,665; wages, \$4,318,022, an average of over \$1,384 per annum for each wage earner, one of the highest averages in the country.

The relative importance of the leading industries are given in the table below:

INDUSTRY	No. of establishments	Wage earners	Value of products	Value added by manufacture
Cars and railroad repairs.....	13	1,750	\$3,992,000	\$2,517,000
Slaughtering and meat packing....	4	118	2,939,000	215,000
Flour and grist mills.....	10	25	1,116,000	125,000
Butter.....	5	17	662,000	62,000
Printing and publishing news-papers, etc.....	34	103	468,000	375,000
Bread and bakery products.....	17	38	274,000	115,000
Automobile repairing.....	17	45	221,000	146,000
Confectionery and ice cream.....	4	10	154,000	64,000

Mining.—The oldest, and at present the second most important, industry is mining. The discovery of the Comstock Lode and its effect on the history of the State has already been detailed, as also something of the story of the rise and decline of mining preceding the discovery of Tonopah in 1900. The surface richness of Tonopah inaugurated a new mining era which, followed by the discoveries of Goldfield, Manhattan, Round Mountain, Rhyolite, Rawhide and other camps in southern Nevada in rapid succession, by 1907 developed nationwide speculation in shares of the mining companies. Some of the mines justified expectations, others did not. The great boom collapsed in 1907-08, leaving a train of disaster in its wake. The industry, however, weathered the storm and re-established itself on a better foundation. Discoveries of new mining districts occurred in other parts of the State, among which being National, Rochester and Gold Circle. The production of the mines, \$19,778,939, in 1907, at the height of the boom, steadily increased to over \$40,000,000 annually during the next decade. The great copper deposits at Ely were developed; 10,000 tons of low-grade copper ores being treated daily at McGill in one of the largest copper concentration plants in the West. Another important copper-producing centre is Yerington. In addition to gold, silver and copper, the State contains large de-

posits of lead, tungsten, antimony, manganese, iron and salt. Nitrates have been found in paying quantities in certain of the old lake beds. No coal of any commercial importance has been discovered, although there are veins of lignite which may yet prove of value. There are vast deposits of shales containing a high per cent of petroleum which may profitably be extracted. With all the discoveries so far made it is believed that the mineral wealth of Nevada has scarcely been touched. The total production of the Comstock Lode to 1918 was \$400,000,000. The total mineral production of Nevada from the discovery of the Comstock Lode to 1918 exceeds \$1,100,000,000. This vast sum has gone to enrich other States; very little of it to develop the permanent wealth of the State in which found. The owners of the dividend-paying mines are largely non-residents. The mining machinery, tools and explosives used, and the clothing, shoes, household utensils and most of the food required by the miners is imported. When the mine is worked out the miners depart. The mining town becomes a "ghost city," with the wealth invested in its buildings, hoisting and reduction works abandoned to the tax gatherer until marked off the list of the delinquent.

Agriculture.—The real foundation of the State's economic wealth and prosperity is agriculture, not mining. By reason of climatic aridity, agriculture, other than the grazing of livestock on the public ranges, is practically limited by the water supply of the streams. The exceptions are comparatively limited areas where the precipitation is sufficient to grow crops under dry-farming methods and certain valleys containing artesian sources of water supply. The acreage of improved land in farms in 1920 was but 594,741 out of the total of 70,285,440 acres within the State. When reclamation works are finally constructed to conserve the entire flows of the streams, it is estimated that 600,000 additional acres of arable lands may be brought under irrigation. Artesian water occurs in a number of valleys at depths of from 100 to 1,000 feet below the surface. While this is being utilized to some extent, economic pressure and land scarcity has not, as yet, caused any extensive development of such underground waters for land reclamation. There are about 100 wells in the Las Vegas Valley, several of which flow large streams, and about an equal number in other parts of the State. The valley soils for the most part are rich in plant foods and under irrigation produce bountiful crops of alfalfa, grass hay, wheat and other grains, potatoes, sugar beets, orchard and small fruits, and vegetables. Forage crops are the principal staples, for which a constant local market is provided for wintering and fattening range cattle and sheep. Potatoes, onions and cantaloupes are exported. Due to excellent markets and the productiveness of the soil, improved farm lands command comparatively high prices, \$200 to \$300 per acre not being uncommon in the more fertile valleys. Southern Nevada is semi-tropical. Experiments with the Egyptian long staple cotton have shown its adaptability to extensive areas in the Moapa and Las Vegas valleys. Almonds, figs, grapes, pomegranates, etc., thrive in this section, but little success has attended the growing of citrus fruits. In the higher valleys of

northeastern Nevada, where the mean annual precipitation is between 12 inches and 15 inches, some success has been obtained in the growing of wheat by dry-farm methods. Recent experiments with certain drought-resistant forage crops, in part native plants, in these valleys, indicate possibilities for very extensive dry-farm reclamation in connection with livestock. The vast public range lands, aggregating 50,000,000 acres, must be taken into consideration as a part of the State's agriculture. Native grasses and other forage plants on this immense area afford subsistence 9 to 12 months in the year for approximately 480,000 beef cattle and 1,500,000 sheep. About 6,000,000 acres of the range lands are within National Forest Reserves. One of the great agricultural problems demanding attention is the extension of Federal control over these open range lands in order that the native vegetation may be conserved from destruction by over-grazing and reseeding practised. Dairying is a profitable industry and is increasing. There are nine creameries and about 25,000 dairy cows. Dairy products to the value of \$832,991 were produced in 1919. The value of all livestock on the farms of the State in 1919 was \$29,893,525; farm crops, \$13,980,303; all farm property, \$99,779,666. Nevada farms are characterized by excessive acreage both of improved and unimproved lands, as compared with other Western States. Until these great "ranches" are subdivided into smaller and more intensively cultivated farms, the agricultural progress of the State will continue to be materially retarded. Happily increasing land values and economic pressures are slowly bringing about such inevitable change.

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NEVADA, Iowa, city, county-seat of Story County, on a branch of the Chicago and Northwestern Railroad, about 30 miles north by east of Des Moines. It is in an agricultural region in which stock-raising is a prominent industry. Its chief manufacturers are flour, brick, tile, lumber and dairy products. It has a large cold-storage plant, and considerable trade in dairy products, poultry, eggs, grain, flour and livestock. The public library contains about 6,000 volumes. Pop. 3,000.

NEVADA, Mo., city and county-seat of Vernon County, on the main line of the Missouri, Kansas and Texas Railroad and a division and hospital point on the Missouri-Pacific railroads; is about 130 miles southwest of Jefferson City and 100 miles south of Kansas City. It was settled in 1830 by a colony from the eastern part of the State, incorporated in 1866, and chartered as a city in 1883. It is in an agricultural and stock-raising region, and in the vicinity of the zinc and coal mines. Its manufactures are chiefly local. The number of men employed in railroad shops and manufacturing establishments is about 1,000. The city has considerable trade in agricultural products and livestock, and is a distributing centre for a large part of Vernon County. Nevada has electric lighting and electric street railway, abundant natural gas with excellent city water from artesian wells, ample fire protection and has a new courthouse, high school and post

office, complete sewage system and paved streets. Its educational institutions are public school, Cottey College for Young Women, opened in 1884, Saint Francis Academy (Roman Catholic), Carnegie Library and the Waltmer Institute of Suggestive Therapeutics established 1897. It has an orphan asylum, the State Lunatic Asylum, Artesian lake, parks and the Missouri National Guard rifle range. The three banks have a combined capital and a surplus of \$400,000, and the Farm and Home Savings and Loan Association of Missouri, strictly mutual with more than \$3,252,000 resources, making it the largest organization of its kind in the State. The government is vested in a mayor and a council of 10 members, who hold office two years; five councilmen are elected each year. Nevada has no saloons. Pop. (1920) 7,139.

NEVADA, University of, was founded at Elko in 1873, removed to Reno and opened in 1886. It is a part of the public educational system of the State, the only school of college grade in the State. Besides the regular collegiate courses in classics, literature, general science, there are courses in civil, mechanical, electrical and mining engineering, and domestic science and agriculture. The Mackay School of Mines, endowed by Mrs. Marie Mackay and Mr. Clarence H. Mackay of New York, specializes in mining education. The Nevada State Normal School is also under the direction of the State University. The Mackay School of Mines gives a prospectors' short course each year which lasts for one month. In the College of Agriculture, short courses in agriculture and home economics are given in connection with farmers' week, which takes place once each year. There is a branch of school mines at Virginia City and another at the city of Tonopah. The University administers the following public service departments: the State Hygienic Laboratory; Pure Food and Drugs and Control of Weights and Measures Laboratory; the State Mining Laboratory; Veterinary Control Service, which administers the quarantine of livestock; Soil and Water Laboratory; conducts the Agricultural Extension Department under the Smith-Lever Act; carries on experimentation in pumping for irrigation purposes; conducts the Agricultural Experiment Station. The degrees conferred are A.B. and B.S. and corresponding masters degrees for graduate work. Women are admitted and constitute scarcely half the number of students. Military drill for men is a part of the curriculum. The university is also the Land Grant College in this State. There are 63 members of the faculty and in 1922-23 there were 825 students registered. The income for the year was \$400,000, while the value of the University property is \$1,110,000.

NEVE, nă-vă, the granular snow-ice that results from the compacting of snow and that represents an intermediate stage in the formation of solid glacial ice. See **GLACIER**.

NEVERS, nê-vâr, France, the capital of the former province of Nivernais, now of the department of Nièvre, picturesquely built on the slope of a hill 600 feet above sea-level, at the influx of the Nièvre to the Loire, 159 miles southeast of Paris. It was the Roman Noviodunum, and has been an episcopal see since 506; its 13th century cathedral has been re-

stored since 1879; the 11th century Romanesque church of Saint Etienne is interesting. The stately courthouse, dating from 1475, was formerly the castle of the Dukes of Nevers. The city contains a fine public garden, a bridge of 14 arches over the Loire, a mediæval gateway, housing a museum of Gallo-Roman antiquities, a public library and a triumphal arch (1746) commemorating the battle of Fontenoy. Its first municipal charter dates from 1194. The industries comprise the manufacture of cannon, iron cables and chains, porcelain (introduced by Italians about 1565), etc. Pop. 27,706.

NEVERSINK HIGHLANDS. See **NAVESINK HIGHLANDS**.

NEVILLE, nêv'il, **Henry**, English actor: b. Manchester, 20 June 1837; d. 19 June 1910. He achieved great success on the London stage, where he first appeared in 1860, and later took the chief rôle in 'The Ticket of Leave Man,' which was his most successful part, and in which he played 2,000 times. In later life he played as principal with Madame Modjeska. He visited America in 1890, opening at Boston as Captain Temple in 'Human Nature,' re-named 'The Soudan.' He was lessee of the Olympic in 1873-77, and established a dramatic school in 1878. Besides plays, such as 'The Duke's Device' and 'The Violin-Maker,' he wrote 'The Stage: Its Past and Present'; 'Gesture' (in Campbell's 'Voice, Speech, and Gesture,' 1895).

NEVILLE, **Richard**, Earl of Warwick. See **WARWICK**, **RICHARD NEVILLE**, **EARL OF**.

NEVILLE'S CROSS, Battle of. See **BRUCE**, **DAVID**.

NEVIN, nêv'in, **Ethelbert Woodbridge**, American composer: b. Edgeworth, Pa., 25 Nov. 1862; d. New Haven, Conn., 17 Feb. 1901. He obtained his musical education in Pittsburgh and in Berlin, and after three years spent in the latter city returned to the United States and opened a studio in Boston. He appeared in public occasionally but his reputation rests chiefly upon his compositions, which date from his 12th year. 'Narcissus,' which has a world-wide popularity, was written when he was 13, and 'O, that we Two were Maying' a year later. Other compositions are: 'A Day in Venice'; 'Cradle Song'; 'Milkmaid's Song'; etc. Consult the 'Life' by V. Thompson (Boston 1913).

NEVIN, **John Williamson**, American Reformed (German) clergyman: b. Shippensburg, Pa., 20 Feb. 1803; d. Lancaster, Pa., 7 June 1886. He was graduated from Union College, Schenectady, N. Y., in 1821 and from Princeton Theological Seminary in 1826, where he remained for a few years as tutor. He was professor of Hebrew at the Presbyterian Theological Seminary at Alleghany City 1829-39, became president of the Mercersburg Theological Seminary in 1840 and was president of Marshall College 1841-53. His translation of Schaff's 'The Principle of Protestantism' created the once famous controversy over 'Mercersburg Theology' (q.v.), of which he was for the rest of his life the principal advocate. He edited the *Mercersburg Review* 1849-53, resigned from the presidency of the Seminary in 1851 and from Marshall College in 1853. In the last-named year the college was removed to Lancaster,

Pa., and merged with Franklin College, Dr. Nevin serving as president of Franklin and Marshall College (q.v.) 1866-76. He published 'The Mystical Presence' (1846); 'The History and Genius of the Heidelberg Catechism' (1847); 'Antichrist or the Spirit of Sect and Schism' (1848). Consult 'Life' by Theodore Appel' (Philadelphia 1889).

NEVINSON, Henry W., English journalist. He was a war correspondent of the *London Daily Chronicle* during the Græco-Turkish war of 1897 in the Transvaal, and Natal during the Boer War in 1899, and in Bulgaria and Albania in 1912-13. He has been on the staff of the *Daily News* and a writer for *The Nation* since 1906. He has published 'Life of Schiller' (1889); 'Neighbors of Ours' (1895); 'In the Valley of Tophet' (1890); 'The Thirty Days' War' (1898); 'Ladysmith' (1900); 'The Plea of Pan' (1901); 'Between the Acts' (1903); 'The Dawn in Russia' (1906); 'The New Spirit in India' (1908); 'Essays in Freedom' (1909); 'Peace and War in the Balance' (1911); 'The Growth of Freedom' (1912); 'Essays in Rebellion' (1913).

NEVIS, West Indies, one of the Leeward Islands, belonging to Great Britain, two miles southeast of Saint Christopher, with which, since 1882, it is administratively connected. It is circular in form, rises in the centre to a wooded ancient crater (3,200 feet), and has an area of 50 square miles. The lower slopes are cultivated, the sugarcane being the principal crop; limes and oranges are grown to a small extent. The capital is the port of Charlestown. Nevis was discovered by Columbus in 1498 and colonized by England in 1628. In the 18th century it was twice taken and restored by the French, and it was a centre for the slave trade. Alexander Hamilton, the American statesman, was born on the island. Pop. 12,945.

NEW, Clarence Herbert, author: b. Brooklyn, N. Y., 1862. He was educated at private schools and at the Polytechnic Institute of Brooklyn, N. Y. He twice traveled around the world, 1880 and 1891, and through South America in 1884, as newspaper correspondent during part of the time. He was shipwrecked on the clipper ship *Eric the Red*, at Cape Otway, Australia, Sept. 1880. He practised as a constructing engineer, 1882-1886; and as editor, author and publisher from 1893. He edited *Truth* (New York 1895); *Reel Life* (1913-14); was manager of the *New York and London Literary Press*, and corresponding secretary of the International Hydrographic Association. He published 'Franc Elliott' (1895); 'Under the Pacific' (1895); 'Chronicles of Murphy's Gulch' (1898). He also published over 400 stories in magazines, newspapers and other periodicals, the best known of which are the series, 'Adventures of a Diplomatic Free Lance' which have run, almost without a break, in the *Blue Book Magazine* for over seven years. Several of them have appeared throughout the United States, Canada and Great Britain as photo-plays. He also wrote 'Mysteries and Adventurers of the Sea,' published in the *Blue Book Magazine*, under the nom-de-plume "Culpeper Sandtt," and in the *Premier and Cassell's New Magazine* of London under his own name. In 1916 he had the misfortune to lose his left arm owing to an attack by a

bear, but with one hand produces his work (averaging 50,000 words each month) upon a typewriter.

NEW, John Chalfant, American financier: b. Vernon, Ind., 6 July 1831; d. 4 June 1906. He was graduated from Bethany College, Va., in 1851 and studied law, becoming clerk of Marion County in 1856. In the Civil War he served as quartermaster of Indiana until his election to the State senate in 1862. He was cashier of the First National Bank of Indianapolis in 1865 and later its president. He was United States Treasurer in 1875-76 and served as Assistant Treasurer in 1882-84. He was appointed consul-general at London in 1889 by President Harrison and was proprietor of the *Indianapolis Journal*.

NEW ALBANY, Ind., city, county-seat of Floyd County, on the Ohio River, and on the Baltimore and Ohio Southwestern, the Pittsburgh, Cincinnati, Chicago and Saint Louis, the Chicago, Indianapolis and Louisville, and the Southern railroads, nearly opposite Louisville, Ky., and about 110 miles south of Indianapolis. It was laid out for a city in 1813, and in 1839 was incorporated. It is two miles below the falls in the Ohio River (see LOUISVILLE) and has extensive water-power. Its chief manufacturing establishments are pork-packing establishments, tanneries, engine and boiler works, furniture factories, flour mills, rolling mills, lumber and planing mills and foundries. It has a large trade in its manufactures, the farm products of Floyd County, and in building material. Some of its prominent buildings are the government building, the city hall, courthouse, the churches and the schools, hospital, new office building, business college. It is the seat of Saint Mary's Academy (Roman Catholic), Holy Trinity Academy (Roman Catholic); it has public and parish schools and a free public library. Within the city limits is a National cemetery in which are 2,908 graves, 676 of unknown dead. The government is administered under the charter of 1839 and provides for a mayor, who holds office four years, and a council. Some of the administrative officials are appointed by the mayor and the others are elected by the council. Pop. (1920) 22,992.

NEW ALBION, the name given by Sir Francis Drake, in 1579, to the western coast of North America, when he landed at Bodega Bay, 40 miles north of the present city of San Francisco, and of which he took possession in the name of Queen Elizabeth. Humboldt and later writers restricted the name to the region between San Francisco and what is now the northern boundary of the State of Oregon.

NEW AMSTERDAM. See NEW YORK.

NEW ARCHANGEL. See SITKA.

NEW ATLANTIS. See ATLANTIS.

NEW BEDFORD, Mass., city, fifth largest in population in the State of Massachusetts, one of the county-seats of Bristol County, on the Acushnet River and New Bedford Harbor, at the head of Buzzards Bay, and on the New York, New Haven and Hartford Railroad, 56 miles south of Boston. It is connected with Fall River, Brockton, Taunton, Wareham, Onset, Dartmouth and Westport by electric lines, and by steamers with New York, Martha's

Vineyard and Nantucket. It was settled in 1652 by John Cook and others from Plymouth, and was a part of Dartmouth until it was incorporated in 1787. It received a city charter in 1847. It was once noted for the number of its inhabitants engaged in the whale fisheries, but since 1860 its whaling interests have decreased and its manufacturing industries increased. The town occupied a prominent place in the Revolution, especially in sending out privateers, which harassed the enemy and captured many of the British vessels. On 5 Sept. 1778 the town was attacked by a British fleet, captured and almost destroyed. The harbor is protected by Fort Rodman on Clark Point. A large lighthouse is on Palmer Island at the entrance of the harbor. The area of New Bedford is nearly 20 square miles. It is well laid out, the streets are clean and nearly all paved. Fine roads along the shore, good views of the sea and electric transit facilities into the surrounding country, all add to the attractiveness of the city. New Bedford stands as one of the leading cities in United States, as an industrial centre; ranking first in the manufacturing of fine cotton goods and fine cotton yarns. The number of cotton-mills employees at the present time is about 38,000. The present capitalization of the cotton mills is in excess of \$52,000,000, owning 68 mills; more than 400,000 bales of cotton are used in the mills yearly. The capital invested in cotton mills is approximately \$100,000,000. There is over \$6,000,000 invested in other industries, including one of the largest twist-drill plants in the world, a rope factory, a copper-rolling mill, a large cut-glass works, a shoe factory, a toy factory, a paint mill and numerous other smaller industries.

New Bedford has about 36,800 feet of water frontage, about 8,016 feet of which has been developed and the wharves are reached by a channel 300 feet wide and 25 feet deep at mean low water and three miles long. Ocean liners engaged in coastwise shipping discharge cargoes at New Bedford. The importance and future possibilities of the port of New Bedford as a shipping terminal was shown in the construction of the mammoth modern pier by the State of Massachusetts at a cost of \$450,000, in addition to the land the pier occupies which was given by the city. A portion of the raw materials for the mills are now brought direct by water to the pier. The area of the pier is 113,000 square feet and the total floor areas of the pier sheds is 90,000 square feet. One section used for storage purposes has a floor space of 31,800 square feet and double railroad tracks under the shed will accommodate 24 cars. New Bedford has always been active in civic progress, and has a civil centre established with many fine buildings, including a new half-million-dollar postoffice, a new county building, remodelled municipal building and one of the finest equipped libraries in New England. Further development of this civic progress includes a new modern hotel and a memorial auditorium. It also has a public park system of seven parks, located in various parts of the city with a total area of approximately 222 acres. The New Bedford Public Library, with 170,000 volumes, is one of the first three public libraries in America and contains the finest collection of whaling prints and

Quakeriana in the world. Two privately-conducted museums, the Bourne Whaling Museum, with a completely rigged whale ship, and the Old Dartmouth Historical Society are visited annually by thousands of visitors to the city. New Bedford has a bi-cameral form of government. The splendid public school system comprises 36 buildings and it also has 11 parochial institutions. It also has one of the largest textile schools in New England, a State institution; the Swain Free School, an advanced institution of art, a public industrial school and a private academy. Three national banks, two trust companies, as well as two savings banks are located in New Bedford. The stock, deposits and surplus of New Bedford banks is about \$58,000,000. New Bedford's drinking water stands high in the State list, coming from one of a chain of lakes 15 miles north of the city. Pop. (1920) 121,217.

There is a large foreign element, chiefly French-Canadian and Portuguese in the city, but all who have made permanent homes are American. Consult Pease, Z. W., 'History of New Bedford' (1918).

NEW BERN, nū'bĕrn (formerly **NEW BERNE**), N. C., city, county-seat of Craven County, port of entry of the Pamlico district, at the confluence of the Neuse and Trent rivers, and on the Atlantic Coast Line and Norfolk-Southern railroads, about 100 miles in direct line southeast of Raleigh, on the Inland Waterway; distributing center for Eastern North Carolina. It was settled in 1710 by a company of swiss and Germans under Baron De Graffenreid. The place was named "New Berne" after Berne in Switzerland. It was incorporated as a city in 1723. It soon became an important southern seaport, on account of its harbor. It was the capital of the Province of North Carolina for several years. It was one of the strongly fortified ports of the Confederacy. (See **NEWBERN, OPERATIONS AT, IN THE CIVIL WAR**). [Annual Mean Temperature 34 year period, 62°. 75 miles from Gulf Stream, causing mild, delightful winters. The chief industrial establishments are lumber and planing mills, grist mills, shingle factories, fertilizing works, ice factory, brick kiln, veneering plants, overall factories, baseball bat factory, tobacco redrying plant, pants factory, toy factory, furniture factory, cotton oil mills, shipyard, carriage factory, lime kiln, and the Norfolk Southern railroad shops, in all having 3,500 employees. There is an extensive trade in lumber, cotton, vegetables, fish, and oysters. The prominent buildings are, a government building (court-house, custom-house and post office), the county courthouse, jail, Saint Luke's Hospital, Elks Temple, National Bank Building, New Bern Banking and Trust Company's building, Shrine Home and home of the Sudan Temple. The educational institutions are the public schools, separate for white and colored. There are 15 church edifices. The three banks have a combined capital of \$375,000. The government is vested in a mayor, board of aldermen and a council of 10 members. The electric-light plant and the waterworks are owned and operated by the city. About 99.3 per cent of the inhabitants are native born Americans. Pop. (1920) 12,198.

NEW BERN, Operations at, in the Civil War. Roanoke Island (q.v.), N. C., was captured by General Burnside, 8 Feb. 1862, and

on 6 March he embarked his troops for an expedition against Newbern, a point of much military importance, at the confluence of the Neuse and Trent rivers, near the head of an extensive and navigable arm of the sea, and connected by railroad with Beaufort Harbor at Moorehead City. By night of the 11th the entire naval and land command was off the mouth of Slocum's Creek, south of the Neuse, and about 15 miles below Newbern. The approaches to the city had been obstructed by sunken vessels and a double row of piles in the river. Four miles below the city, on the southern side of the river and opposite the obstruction in the stream, was Fort Thompson, mounting 13 heavy guns. From the fort inland was a line of rifle-pits and redoubts extending about two miles to and beyond the Atlantic and North Carolina Railroad, and terminating on almost impassable ground. In the fort and on this line were 41 heavy guns and 19 field-pieces. The position was held by seven North Carolina regiments, a battalion of militia and three batteries of artillery, numbering in all some 5,000 men, under command of Gen. L. O'B. Branch. Burnside's troops, 13 regiments of infantry, about 9,000 men and 8 guns, were landed by noon of the 13th, and after a hard march in rain and deep mud bivouacked near the Confederate position, the naval vessels, under Commodore Rowan, moving up the river abreast of the infantry, and shelling the road and woods in advance. On the morning of the 14th the attack was made. Gen. J. G. Foster, with the 10th Connecticut and the 23d, 24th and 28th Massachusetts, moved up a country road on the right; Gen. J. L. Reno on the left, with the 21st Massachusetts, 9th New Jersey, 51st New York and 51st Pennsylvania, moved along the line of the railroad; while Gen. J. G. Parke, with the 4th and 5th Rhode Island and 11th Connecticut, moved in the centre, on a country road, as reserve. Foster began the battle about 8 A.M. by an attack on Fort Thompson and the line near it, maintained the brunt of the contest for some time, and was reinforced by Parke. Meanwhile, Reno had gained ground on the left, the entire division now became engaged and the Confederates, after a resistance of four hours, broke and retreated to Newbern, burning behind them the railroad and turnpike bridges over Trent River. Burnside followed, crossed the Trent in boats, Branch retreating, and in the afternoon the Union troops occupied the city, capturing many heavy guns and other material. The Union loss was 90 killed and 380 wounded. The Confederate loss was 64 killed, 101 wounded and 413 captured or missing.

Confederate Efforts to Recapture Newbern.—The fall of Newbern was a serious blow to the Confederates, but the necessities of the army in Virginia forbade attempt to regain it until after the close of the campaigns of 1862, when troops were sent to North Carolina, and 13 March 1863, Gen. D. H. Hill, who had been assigned to the command in the State, organized an expedition for its recapture. General Daniel's brigade moved from Kinston toward Newbern by the lower Trent road; General Robertson's cavalry brigade was sent by the upper Trent road; and General Pettigrew, with

five North Carolina regiments and 15 guns, was ordered to approach the city near Barrington's Ferry, north of the Neuse, to attack two small gunboats in the river, and capture Fort Anderson, an earthwork on the river, opposite the city, garrisoned by 300 men of the 92d New York. At Deep Gully, a few miles out of Newbern, Daniel attacked five companies of the 25th Massachusetts, supported by two guns, and drove them in, but advanced no farther, as Pettigrew had failed. That officer, at daylight of the 14th, appeared in front of Fort Anderson and demanded its surrender, which was refused, and Pettigrew opened fire from all his guns and engaged the gunboats *Hetzel* and *Hunchhback*, which had been towed into position. The fire of the gunboats, with that of five guns of a battery of rifled guns from the other side of the Neuse, caused Pettigrew to withdraw and cover the movement of the 85th New York to reinforce the 92d. The casualties on either side were insignificant.

On 20 January 1864, General Lee ordered General Pickett, then at Petersburg, Va., to capture Newbern if upon examination he found it practicable, and authorized him to use four brigades of his command for the purpose, in addition to which he promised to assist him with Hoke's brigade of the Army of Northern Virginia. He gave detailed instructions for the movement, and all the Confederate forces in eastern North Carolina were to co-operate and retake Newbern, Plymouth, Washington and other coast towns. On the morning of 30 January the movement began from Kinston in three columns; General Barton, with his own brigade, Kemper's, part of Ransom's, 14 guns and 600 cavalry, was directed to cross the Trent, take the works in front of Newbern in reverse, and cut off communication with the place. Colonel Dearing was sent north of the Neuse with a cavalry force, two infantry regiments and three guns, to attack Fort Anderson. Col. J. T. Wood, with picked crews in boats, was to descend the Neuse, seize the Union gunboats and co-operate with Dearing in the attack on Fort Anderson. General Pickett, with Hoke's brigade, three regiments of Corse's, two of Clingman's, and 10 guns, was to advance by the Dover road. Newbern had been strongly fortified, and was held by 2,000 men, under Gen. I. N. Palmer, and three gunboats were stationed in the Neuse and Trent rivers. An outpost of 300 men of the 132d New York was at Bachelor's Creek, eight miles above Newbern. General Hoke, advancing by the Dover road, on 1 February, at Bachelor's Creek encountered the Union outpost, which was driven in after a severe Federal loss, and Pickett with his column crossed the creek and advanced toward Newbern. The batteries opened upon him; he made no attack, but awaited the result of the co-operating movements. Colonel Wood, with 10 rowboats, carrying picked crews of 15 men each, armed with rifles and cutlasses, left Kinston at noon of 31 January, dropped down the river, and at 4 A.M. of 1 February arrived near the town; but, owing to a fog, he could not locate the position of the gunboats. He finally located the *Underwriter*, moored close in shore, near the wharf, and not more than 100 yards from three batteries; and at night he

boarded her, killing her commander and some of the crew and capturing a third of the remainder in a hand-to-hand conflict. The fires under the boilers of the vessel were very low, and in attempting to tow her out Wood was subjected to fire of artillery and infantry from the forts on shore, and therefore he set her on fire. Pickett waited for Barton's movement, which failed, and after a feeble demonstration he gave up the enterprise and withdrew to Kinston, after a loss of 45 killed and wounded. The Union loss was 326 killed, wounded and missing.

The third attempt on Newbern was made by General Hoke, who after his capture of Plymouth, N. C. (q.v.), 20 April 1864, moved against the place and demanded its surrender, and on being refused began a siege. Hoke was recalled to Kinston, 5 May, and ordered to Petersburg, Va. Consult 'Official Records' Vols. IX, XVIII, XXXIII, XXXVI and 'Battles and Leaders of the Civil War' (Vol. I).

NEW BRAUNFELS, Tex., city, county-seat of Comal County, was laid out in the year 1845, at the foot of a range of hills, 48 miles southwest of Austin, the capital of the State, and 31 miles north of the city of San Antonio, on the International and Great Northern and the Missouri, Kansas and Texas railways. The Guadalupe River, the best water-power river in the State, forms the northeastern boundary of the city limits, and is well stocked with fish. The Comal, which is only about one and one-half miles long, also well stocked with fish, is formed by a great many springs gushing out of the mountain side, about one-half mile from the city courthouse and divides the city. The main streets of New Braunfels are 90 feet wide, all centring on Landa's Park in the heart of the city, known as one of the most beautiful natural parks in the United States. All of these different springs have their own courses and through Landa Park their channels converge into a large reservoir from which the water is used for manufacturing purposes. The city owns its own waterworks system, whence the city's supply is pumped out of two large springs which have a capacity of 3,000,000 gallons daily. The south eastern and the southwestern part of the county is composed of rich black land upon which is produced mainly corn and cotton. The northeastern and northwestern part is mountainous, and is being used for cattle and other stock-raising purposes. The mountainous part of the county is full of wild game, and more deer are killed in Comal County every year than in any other county in the State. The scenery along the Comal and Guadalupe rivers is equal to that of Colorado.

New Braunfels in the year 1853 levied a tax of 30 cents on the \$100 for the purpose of maintaining and establishing a free school system, and in 1856 was granted a charter for 20 years by the State of Texas authorizing the levy of a tax for educational purposes. An attempt to renew this charter at its expiration in 1876 failed because of its unconstitutionality. This system of taxation for school purposes attracted attention all over the State and led to the constitutional provision authorizing the levy of a tax for school purposes. New Braunfels has the distinction of being the cradle

of the beneficent educational system of Texas, and has one of the most beautiful and modern school buildings in Texas. The industrial establishments include a large cotton oil factory, two large modern flour mills, the largest hydrated lime factory in the South, three rock crushers, a large collar factory, a whip factory and two large tanneries. New Braunfels has two newspapers, the *New Braunfels Herald*, published in the English language, and the *New Braunfelser Zeitung*, published in the German language; the *New Braunfelser Zeitung* being established in the year 1852 under the editorship of Ferd. Lindheimer, a noted botanist, who devoted a great portion of his life to the study and classification of the plant life of Texas.

New Braunfels was laid out by a colony of German immigrants, who reached New Braunfels in 1845 under the leadership of Prince Solms-Braunfels, under circumstances of considerable hardships, dangers and sufferings. They had to plow their small patches of ground with a gun hanging on the handle of the plow and guard their stock at all times against depredations by the Indians and Mexican bandits. Pop. about 4,000, of which 3,500 are of German descent, nearly all descendants of the old settlers, and 100 Americans, about 100 negroes and the balance Mexicans.

NEW BRIGHTON, brí'tón, Pa., borough, in Beaver County, on the east bank of Beaver River, two miles from its junction with the Ohio and on branches of the Pennsylvania and the Pittsburgh and Lake Erie railroads, 28 miles northwest of Pittsburgh. It was settled in 1799 by the laborers employed to build Wolf's mill,—a flouring mill, laid out in 1818 and incorporated as a borough in 1838. Coal-fields and fire-clay beds are in the vicinity. It is in a section of the State in which manufacturing and industries connected with coal are prominent. The good water power furnished by Beaver River is utilized in a number of manufactories, chief of which are potteries, coffee mills, flour mills, wire, wall-paper, glass, rivet and nail factories, brick and sewer pipe works, twine factory, iron enameled bath-tub works, fire-engine, keg and brass casting works. There are several churches and public and parish schools. It has the Beaver Valley General Hospital, a public art gallery, a fine government building and library and a park. The banks have a combined capital of over \$1,150,000. The government is vested in a burgess and a council of 12 members. About three-fourths of the population are native-born Americans. Pop. (1920) 9,361.

NEW BRIGHTON. See RICHMOND, BOROUGHS OF.

NEW BRITAIN, brít'n, Conn., city, in Hartford County, on the New York, New Haven and Hartford Railroad, about 11 miles southwest of Hartford. It was settled in 1687 and remained a part of Berlin until 1850 when it was incorporated as a town. In 1871 it was granted a city charter. It is in an agricultural region, but is noted for its extensive manufacturing interests. The chief manufactures are stamped ware, hardware, foundry and machine-shop products, knit goods, hosiery and cutlery. The trade is chiefly in the manufactured goods, but it is a distributing centre for

quite a number of the nearby villages. It has a park, area about 234 acres, well-kept streets and a large number of fine church buildings. It is the seat of a State Normal School and the New Britain Institute. It has a school system second to none in a city of its size. In addition to a high school and grade schools it has a pre-vocational grammar and a vocational high school. The revised city charter of 1896 provides for a mayor, who holds office two years, and a council. Some of the administrative officials are appointed or elected by the mayor and council. The sheriff, city clerk, collector, treasurer and auditor are elected by popular vote. The city elects the school board. The city owns and operates the waterworks. Elihu Burritt (q.v.) was born in New Britain and lived here nearly all his life. Pop. (1920) 59,316.

NEW BRITAIN. See NEW POMERANIA.

NEW BRUNSWICK, Canada, a maritime province, lying mainly between the 45th and 48th degrees of north latitude and the 64th and 68th degrees of west longitude. It is bounded on the south by the Bay of Fundy, on the east by the Straits of Northumberland and Gulf of Saint Lawrence, on the north by the Bay of Chaleur and the province of Quebec, and on the west by the State of Maine. The length of the province from north to south is 230 miles and its greatest breadth 190 miles, and it has an area of 27,985 square miles (a little larger than Scotland) and a sea coast of about 600 miles.

Topographical Features.—Being a portion of the continent, it resembles in its topographical features and climate the adjoining portions of Quebec and New England. It is a rolling country of no great elevation; its loftiest hills are in the northern and northwestern sections of the province and are an extension of the Appalachian Mountains. The scenery is picturesque and varied, but a large portion of the centre of the province consists of one vast forest.

The most marked feature of the eastern highlands of New Brunswick is a ridge of hills almost continuous from Maine to the Saint John River in Queens County, and eastward through Kings County ending in Butternut ridge. This ridge rises 800 or 900 feet above the surrounding country and includes some high peaks, Prospect Mountain and Eagle Mountain near the Nerepis River, Mount Pleasant, Mount Porcupine and Red Rock Mountain in Charlotte County, and Ben Lomond in the county of Saint John. This ridge runs parallel to the coast and is cut through in many places by rivers which flow into the Bay of Fundy east of the Saint John River. There are also five parallel ridges running in an easterly direction and rising to an average of 1,000 feet with valleys between. The highest of these ridges skirts the Bay of Fundy and contains Bloomsbury Mountain and the Quaco hills. It divides into two or more ridges in Albert County, in Caledonia Mountain and Shepody Mountain, the latter being 1,050 feet high. The triangular area of sandstone of the carboniferous period presents a comparatively level surface nowhere rising above 800 feet, the general level, especially in the eastern part of the province, being below 300 feet. The highest land of the province is in the northern highlands. West of the

Saint John River, in York and Carleton counties, it rises into several peaks and ridges to a height of 800 or 900 feet, while the general level is about 500 feet. East of the Saint John River the land rises to the watershed dividing the Tobique and other tributaries of the Saint John from the rivers which flow eastward. Mountains and broken ranges cross this tract of land in all directions and reach the Saint John Valley in the vicinity of Mars hill, which is 1,688 feet in height. The highest elevation in the province is Mount Carleton (2,600 feet).

The coast line of the Bay of Fundy is rocky and bold and indented with several fine harbors, the principal ones being Saint John, Letang and Saint Andrews. On the Bay of Chaleur and Gulf of Saint Lawrence, the shore is less rugged and the harbors are not so deep.

Hydrography.—Few countries are so well watered as New Brunswick. Lakes are numerous and there are many rivers and streams, some of them of large size. The Saint John, which flows into the Bay of Fundy, is 390 miles in length and drains 21,500 square miles of territory. Some of its tributaries are upward of 100 miles in length. Other large rivers are the Miramichi (135 miles), Restigouche, Peticodiac and the Saint Croix.

Soil.—The province presents a considerable diversity of soil. At its southern boundary there is a belt about 30 miles wide along the coast of the Bay of Fundy composed of granite and crystalline rocks, which are much disturbed and thrown up into ridges. North of this belt lies a large part of Sunbury, Westmoreland, Albert and Northumberland counties and the whole of the county of Kent. The western area of this limit is in York County, west of Oromocto Lake, while its southern boundary extends to near the mouth of the Peticodiac River and the northern boundary goes as far as Bathurst. Northwest of this sandstone area the rocks are principally slate and limestone with large deposits of granite appearing in different places. These rocks are much disturbed and are thrown up at various angles forming high ridges and lofty peaks. The sandstones which occupy the middle and eastern part of the province are the newest rocks in New Brunswick. They belong to what is called by geologists the carboniferous period, because deposits of coal are found in them. The rocks lie for the most part flat, or are spread out layer upon layer on the shores and bottoms of ponds and lakes in the form of clay, sand and gravel, carried down by streams and rivers and hardened, after the lapse of ages, into solid rock.

Minerals.—New Brunswick is inferior to Nova Scotia in respect to mineral wealth, but it possesses some valuable ores and abounds in excellent stone. Gypsum, coal and oil with natural gas are successfully exploited. Coal is found in the southern portion of the province at many places and is being worked at Grand Lake and in two or three places in the county of Kent. The seams are thin, but close to the surface and easily reached. Albertite, which appears to be a form of petroleum, is found in the county of Albert, and with it other substances termed bituminous, shale and also petroleum. Wells of the latter are being operated in Westmoreland. Natural gas is sold for distribution in Moncton and Hillsborough.

Iron is found in many portions of the province and has been worked extensively in the county of Carleton; but the most important deposit is in Bathurst County. Copper ore exists in large quantities and has been worked in Westmoreland County. Deposits of nickel, antimony, galena, manganese and graphite also exist.

New Brunswick is abundantly supplied with limestone, the most valuable deposit being in the county of Saint John. Gypsum is found in large quantities and is extensively quarried in the county of Albert. There are large quarries of granite in various parts of New Brunswick, at Hamstead, in the Nerepis Valley and near Saint George in the county of Charlotte. Marble is also found in some localities. Free-stone suitable for building purposes and for the manufacture of grindstones and millstones is also found in many parts of the province. Slate is abundant, and there is clay for the manufacture of bricks in most of the counties. Mineral springs are numerous, the principal ones being in the county of Kings. Salt springs are also found in the same county, and are now being operated with profit. The value of the mineral products of the province, in 1916, is put down at \$878,446.

Climate.—The climate, except on the coast of the Bay of Fundy, is similar to that of Quebec and Maine. The winters are severe and in summer a high temperature prevails, but the climate is healthy and there are no diseases peculiar to the soil. Winter begins early in December and lasts until the end of March. The most charming season is the autumn, which lingers long. The cold weather does not become established until well on in November. The average rainfall is 30 inches and the average snowfall 88 inches. The total precipitation, rain and melted snow, averages 44 inches.

Animal Life.—There is no country in North America in which game is more abundant than it is in New Brunswick. There was a time in the history of the province when, owing to unlawful methods of catching moose, they became scarce, but in recent years, under the protection afforded by the laws enacted by the provincial government, moose are now abundant. The area of land in the interior of the province which is seldom trodden by human feet is so large that moose find there a splendid haunt, and the same is true with respect to other wild animals.

The caribou, which is a smaller animal than the moose and is allied to the reindeer of northern Europe, is also abundant in New Brunswick. Deer are so plentiful as to have become almost a nuisance, and their numbers continue to increase.

New Brunswick has a large number of fur-bearing animals, among which are the bear, the raccoon, the wolverine, the marten, the mink, the otter, the lynx, the muskrat, the woodchuck, the fisher and the squirrel. The hare is also found in great numbers all over the province. This animal turns white in winter.

Wild geese are abundant, and there are no less than six species of wild ducks besides brant. The great haunts of wild geese and of brant are on the north shore, but wild ducks are to be found on the rivers all over the province. There are two species of partridge, although the proper designation of this bird is grouse. Curlew, plover, snipe and woodcock

are also abundant and afford admirable sport. The great northern diver or loon is to be found in all the great rivers. In addition to these, there are two species of eagle, five species of hawks and four or five varieties of owls. These are but a few of the birds of New Brunswick, of which there are about 200 species in all. The government possesses a splendid collection of them, which can be seen at Fredericton.

New Brunswick is pre-eminently the land of the angler, for nearly all its great rivers abound in game fish. The salmon, the king of sporting fish, frequents all the tributaries of the Saint John below Grand Falls, such rivers as the Tobique being famed for that fish. Salmon also are found in all the rivers of the North Shore. The Nepisiguit, the Restigouche and the Miramichi have a world-wide reputation as angling rivers. All the lakes of the province swarm with trout and furnish admirable fishing in their season. There is hardly a stream in the province in which trout are not to be found, and some of the rivers, such as the Tabusintac, are widely famed for the enormous numbers of fish which have been taken in them by sportsmen. In the early summer sea trout of large size swarm in all the rivers which flow into the Gulf of Saint Lawrence. In addition to these game fish other species, which are esteemed in Europe but attract little attention on this side of the Atlantic, such as chub and perch, are very abundant. Pickerel are also to be found in many rivers as well as eels, which frequently attain a large size.

Agriculture.—The leading industry of New Brunswick is agriculture, as the greater portion of its people are farmers. The province contains much excellent land, the marshes at the head of the Bay of Fundy, the intervals of the Saint John and other large rivers, and the uplands of the northern portion of the province being very fertile. Wheat is grown successfully in many districts, but not in sufficient quantities to supply the needs of the province. The largest crops are oats, potatoes, turnips and buckwheat, all of which yield well. A great deal of attention is now being given to dairying. There are numerous cheese factories and creameries in the province which export their products to England and other countries. The government has a department of agriculture which attends to the needs of that important industry.

According to the statistics of 1916 the province had 889,220 acres under crop, of a value of \$22,924,200. The product included 242,000 bushels of wheat, 45,000 of barley, 6,039,000 of oats, 1,206,000 of buckwheat, 7,488,000 of potatoes, 3,165,000 of field roots and 850,000 tons of hay. The livestock consisted in 1917 of 65,169 horses, 100,221 milch cows, 89,456 other horned cattle, 103,877 sheep and 69,269 swine.

Lumbering.—The larger portion of the province is still covered by forests and lumbering is, after agriculture, the principal industry. This business is carried on on a large scale by operators, some of whom own the land upon which they cut their lumber, while others lumber on lands which they lease from the provincial government, which still owns upward of 10,000 square miles of forest. The principal commercial wood is the spruce, which is sawn into deals and sent to England and the United States. Pine, which formerly abounded,





is now scarce. The other forest trees of commercial value are fir, hachmatac, maple, oak, elm, birch, beech, ash, butternut, poplar and hemlock. The value of the lumber cut in 1916 was \$8,384,397, for which Great Britain is the principal market. The abundance of wood of all kinds in New Brunswick at one time made it a great shipbuilding country and the ships of the province were known all over the world. This business has been destroyed by the introduction of steel ships and steamships, and the only shipbuilding now done in the province is the construction of small vessels for the coasting trade. The forests of New Brunswick are a large source of revenue to the government, the amount received for timber licenses and stumpage being in the vicinity of \$420,000 a year.

The principal lumbering rivers of the province are the Saint John, Saint Croix, Restigouche and Miramichi and their tributaries. All the rivers of New Brunswick, of any size, contribute something to the lumbering industry.

Sea Fisheries.—New Brunswick possesses a coast line on the Bay of Fundy, Gulf of Saint Lawrence and Bay of Chaleur of upward of 600 miles, and these waters abound in fish. Although less extensive than the fisheries of Nova Scotia, those of New Brunswick are very valuable, the average product being about four and a half million dollars a year. The two greatest fishing countries are Charlotte and Gloucester, but Westmoreland, Northumberland, Kent and Saint John are also well to the front. The value of the fish caught in the province in 1916 was \$4,737,145.

Manufactures.—The great manufacturing industry of New Brunswick is the conversion of the lumber of the province into deals, boards, clapboards, shingles and similar articles. This industry employs hundreds of saw mills and gives employment to many thousands of men. The province contains four pulp mills for the making of chemical pulp, its value in 1916 was \$591,705. There are five cotton factories in New Brunswick and several iron foundries. The manufacture of nails is carried on extensively. Boots and shoes are made in a number of places, as are wrappers, paper boxes, woolen cloths, candy and soap. There are also furniture and carriage factories. The exports for the year to 31 March 1917 were valued at \$206,173,927, and the imports at \$19,993,584.

Revenue.—The revenue of the Province is mainly derived from subsidies received from the Dominion government and also from the receipts of the Crown Land Office. There is also a revenue from liquor licenses, succession duties, taxes on incorporated companies, fees of office and other sources, the whole amounting (1916) to \$1,580,419 a year. The province expends yearly about \$290,000 on education, \$346,000 on public works, \$47,000 on agriculture, \$33,000 on game protection, \$95,000 on the Provincial Hospital for Nervous Diseases, and \$73,000 on the legislature and executive government. The debt of the province, amounting to \$9,000,000, has been largely expended on subsidies to lines of railway, the construction of permanent steel bridges for the highways and similar services. No direct taxes are levied on the individual by the provincial government.

Education.—The educational system of the province is based on the theory that the property of the community should support the

schools which are free and undenominational. The number of pupils attending the schools is upward of 66,000. There is a normal school at Fredericton for the education of teachers. Besides the common schools there are superior schools and grammar schools in each county and the cities have high schools which take the pupils to the threshold of the university. The University of New Brunswick, located at Fredericton, is maintained by an endowment granted by the province, and is an efficient institution. There are also two denominational universities, Mount Allison at Sackville, maintained by the Methodists, and Saint Joseph at Memramcook, maintained by the Roman Catholics. Consolidated schools, which are formed by the conjunction of three or more school districts, have been established in several counties.

Religion.—There is no State church in New Brunswick, all denominations being on an equal footing. The largest religious body is the Roman Catholic which, at the census of 1901, numbered 144,889. The Baptists come next, numbering 82,106. The adherents of the Church of England number 42,864, Presbyterians 39,207, Methodists 34,558.

Government.—New Brunswick, as one of the provinces of the Dominion of Canada, sends 11 members to the House of Commons and is represented in the Senate by 10 members. For provincial matters there is but one legislative body of 48 members, the Upper House having been abolished in 1892. Every male resident is a voter and responsible government prevails to the fullest extent. The lieutenant-governor is appointed by the government of Canada, but all power rests in the Executive Council or Cabinet, which depends for its existence on having a majority in the legislature. Of the seven members of the Executive Council six are heads of departments. The term of the legislature is five years, but it may be dissolved at any time by the lieutenant-governor.

New Brunswick is divided into 15 counties, each of which is a municipality and is governed by a body elected by the taxpayers which is known as the municipal council and which contains representatives from each parish. Each county is divided into parishes and the parish officers are appointed by the municipal council. There are also three incorporated cities in the province and a large number of incorporated towns, almost every small town having now a municipal government of its own. Liquor prohibition is in force.

Means of Communication.—New Brunswick contains nearly 2,000 miles of railway, the principal lines being the Intercolonial, which is owned by the government of Canada, and the Canadian Pacific. Moncton is the headquarters of the Canadian government railways. The Intercolonial Railway system connects Saint John, Fredericton, Chatham and other important New Brunswick towns with Quebec and Montreal. The construction of the Intercolonial Railway was one of the terms upon which the maritime provinces agreed to enter confederation in 1867. The Canadian Pacific Railway has its Atlantic terminus at Saint John, and it connects that city as well as Fredericton, Woodstock, Saint Andrews and Saint Stephen with Moncton and the west. A large portion of the winter traffic of Canada and of the State of Minnesota passes over its road, through

New Brunswick to the port of Saint John where there are deep water wharves and elevators. Several lines of steamships run between Saint John and Great Britain during the winter. Vessels of a tonnage of 50,147 tons were owned in the province in 1916. The highway roads of the province have a total length of upward of 12,000 miles and are well kept up by the department of public works. The bridges number upward of 4,000.

Cities and Towns.—New Brunswick contains three cities and a number of towns which are rising into importance. The largest of these is Saint John (q.v.), situated at the mouth of the river of that name. It is a large shipping port and lines of steamships run from it in winter to Great Britain, carrying the produce of western Canada to European markets. It has railway connection with the west by means of the Canadian Pacific and Intercolonial railways. Saint John is also a considerable manufacturing centre. Its population is about 53,000.

Fredericton, with a population of over 7,000, situated 84 miles up the Saint John River, is the capital of the province. It is the centre of an important agricultural district and the seat of some manufacturing industries. Moncton, which has upward of 11,000 inhabitants, manufactures to a considerable extent, besides being a great railway centre.

Chatham, at the mouth of the Miramichi River, is an important port for the shipment of lumber to Europe. Among the other towns of the province that are worthy of mention are Saint Stephen, Saint Andrews, Woodstock, Edmundston, Sussex, Dorchester, Sackville, Richibucto, Shediac, Newcastle, Dalhousie, Hillsborough and Campbellton.

History.—The first European settlement in the province was made by De Monts and Champlain on Saint Croix Island, near the entrance to the Bay of Fundy in 1604. It was a part of the French Province of Acadia, and after the downfall of French power it was a part of Nova Scotia until the year 1784. Fort Latour, at the entrance of the Saint John River, was the scene of the contests between Latour and Charnisay for the mastery of Acadia and of the heroic deeds of Lady Latour. It was captured and destroyed in 1645. Fort Beausejour, at the head of Chignecto Bay, a stronghold of the French, was taken by the English in 1755. At the close of the War of the Revolution many loyalists who had taken the side of the king in the contest came to New Brunswick and a number of the Loyalist regiments were disbanded in the province where their descendants still live. After the close of the Napoleonic wars, and again after the Irish famine of 1847, large numbers of immigrants came to the province. About 100,000 of the inhabitants are of French origin, descendants of the Acadians who settled in the country in 1634. The others are of the British races, the English predominating. The population of the province in 1921 was 388,092 (over 90 per cent of Canadian birth).

JAMES HANNAY,
Author of 'New Brunswick: Its Resources and Advantages'; Revised by D. S. DOUGLAS,
Toronto.

NEW BRUNSWICK, N. J., city, county-seat of Middlesex County, on the Raritan River, the Delaware and Raritan Canal and on the Raritan River and the Pennsylvania Rail-

road, about 25 miles north by east of Trenton, 30 miles west by south of New York, and 15 miles from the mouth of the river. It was settled in 1681, and until 1697 was called "Prigmore's Swamp." The name was changed to "Inion's Ferry," and in 1714 it was again changed and called New Brunswick after the House of Brunswick. In 1730 it was granted a royal charter; in 1736 it was incorporated as a town, and in 1784 was chartered as a city. It was an active centre during the Revolutionary War, and was occupied by the British in the winter of 1776-77.

It is a manufacturing city, and has considerable trade, with good shipping facilities by land and water. The chief manufacturing products are red cross supplies, cigars, automobiles, wall paper, rubber tires and tubes, linoleum, horse-shoe calks, hosiery, music wire, cigar boxes, etc. It is the seat of Rutgers College (q.v.), the State Agricultural and Mechanical College and the Rutgers Preparatory School and Saint Agnes Academy. The Theological Seminary of the Dutch Reformed Church is connected with Rutgers. It has a new high school, built at a cost of \$175,000; nine public schools, four parochial schools and a young ladies' seminary; the Gardner A. Sage library contains about 50,000 volumes and the public library contains about 30,000 volumes; the Saint Mary's Orphan Asylum and Home for the Aged is in charge of the Sisters of Saint Francis. There are two hospitals and also a hospital for incurables. The city is governed under the commission form of government consisting of a mayor and four commissioners. It has a full paid fire department and motor-drawn apparatus. The board of education is appointed by the mayor. It has 141 acres of public parks. The city owns and operates the waterworks. Pop. 32,779.

NEW CAANAN, Conn., town in Fairfield County, on the New York, New Haven and Hartford Railroad and on Five Mile River, eight miles northeast of Stamford and six miles northwest of Norwalk. It is a beautiful residential town and a favorite summer resort for New York business men. The surface is hilly, the altitude about 400 feet, and the climate cool in summer and temperate in winter. Well-kept roads extend into the country and to the beaches on the Sound. The principal industry is the manufacture of shirts and overalls. A handsome town hall, school, public library and reading room, the Mead Memorial Park and Brooks Sanitarium are prominent municipal features. Pop. (1920) 1,918.

NEW CALEDONIA.—An island belonging to France, situated almost in the antipodes of that country between 161° and 165° E. long. and between 20° and 25° S. lat., and this geographical situation became much enhanced when the Panama Canal was opened. In fact, it is only necessary to glance at a map to realize that, placed between Australia and the Melanesian and Polynesian islands, New Caledonia is on the route from Sydney to San Francisco and Panama, passing by Fiji, Samoa, Tahiti and the Marquesas Isles on the one hand, and the route from New Zealand to Indo-China via the Solomon Isles, New Guinea, Java and Sumatra, or in other words, it is admirably placed, once it is properly developed, to become the emporium of the Pacific.

History.—The existence of New Caledonia was foreseen by Bougainville during a voyage round the world which he made in 1766 to 1769, but he did not endeavor to approach it and the honor of discovering the island fell to the famous explorer Cook in 1774, while returning from the New Hebrides which he had just explored. He approached it from the north-east at Balade, and gave it the name it still preserves on account of the resemblance of the country to certain parts of the coast of Scotland. It is practically certain that La Perouse visited New Caledonia in 1788 before being lost on the neighboring islands, but no trace has been found of his visit there. A little later in 1792-93 d'Entrecasteaux explored the island, but it was only in 1843 that the first Europeans settled there; these were the French Maristes priests which *Le Bucéphale* brought there while returning from Tahiti. Several of their number were massacred, as well as some French sailors. In order to avenge them Napoleon III caused the island to be occupied by Rear-Admiral Febvrier-Despointes in September 1853. A penitentiary colony was established by decree of 1859 and in 1864 the first batch of convicts arrived there.

From a geographical point of view, New Caledonia, which has an area of about 20,000 square kilometers (7,722 square miles), forms part of an Oceanic continent, which has sunk gradually and of which there only remain a few high summits. It has the form of a very elongated ellipse, the greater axis of which inclines about 45° to the meridian. A very irregular but continuous mountain chain stretches from one end to the other of the island, which it separates into two parts; there are fairly high mountains like Humbolt and Panie, their altitudes being about 1,650 metres (5,406 feet). From this mountain chain extend numerous buttresses which form so many valleys, in each of which more or less important water courses flow—such as the Diahot—which never dry up in the mountain regions, being fed less by the infrequent rainfall than by the moisture deposited by the clouds covering the higher parts.

By reason of its geographical situation, New Caledonia must be considered as a tropical country, though its climate is rather temperate than tropical; moreover, it is healthy and Europeans can cultivate the land without risk.

Inhabitants.—The population is estimated at about 50,000, and the male inhabitants are known as Canaques. They belong to two distinct races: Melanesians and Polynesians, who have, however, intermarried, thus creating intermediary types.

Government.—New Caledonia is governed by a resident governor at Noumea, with the assistance of a privy council of the principal heads of departments and influential inhabitants; a general council is elected to supervise. The colony has no senator nor deputy but only a delegate elected to represent it at the higher council of colonies.

Commerce.—The exports in 1913—the last normal year—amounted to 15,838,405 francs (\$3,167,681), products from the land figuring for 13,745,028 francs (\$2,749,005) in this total. If we deduct from this figure the value of guanos, 84,000 francs (\$16,800), and of ores and minerals, 8,441,428 francs (\$1,688,285), there remain 5,219,500 francs (\$1,043,900) for

the total of the other products of the country, i.e., agricultural, forestal and fisheries. Among the products of a vegetal origin, copra takes the first place and its exportation shows 2,960 tons of a value of 1,744,000 francs (\$348,800); coffee figures next with 421 tons of a value of 1,027,000 francs (\$205,400). The total cotton output gives an export figure of 269 tons of cotton seed, representing a value of 24,000 francs (\$4,800), and 163 tons of cotton valued at 250,000 francs (\$50,000).

Products, etc.—Among the cultivated plants giving aromatic essences are balm mint, whorl plant, and especially niaoubé, which is abundant and is used in the production of an oil of which the colony could export considerable quantities. In 1913 the colony exported 3,565 kilograms (7,857 pounds) of volatile oil or essences, of a value of 19,290 francs (\$3,858).

The natives cultivate especially maize, rice, manioc and numerous varieties of yams and potatoes, and particularly taro. The forests contain many varieties of wood, of which nissouli, proper to New Caledonia, is mostly exported; then come sandal wood and damara, which produces the resinous kaori gum; in 1913 26 tons of sandal wood were exported, representing a value of 14,000 francs (\$2,800), and 2,507 kilograms (5,524 pounds) of kaori of a value of 3,500 francs (\$700).

The livestock comprises about 130,000 oxen. These are good animals for butcher's meat, weighing on an average 450 to 500 kilograms (900 to 1,100 pounds). The meat is mostly canned before being exported. In 1913 it was 436 tons. Among the fish products, mother of pearl figures for 1,005 tons representing 830,665 francs (\$166,133 and sea-slugs for 23 tons valued at 23,750 francs (\$4,750).

The mineral riches of New Caledonia comprise nickel and chrome outcrops, cobalt, copper, lead, zinc, silver, gold. Antimony and mercury deposits are also said to exist in certain parts. The transformation in the colony of nickel ore into mats is now capable of commercial realization which speaks well for the future of New Caledonia.

Dependencies.—The Dependencies of New Caledonia are of little importance. The small Island of Pines, which serves as the central supply depot, is a madreperic rock. The Loyalty Islands are covered with forests. The Huon Islands are not inhabited but have been exploited for their abundant deposits of guano and quantities of tortoises which frequent the pink sand banks. In the Chesterfield Island guano and mother of pearl is sought after, or whale and tortoise fishing. The New Hebrides (q.v.) are more important. Situated between 21° and 13° south latitude they are hotter and less salubrious than New Caledonia; they comprise some 40 island divided into two groups: the Torres Isles and the Banks Isles at the north, and New Hebrides proper at the south. They cover 1,500,000 hectares (3,706,500 acres), and have a population of about 60,000 canaques and 250 Europeans.

Visited by Bougainville, Cook and La Perouse they were annexed at the same time as New Caledonia in 1853 and occupied by France in 1886. But as a result of protestations by the Presbyterian missionaries, the small garrison was withdrawn and France signed agreements with England on 16 Nov.

1887 and 26 Jan. 1888 establishing the condominium of England and France. The Anglo-French agreement of 1904 provided for the establishment of a mixed commission to settle litigation concerning real estate and a commission of February 1907 established an Anglo-French Protectorate over the islands. The principal centre is Port Vila in communication once a month with Noumea and Australia by a boat belonging to the Société des Nouvelles Hébrides. The soil is of remarkable fertility; it is quite likely even that it reserves many a surprise for mine prospecting. Finally, this archipelago possesses a considerable reserve of labor.

The Wallis and Horn island since 1844 have been placed under French protection; their exportations consist of copra, kava roots, "fan" matting, etc. These two archipelagos are only in intermittent communication with France by men-of-war which visit them every year. Consult Bernard, Augustin, 'L'Archipel de la Nouvelle Calédonie' (Paris 1895); Blanc, 'Les Îles Wallis (ib. 1912); Jeannency, A., 'La Nouvelle Calédonie agricole' (Paris 1894); Legrande, M. A., 'Au pays des Canaques' (Paris 1893); Salivis, P. A. de, 'Marins et missionnaires: Conquête de la Nouvelle Calédonie, 1843-1853' (Paris 1892).

NEW CASTILE, käs-tél', Spain, an ancient province, corresponding to the ancient Moorish kingdom of Toledo, and now forming the provinces of Madrid, Ciudad-Real, Cuenca, Guadalajara and Toledo, occupying nearly the centre of the peninsula within the basins of the Guadiana, Tagus and Júcar; it had an area of 28,010 square miles, and the population of the region in 1910 was 2,150,000. With the province of Old Castile which bounded it on the north, and is now divided into the provinces of Avila, Burgos, Logrono, Palencia, Santander, Segovia, Soria and Valladolid, area, 25,490 square miles, pop. 1,850,000. New Castile formed the kingdom of Castile which was instrumental in expelling the Moors from Spain (q.v.).

NEW CHURCH. See CHURCH OF THE NEW JERUSALEM.

NEW-CHWANG, nū-chwäng'. See NIU-CHUANG.

NEW COLLEGE, Oxford, England, was founded in 1379 by William of Wykeham, bishop of Winchester and lord-chancellor of England, as the College of Saint Mary of Winchester, the scholars to be recruited from the most promising pupils of the great public school of Winchester (q.v.). Its original establishment comprised a warden, 70 fellows and scholars, 10 chaplains, 3 clerks and 16 choristers; its modern establishment comprises a warden, 28 fellows, 2 chaplains, 39 scholars, 8 lay clerks and 18 choristers. The scholarships are divided into two classes, Winchester and open. Forty church presentations are within its gifts. The college buildings are among the finest in Oxford, and originated the style of English college architecture; the chief features are the hall, the chapel and the gardens. Among celebrities associated with the college are Vitelli, Grocyn, Archbishop Chichele, Bishops Waynflete, Lowth, Ken and Sydney Smith. Consult Rashdall and Rait, 'New College' (London 1901).

NEW COMERSTOWN, küm'ërz-town, Ohio, city, in Tuscarawas County on the Tuscarawas River, and on the Pennsylvania and the Pittsburgh, Cincinnati, Chicago and Saint Louis railroads, about 80 miles east by north of Columbus. It is in a fertile agricultural region, near bituminous and clay deposits. The chief manufactures are lumber and planing mill products, cigars, brick and dairy products. Pop. 3,389.

NEW CONNECTION METHODISTS, the first secession from the English Wesleys, dating from 1797. The New Connection comprised the followers of Alexander Kilham (hence sometimes called KILHAMITES), who, in 1795, published 'The Progress of Liberty,' a criticism of the lax church discipline of the day, and in which he contended that the members of the various societies of Methodists and not the Conference should be the source of authority in the church, and claimed lay representation equal with ministers in the Conference. In 1796 he was expelled from the Conference, three other ministers joined him in the following year, and the body soon had 5,000 adherents. It was never large in its membership, and in 1907 it joined with the United Methodists and the Bible Christians to form the United Methodist Free Church. The united church had in 1916 671 ministers, 2,727 churches and a membership of 157,852.

NEW CREEK (Keyser), Engagements at. While Gen. J. E. Johnston was at Winchester, Va., 14 June 1861, he heard that Col. Lew Wallace, with the 11th Indiana regiment, had marched from Cumberland, Md., and driven a Confederate force from Romney. Believing it to be the advance of McClellan's column from West Virginia, Johnston ordered Col. A. P. Hill, with three regiments, to march on Romney, 45 miles, west, drive out Wallace, and destroy the bridges on the Baltimore and Ohio Railroad west of Cumberland. Hill reached Romney, but Wallace had fallen back to Cumberland. At night of the 18th Hill sent Colonel Vaughn, with four companies of infantry, to destroy the bridge of the Baltimore and Ohio Railroad over New Creek, guarded by about 200 local militia and two guns. Vaughn crossed the north branch of the Potomac, beyond which the Union troops had taken position, and put them to flight, captured the two guns and a set of colors, burned the bridge over the mouth of New Creek, and then pushed on to Piedmont, five miles westward, destroyed parts of the railroad and cut the telegraph wires, and then returned to Winchester. Later the position at New Creek was fortified and garrisoned to protect the railroad bridge. On 4 Aug. 1864 it was held by Col. Robert Stevenson of the 154th regiment Ohio National Guard with his regiment, small detachments of three other regiments, and eight guns, in all about 1,500 men. During the day Stevenson was attacked by Gen. John McCausland, who, returning from his raid on Chambersburg, had approached by way of Romney. After a severe fight of several hours McCausland withdrew toward Moorefield, leaving several dead and severely wounded on the field. The Union loss was 8 killed, 29 wounded and missing. On 27 Nov. 1864 New Creek was held by Colonel Latham, 5th West Virginia Cavalry, with about

700 dismounted cavalry, four heavy guns and three field pieces. On the morning of the 27th General Rosser with two brigades of cavalry, his own and Payne's, crossed Great North Mountain into Hardy County, surprised and captured Latham's pickets, charged over his works and captured his artillery and most of his command with but slight resistance. The prisoners taken numbered about 500, and with them their arms and some colors. Four of the seven guns, being heavy pieces, were spiked and left, the carriages being burned. All the government buildings, containing a large amount of ordnance, quartermaster and commissary stores and 200 wagons, were burned, and Rosser marched away with his prisoners, three guns, about 250 horses, also several hundred head of cattle and a large number of sheep collected from the farms of Hardy and Hampshire counties.

NEW CUMBERLAND, W. Va., town, county-seat of Hancock County, on the Ohio River, and the Pittsburgh, Cincinnati, Chicago and Saint Louis Railroad, about 35 miles north of Wheeling. In the vicinity are coal mines and valuable clay beds. The chief manufactures are sewer pipe, tile, a semi-porcelain pottery, fire and paving brick, foundry products and machinery. It has large mills where the fire clay, for use in the iron works, is pulverized. It has an extensive trade in coal and clay products. Pop. 1,816.

NEW DECATUR, de-kā'tér, Ala., city, in Morgan County, near the Tennessee River. and on the Louisville and Nashville Railroad, about two miles south of Decatur and 85 miles north by west of Birmingham. The first settlement was made in 1887, and in 1889 it was incorporated. It is an agricultural, lumbering and manufacturing section of the State. Its industrial interests are connected with the manufacturing and shipping of iron products, lumbering and farm products. It has a good trade in wool. It is governed by a mayor and council under a revised charter dating from 1899. Pop. (1920) 4,228.

NEW ENGLAND, a collective term applied to the northeastern portion of the United States, comprising the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut. It extends from lat. 41° to 48° N., and from lon. 67° to 74° W., with an aggregate area of 67,384 square miles and a population at present of about 7,000,000. It has a coast line of about 700 miles, without allowing for the smaller inlets, and constitutes a large part of the great peninsula which, including Nova Scotia, New Brunswick and parts of Lower Canada, is formed by the Atlantic Ocean, the Saint Lawrence, and the connected waters of Lakes Champlain and George and the river Hudson. It was originally granted for colonization by James I in 1606 to the Plymouth Company under the name of North Virginia, and received its present name from Capt. John Smith, who in 1614 explored and made a map of the coast. For the details of the geography and history of New England, consult the States respectively of which it is composed, and also the United States. Consult Palfrey, 'History of New England.'

NEW ENGLAND, A Compendious History of, by John Gorham Palfrey (q.v.). It

covers the time from the first discovery of New England by Europeans down to the first general congress of the Anglo-American colonies in 1765, with a supplementary chapter giving a summary of the events of the last 10 years of colonial dependence, and was published 1865-73.

NEW ENGLAND EMIGRANT COMPANY, The, in *American history*, a corporation organized at Boston in 1855 to control emigration to the Territory of Kansas in the interest of the anti-slavery party. The Emigrant Company aided largely in making Kansas a free State.

NEW ENGLAND HISTORIC AND GENEALOGICAL SOCIETY, The, an association organized in Boston, Mass., in 1845 for historical research and the preserving of early New England records. Meetings are held every month and the membership is about 1,000. A quarterly magazine, *The New England Historical and Genealogical Register*, was begun in 1847 and the Society also publishes the *Bibliopolist* for circulation among its members. It issues also 'Vital Records of Massachusetts Towns' ending at 1850. The library of the Society contains 40,000 volumes, and in addition many pamphlets, relics, manuscripts and curios. The Society has a valuable collection of old prints and paintings.

NEW ENGLAND ORDER OF PROTECTION, an American fraternal and beneficial society organized in 1887 by members of the Knights and Ladies of Honor who sought an independent authority for New England. The central lodge is located in Boston. Membership is confined to New Englanders. In 1917 it had six grand lodges, over 350 sub-lodges and 49,350 members. In 1917 it disbursed \$1,114,110 in benefits, and \$15,038,706 since its organization.

NEW ENGLAND PRIMER, a famous educational work, compiled by one Benjamin Harris, an English versifier and printer, who established a nondescript shop in Boston during the reign of James II. He first published 'The Protestant Tutor,' and before 1690 the 'New England Primer' as an abridgment of the earlier work. It is thought that in the 18th century about 2,000,000 copies were sold, yet of these less than 50 are known to be extant. These surviving copies represent about 40 editions. Only a small portion of the supposed 1st edition is in existence, this so-called 'Bradford Fragment' having been discovered as waste in the binding of a later work. The contents of the 'Primer' was variously altered in accommodation to religious and political changes. The alphabet rimes, with wood-cuts crude as themselves, are probably the best-known feature. One of the most curious of these illustrations shows Job literally covered with spots. The shorter Westminster Catechism is also included. P. L. Ford (q.v.) did much to clear up the subject of the 'Primer' by his historical bibliographical study, 'The New England Primer: A History of its Origin and Development, with a Reprint of the Unique Copy of the Earliest Known Edition' (New York 1897). A reprint was issued (Albany 1899).

NEW ENGLAND SHILLING, the name given to the first American colonial coins issued

in 1652. They were of the value of "12d, 6d and 3d peeces," stamped N E on the face and XII, VI or III on the reverse to denote the value. See NUMISMATICS.

NEW ENGLAND THEOLOGY, a Calvinistic school of theology, originated in New England by Jonathan Edwards (see EDWARDS, JONATHAN). This school was controversially opposed to Arminianism (q.v.), and later to Unitarianism (q.v.). A new element was introduced into the theological atmosphere of New England by the preaching of Universalism (q.v.) by John Murray 1770. The controversies of the early 19th century resulted in the crystallization of New England Theology into a complete system, comprising the tenets, that sin is voluntary; that depravity is inherited from Adam; that repentance or turning to God can only result from preventing grace; that man has complete freedom of will; that holiness consists in unselfish love; that certain persons are predestined to receive the grace of God which leads to repentance. Modern philosophy and criticism have dissolved the dogmatism of this theology which is no longer taught in an unmodified form in Congregational seminaries. Consult Boardman, E. N., 'New England Theology' (New York 1899); Foster, F. H., 'A Genetic History of the New England Theology' (Chicago 1907); Walker, W., 'History of the Congregational Churches in the United States' (New York 1894).

NEW ESSAYS: OBSERVATIONS, DIVINE AND MORAL, collected out of the Holy Scriptures, Ancient and Modern Writers, both Divine and Human: as also out of the Great Volume of Men's Manners: tending to the furtherance of Knowledge and Virtue. By John Robinson (q.v.). (1624). A volume of 62 essays, on the plan of Bacon's, but at greater length, and in ethical, religious and human interest more like Emerson's 'Essays' in our own time: the work of an English clergyman and scholar, in exile at Leyden in Holland, under whose ministry and through whose counsel the Pilgrim Fathers developed religious liberalism and executed the earliest planting of New England.

NEW FOREST, England, a public pleasure ground covering most of the southwest of Hampshire. It measures 14 by 16 miles, and has an area of 144 square miles. Its name dates from 1079, when William the Conqueror made a "mickle deer-frith," in so doing destroying several hamlets. This afforestation, enforced by the savage "Forest Laws," was regarded as an act of the greatest cruelty, and the violent deaths in the forest of his sons Richard and William Rufus were looked upon as special judgments. Oak and beech are the principal trees; the deer were removed in 1851. The forest is under the supervision of the Court of Verderers since 1877; it gives its name to a county parliamentary division. There are several villages within its limits, Lyndhurst being the forest 'capital'. Consult Cornish, C. J., 'The New Forest' (1905).

NEW FRANCE, Company of, or of the Hundred Associates. Founded by Cardinal Richelieu in 1627 for the colonization of Canada and the conversion of the Indians to the Christian faith. The company was granted

feudal powers over the fort and town of Quebec, and the whole of New France, extending, according to the charter, from Florida to the Arctic Circle, and from Newfoundland on the east to the great freshwater sea on the west; and was also given a monopoly of trade. Huguenots were to be rigidly excluded. Neither as a colonizing nor as a religious enterprise did the company fulfil its obligations, the exploitation of the fur trade being its main concern. In 1645 it transferred its trading monopoly to a local corporation, the Compagnie des Habitans, and in 1663 its charter was withdrawn and the Crown resumed control over the colony.

NEW FRANCE, or **LA NOUVELLE FRANCE**, lä noo-věll fräns, the original name given to Canada (q.v.) by the earliest settlers, who were Frenchmen.

NEW GLASGOW, gläs'gō or -kō, Canada, town of Pictou County, Nova Scotia, on the East River, near its entrance into Pictou Harbor, and on the Intercolonial Railway, 104 miles northeast of Halifax, eight miles south of Pictou, on the Northumberland Strait. In the vicinity are rich deposits of coal and iron, which contribute to make it an important centre for the manufacture of iron and steel, and it is the headquarters of the Nova Scotia Steel and Coal Company, which has 6,000 persons on its payrolls. It has shipbuilding yards, foundries, machine shops, tanneries, glass and pottery works, and a considerable trade in coal, iron ore and manufactured articles. Pop. 9,000.

NEW GRANADA, gra-nä'da, the name by which the republic now called Colombia (q.v.) was known for many years after its settlement by people from Granada, Spain.

NEW GUINEA, gin'ī, or **PAPUA**, pāp'-oo-ā or pā'poo-ā, Australasia, a large island of the Melanesian region, the western and larger portion of which belongs to the Netherlands, while the eastern portion is divided into northern and southern sections, of which the former belonged to Germany until the European War, when it was placed under the administration of Australia by the Peace Treaty of 7 May 1919. The southern section belongs to Great Britain. The island, which after Australia and Greenland ranks third among the largest islands of the world, lies on the southwestern side of the Pacific Ocean, between lat. 0° 19' and 10° 42' S. and long. 130° 57' and 150° 52' E. Its length is about 1,490 miles; maximum breadth, 410 miles; estimated area, over 234,768 square miles. It is separated from Australia (Queensland) on the south by Torres Strait, from the northern territory of South Australia by the Arafura Sea, and from the Moluccas on the west by Gilolo Passage. The island has a somewhat irregular form, but it may be described as consisting of a broad central portion from which proceed two narrower peninsulas, one in the northwest and the other in the southeast. The coasts are mostly lofty, but in the neighborhood of Torres Strait and to the west the shore presents the appearance of a marshy flat, covered with dense forests. The outline is broken by many indentations, among the chief being the Gulf of Papua and M'Cluer Inlet on the southern side, and Great Geelvink Bay, Astrolabe

Bay and Huon Gulf on the northern side. Many islands, large and small, lie off the coast, chief of which are those of the Bismarck Archipelago formerly belonging to Germany off Kaiser Wilhelm Land, the northeastern section of New Guinea.

In the southeast of the island the mountain ranges rise in Mount Albert to 13,250 feet, and in Mount Victoria to 13,121 feet; and in Dutch New Guinea there are still loftier mountains, Mount Wilhelmina (15,830 feet) and Mount Carstensz (15,694 feet). The chief rivers are the Fly, in British territory, with its tributary, the Strickland; the Kaiserin Augusta, in the former German territory; and the Amberno, in Dutch territory, with a large delta. New Guinea has few indigenous mammals, and all these, with the exception of a species of pig and some mice, are marsupials and monotremes. It abounds in birds, among which are immense flocks of parrots, pigeons and kingfishers, and the celebrated birds of paradise. There are also several remarkable species of bower-birds, belonging to the genus *Amblyornis*. The forests abound in enormous trees, including the camphor-tree; and bananas, coconuts, sago, sugarcanes, rice, maize and yams are cultivated by the natives. On the west coast there are numerous Malay settlements, but the bulk of the inhabitants is composed of Papuans, a race resembling the negroes of Guinea. They are divided into numerous tribes chiefly in a neolithic stage of civilization, some of whom are of a friendly disposition, while others are fierce and untractable, cannibals and head hunters, but gradually improving under Europeanizing and missionary influence.

The discovery of New Guinea is said to have been made by Abreu in 1511, but the first navigator who is known to have visited the island was another Portuguese, Jorge de Meneses, who touched on it in 1526. The present name was given to the island by the Spaniard Ynigo Ortiz de Retes, who sailed along its north coast in 1546. From the beginning of the 17th century much exploring work was done by the Dutch, especially along the west and south coasts of what is now Dutch New Guinea. Dampier in 1700 added to our knowledge of the south coast, and discovered Dampier Strait. In 1827 the Dutch formed a settlement at Triton Bay, but they soon abandoned it. The southeast coast was surveyed between 1845 and 1850 by Capt. Owen Stanley, and 1873 Captain Moresby ascertained the exact form of the southeastern extremity. The naturalists were the first to make incursions into its interior, and among these Dr. A. R. Wallace, who visited it in 1858, was the pioneer. The missionaries came next, and mission stations formed by Germans are maintained on the northeast coast and by the London Missionary Society at various points on the southeast coast. Germany and the Australian colonies also began to take an interest in New Guinea, and the latter urged the British government to annex the east part of the island, the west portion having long been recognized as Dutch. The delimitation and division of the island between Great Britain, Germany and Holland was settled in 1885. That part of the island lying west of the 141st meridian was assigned to Holland, and comprises 151,789 square miles; the north part of the rest of the island was assigned to Germany, and the south to Great

Britain. The German territory, called Kaiser Wilhelm's Land, contains about 70,000 square miles; the English territory, 90,540 square miles. The German territory was occupied by Australian troops in October 1914.

The government of the British portion, known as the territory of Papua, is in the hands of an administrator, appointed by the Crown, assisted by an executive and a legislative council, and has since 1905 been under the government of the Australian Commonwealth. Land cannot be purchased except from the administrator. The deportation of the natives is forbidden, as is also the sale to them of firearms, intoxicating spirits or opium. The official centre is Port Moresby. The islands of Torres Strait, which are the seat of a valuable pearl-shell and trepang fishery, and which practically command the strait, have all been annexed to Queensland. A German chartered company whose object is to develop the resources of the country has stations in German New Guinea, where also the sale of firearms, gunpowder and spirits is forbidden. The Dutch have done little or nothing for their portion of the island. The population of the Dutch portion is estimated at 200,000; of the German, 530,000; of the British, 280,000. Consult Bevan, 'Toil, Travel and Discovery in British New Guinea' (1890); Chalmers, 'Pioneer Life and Work in New Guinea' (1895); Krieger, 'New Guinea' (1899); MacGregor, 'British New Guinea' (1897); Murray, 'Papua, or British New Guinea' (1912); Newton, 'In Far New Guinea' (1914); Webster, 'Through New Guinea' (1889); Seligmann, 'The Melanesians of British New Guinea' (1910); Williamson, 'The Ways of the South Sea Savage' (1914).

NEW HAMPSHIRE, one of the original States of the Union, located in the northeastern or New England division of the United States of America. Its name first was applied to a part of its territory in a grant from the Plymouth Company to Capt. John Mason of Hampshire, England, in 1629. From its abundant granite it is locally and popularly called the "Granite State."

Boundaries and Area.—New Hampshire lies between 70° 37' and 72° 37' W. from Greenwich and between 42° 40' and 45° 18' N. lat. Its general outline is that of a scalene, almost a right-angled triangle, the right angle being at the southeast corner, with an east and west base—the southern boundary—of approximately 95 miles, a north and south perpendicular of 180 miles to its acute angle and a hypotenuse of 190 miles. The State is bounded on the north by the province of Quebec, on the east by the State of Maine, on the southeast by the Atlantic Ocean and Essex County, Mass., on the south by the State of Massachusetts and on the west by the State of Vermont, the divisional line being the west bank of the Connecticut River, and by the province of Quebec. The area of the State is 9,341 square miles, of which 9,031 square miles are land surface and 310 square miles are water.

Physiography.—The surface of the State is in general rugged and picturesque. It presents in close proximity the diversified features of high, rocky and steep mountains, long ranges of hills, large forests, fertile valleys,

numerous lakes and rivers, with a strip of sea-coast 18 miles in length. Topographically the State is divided by a mountainous ridge six or seven miles east of the Connecticut River and nearly parallel to its course whose crest separates the Connecticut and the Merrimac River basins, and by the White Mountains into four nearly equal parts, each of which has distinctive features. The southeastern division which is the largest lies south of the White Mountains and east of the crest of the mountainous ridge between the Connecticut and Merrimac River basins. It also is the lowest of these divisions, three-fourths of its area away from the foothills on its northern and western borders scarcely exceeding 500 feet above sea-level. Though it has many hills and much of its soil is sandy, it has a considerable tract of fertile land and is underlaid by gneissic or granitic rocks. Within its borders are nine of the 11 cities of the State and the largest number of its manufacturing centres. The southwestern division lies south of the White Mountains and west of the crest of the mountainous ridge which separates the Connecticut and Merrimac River basins. The width of this division varies from five miles near Orford on the north to 30 miles near New Ipswich on the south, and is traversed by numerous ranges of hills and fertile valleys. Near the divisional line between the Connecticut and Merrimac River basins are three isolated peaks of hard rock called monadnocks, which geologically resemble those in the White Mountain division, two of them northwest of the central part of the State and the other near its southern border, Cardigan, 3,100 feet; Kearsarge, 3,310 feet, and Monadnock, 3,186 feet above sea-level. The north-central division is entirely covered by the ranges and valleys of the White, Franconia and Sandwich Mountains, which together form one system of mountains. This division which contains very little cultivable soil extends from the Connecticut River to the Maine boundary and from Squam Lake on the south approximately 33 miles to the transverse valleys of the Androscoggin and Upper Ammonoosuc and Johns rivers on the north. It has an area of 1,270 square miles and presents the most unique physical features of the State in the White Mountains which contain the culminating elevation of the northeastern spur of the Appalachian or Atlantic Coast system of mountains. Mount Washington, 6,293 feet, the highest of the White Mountains, is the loftiest peak in the United States northeast of the Potomac River. The heights of the other neighboring mountains are Mount Adams, 5,805 feet; Jefferson, 5,725 feet; Clay, 5,554 feet; Monroe, 5,390 feet; Madison, 5,380 feet; Lafayette, 5,269 feet; Moosilauke, 4,810 feet. Geologically these mountains belong to the older or crystalline belt of the Appalachian system and have the form of a group of monadnocks or isolated remnants of hard rock, gneiss or granite, which have withstood through a long geological period the erosion which has worn down the schists and other foliated strata which originally surrounded them into bordering hills and the southeastern peneplain. The diversified and beautiful scenery of this region annually attracts tourists from all parts of the country and has given it the name of the "Switzerland

of America." The northern division lies north of the White Mountain district or the transverse valleys of the Androscoggin and Upper Ammonoosuc and Johns River valleys and is nearly coterminous with the northern county (Coos) of the State. Its surface is broken by undulating ridges and numerous rugged mountains whose altitude exceeds 2,000 feet above sea-level. A large part of it is covered with forests, but it contains along its valleys many tracts of great fertility.

River Systems.—There are five distinct water-shed areas drained by the Connecticut, Merrimac, Androscoggin, Saco and Piscataqua rivers and their numerous tributaries. These streams contribute materially to the economic resources of the State through their abundant water power and to the fertility of their valleys.

Lakes.—The lakes of this State are numerous. The largest, Winnepesaukee, situated in Belknap and Carroll counties, has an area of 71.75 square miles, exclusive of islands, of which it has 264. Other important lakes in order of size are Umbagog, 15.80 square miles; Squam, 11.75 square miles, and Sunapee, 9.22 square miles.

Climate.—By reason of latitude, ocean proximity, high mountains and narrow valleys the climatic conditions of the State present great variety. In general the climate is rigorous, the snow covering the ground for four or sometimes five months of the year. The mean average temperature of the northern portion for the year is 41°; for the winter, 17°; for the summer, 65°; of the southern part the mean average for the year is 45°; for the winter 23°; for the summer, 66.5°.

Precipitation.—The average precipitation is nearly 40 inches per year, quite evenly distributed both as to area and period.

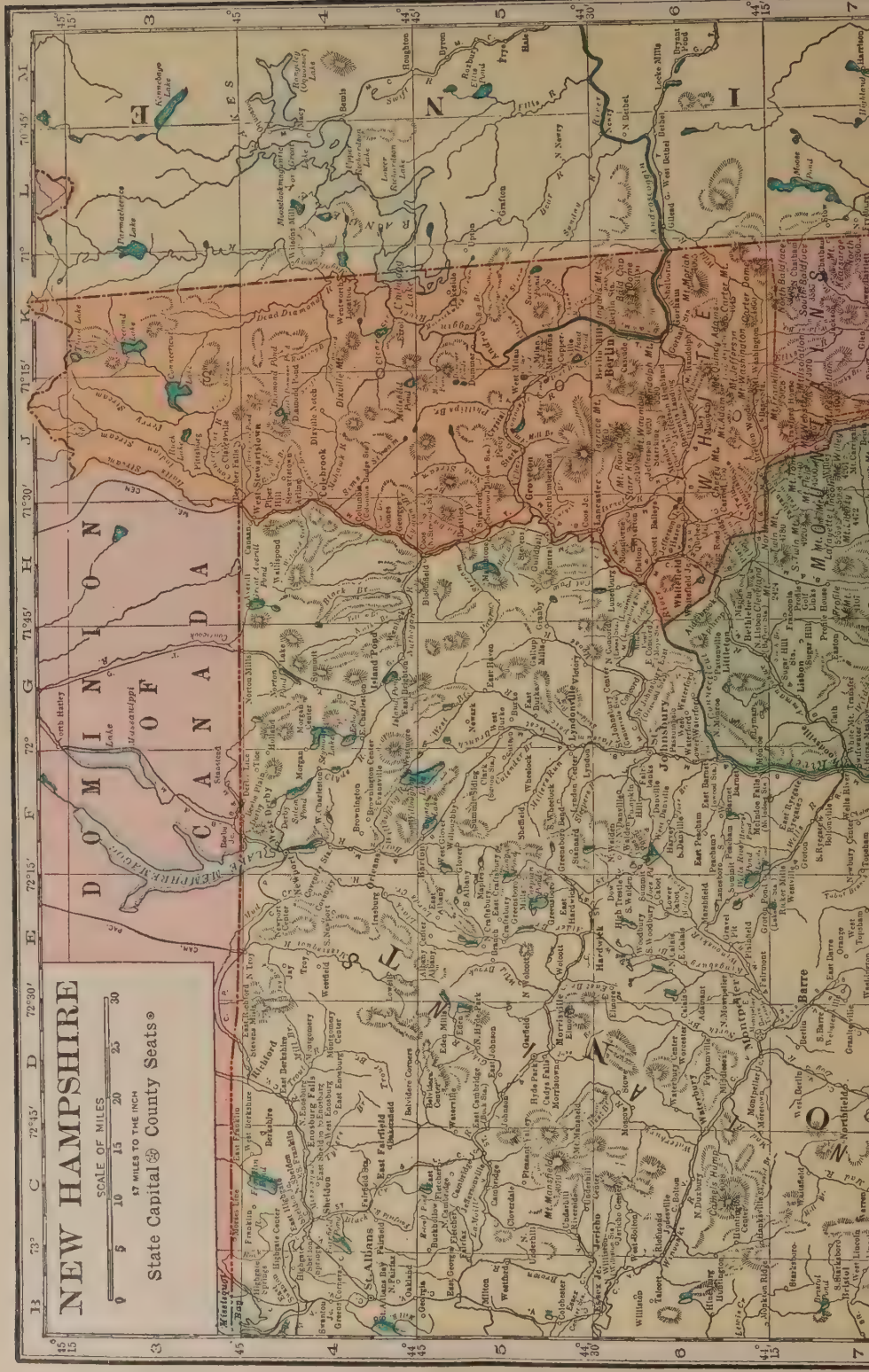
Soil.—The mountainous portions of the State are exceedingly rocky and have a thin gravelly soil. The less elevated regions are generally well watered and fertile, affording much excellent land for grazing and tillage. The productiveness of the soil is well above the average yield of the United States.

Population.—The original white settlers in different parts of New Hampshire between 1623 and 1776 with few exceptions were English folk who came directly from England or from the neighboring colonies of Massachusetts and Connecticut or Scotch-Irish folk from the north of Ireland. The total population probably did not exceed, in 1641, 1,000, and in 1771 70,000. According to the first census of the United States in 1790 the population of the State was 141,885. The most rapid increase of the population was during the next six decades. During the 60 years from 1790 to 1850 the absolute increase in population was 176,091 or 124.1 per cent, while during the 60 years since 1850 the increase was 112,596 or 35.4 per cent. In the last of these decades, 1900–1910, the increase of population was 18,984 or 4.6 per cent. By the 14th census in 1920 the population was 443,083, the average number of persons to the square mile being 48.9 per cent, making the State rank 19th among the States of the Union in the density of its population. The urban population in 1910 including that of all incorporated places of 2,500 inhabitants or more was 255,099

NEW HAMPSHIRE

Acworth, (E11)...	436	Center Barnstead, (J10).....	500	Durham, (L11)....	749	Franklin, (H10)....	6,318	Hinsdale, (E12)...	1,773
Albany, (J8).....	170	Center Conway, (K8) 200		E. Alstead, (L11)...	125	Freedom, (K8)....	467	Holderness, (H9)....	602
Alexandria, (G9)....	502	Center Eppingham, (K9).....	100	E. Andover, (G10)...	350	Fremont, (K11)....	519	Hollis, (J13).....	775
Allenstown, (J11)...	1,213	Center Harbor, (J9) ■422		E. Barrington, (K11) 550		Georges Mills, (F10) 200		Hooksett, (H11)...	828
Alstead, (E11).....	672	Center Sandwich, (H8)350		E. Candia, (J11)....	450	Gerrish, (H10)....	100	Hopkinton, (H11)...	438
Alstead Center, (E11)100		Center Strafford, (K10).....	250	E. Canterbury, (J10) 100		Gilford, (J9).....	738	Hudson, (J12).....	954
Alton, (J10).....	1,221	Center Tuftonboro, (K9).....	180	E. Concord, (J11)...	500	Gilmanton, (J10)...	814	Hudson Center, (J12) 270	
Alton Bay, (J10)....	300	Charlestown, (E11)■1,505		E. Conway, (K8)....	100	Gilman Iron Works, (J10).....	500	Intervale, (K7).....	200
Amherst, (H12).....	868	Chatham, (K7).....	229	E. Deering, (G11)...	190	Gilsun, (E11).....	439	Jackson, (K7).....	533
Andover, (G10).....	1,121	Chesham, (F12).....	110	E. Derry, (J12)....	590	Glen, (K7).....	150	Jaffrey, (F12).....	2,303
Antrim, (G11).....	1,052	Chester, (J12).....	652	E. Grafton, (G9)....	280	Goff Falls, (J12)...	200	Jefferson, (J6)....	960
Apthorp, (G6).....	100	Chesterfield, (E12)...	601	E. Hampstead, (K12) 240		Goffstown, (H11)...	2,391	Jefferson Highland, (J6).....	150
Ashland, (H9).....	1,325	Chichester, (E12)...	507	E. Haverhill, (G7)...	100	Gonic, (L10).....	460	Kearsarge, (K7)....	130
Ashuelot, (E12)....	380	Chocoma, (K8).....	100	E. Jaffrey, (F12)....	1,700	Gorham, (K6).....	2,744	Keene, (E12).....	11,210
Atkinson, (K12)....	413	Claremont, (E10) ■9,524		E. Kingston, (L12)...	384	Goshen, (F10)....	283	Kensington, (L12)...	383
Atkinson Depot, (K12)100		Claremont Jc., (E10) 100		E. Lempsster, (F11)...	150	Gossville, (J11)...	260	Kingston, (K12)...	859
Auburn, (J11).....	652	Clarksville, (J3).....	410	Easton, (G7).....	131	Grafton, (G9).....	554	Laconia, (J9).....	10,897
Barnstead, (J10)...	873	Colebrook, (J4).....	1,811	E. Pembroke, (J11)...	100	Grafton Center, (F9) 100		Lakeport, (J9)....	1,150
Barrington, (K11)...	616	Columbia, (H4).....	601	E. Rindge, (G12)....	135	Graham, (F10)....	495	Lancaster, (F6)....	2,819
Bartlett, (J7).....	1,059	CONCORD, (H11).....	22,167	E. Rochester, (L10)1,200		Grasmere, (H11)...	400	Landaff, (C7)....	510
Bath, (G7).....	838	Contoocook, (H11) . 940		E. Sullivan, (F12)...	200	Greenfield, (G12)...	417	Langdon, (E11)...	279
Bedford, (H12)....	1,118	Conway, (K8).....	3,102	E. Swanzy, (F12)...	300	Greenland, (L11)...	394	Leavitts Hill, (J11) 100	
Belmont, (J10)....	1,194	Cornish, (E10).....	844	E. Wakefield, (K9)...	150	Greenland Depot, (L11).....	100	Lebanon, (E9)....	6,162
Bennington, (G11)...	568	Cornish Flat, (E10) . 450		E. Washington, (F11)100		Greenville, (G12)...	1,346	Lee, (L11).....	475
Benton, (G7).....	177	Crawford House, (J7) 130		E. Weare, (H11)....	340	Groton, (C9).....	199	Lempster, (I11)...	287
Berlin, (K6).....	16,104	Croydon, (F10)....	100	E. Wolfboro, (K9)...	150	Groveton, (J5)....	1,900	Lincoln, (H7)....	1,473
Berlin Mills, (K6)...	700	Crystal, (J5).....	100	Eaton Center, (K8).....	237	Guild, (F10)....	100	Lisbon, (G7).....	2,288
Bethlehem, (H6)...	866	Dalton, (H6).....	460	Eppingham, (K9)....	393	Hampstead, (K12)...	670	Little Boarshead, (M12).....	100
Boscawen, (H10)...	1,260	Danbury, (G9).....	516	Eppingham Falls, (K8) 150		Hampton, (L12)...	1,251	Littleton, (C6)...	2,308
Bow, (H11).....	568	Danville, (K12)....	463	Elkins, (G10).....	170	Hampton Beach, (I12).....	420	Livermore, (J7)...	98
Bow Mills, (H11)...	300	Deerfield, (K11)...	746	Ellsworth, (G8)....	30	Hampton Falls, (L12).....	483	Lochmere, (H10)...	150
Bradford, (F10)....	580	Deerfield Center, (K11)350		Elmwood, (G12)....	100	Hancock, (F12)....	531	Londonderry, (J12).....	1,303
Brentwood, (K12)...	685	Deering, (G11)....	287	Enfield, (F9).....	1,577	Hanover, (E9)....	1,551	Long Island, (J9)...	150
Bridgewater, (H9)...	199	Derry, (J12).....	5,382	Enfield Center, (F9) 400		Harrisville, (F12)...	559	Loudon, (J10)....	690
Bristol, (G9).....	1,428	Dorchester, (F9)...	228	Epping, (K11)....	1,276	Haverhill, (F7)...	3,406	Lyman, (C6).....	310
Brookfield, (K9)...	186	Dover, (L11)....	13,029	Epsom, (J11).....	655	Hebron, (G9).....	184	Lyme, (F8).....	891
Brookline, (H13)...	546	Dover Point, (L11) .. 800		Errol, (K4).....	241	Henniker, (G11)...	1,344	Lyme Center, (F8)...	150
Campton, (H8).....	1,028	Drewsville, (E11)...	125	Etna, (F9).....	150	Hill, (H9).....	500	Lyndeboro, (H12)...	428
Canaan, (G9).....	1,236	Dublin, (F12).....	408	Exeter, (L12).....	4,604	Hillsboro, (G11)...	2,229	Madbury, (L11)...	326
Canaan Center, (F9) . 150		Dummer, (J5).....	266	Fabyan House, (H7) . 250		Hillsboro Lower Village, (G11)....	400	Madison, (K8)....	482
Canaan Street, (G9) . 150		Dunbarton, (H11)...	405	Farmington, (K10)2,461		Hillsboro Upper Village, (F11)...	100	Manchester, (J11) 78,284	
Candia, (J11).....	780			Fitzwilliam, (F12) .. 962				Marlboro, (F12)...	1,380
Candia Village, (J11) 150				Fitzwilliam Depot, (F12).....	500			Marlboro Depot, (F12)300	
Candob Lake, (K12) .100				Francestown, (G12) ■385					
Canterbury, (H10)...	655			Franconia, (H7)....	440				
Carroll, (H6).....	388								

■ = Population of Township



NEW HAMPSHIRE

SCALE OF MILES
0 5 10 15 20 25 30

AT MILES TO THE INCH

State Capital @ County Seats @



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Hammond's 8111 Map of New Hampshire

N. Andover

Lowell

Concord

Nashua

Keene

Springfield

NEW HAMPSHIRE - Cont'd.

Marlow, (F11).....	■401	No. Lisbon, (G6)....	100	Randolph, (K6)....	■67	So. Merrimack, (H12)110	W. Andover, (G10). 180
Mascoma, (F9).....	100	No. Monroe, (G6)....	150	Raymond, (K11)....	■1,050	So. Newbury, (F10). 100	W. Brentwood, (K12)200
Mason, (G13).....	■278	No. Newport, (E10). 190		Redstone, (K7)....	100	So. Seabrook, (L12). 100	W. Campton, (H8).. 200
Meadows, (J6).....	180	No. Richmond, (F12) 100		Reeds Ferry, (J12)..	320	So. Sutton, (G10).. 120	W. Canaan, (F9).... 100
Melvin Village, (J9). 295		No. Rochester, (K10) 150		Richmond, (E12)..	■306	So. Tamworth, (J8).. 390	W. Chesterfield, (E12)260
Meredith, (H9)....	■1,680	No. Salem, (J12)....	400	Rindge, (G12).....	■643	So. Weare, (G11)... 100	W. Claremont, (E10) 500
Meredith Center, (H9).....	150	No. Sanbornnton, (H9) 430		Riverdale, (H11)....	100	So. Wolfboro, (K9).. 150	W. Concord, (H11). 900
Meriden, (F9).....	500	No. Sandwich, (J8). 100		Riverton, (H6).....	100	Spofford, (E12)....	260
Merrimack, (H12)■1,022		No. Stratford, (H5).. 425		Robys Corner, (G10) 150		Springfield, (F9)..	■349
Middleton, (K10)....	■174	No. Sutton, (G10)... 140		Rochester, (K10)....	9,673	Stark, (J5).....	■339
Milan, (K5).....	■730	Northumberland, (J5).....	■2,567	Rockingham, (L11)..	150	State Line, (F13)..	180
Milford, (H12)....	■3,783	No. Wakefield, (K9) 150		Rollinsford, (L11)..	■1,701	Stewartstown, (J4)■1,109	W. Lebanon, (E9)... 500
Mill Village, (F10).. 100		No. Walpole, (E11). 100		Rumney, (G8).....	■911	Stoddard, (F11)....	■213
Milton, (K10)....	■1,428	No. Weare, (G11)...	540	Rumney Depot, (G8)240		Strafford, (H11)....	■764
Milton Mills, (L9)... 730		Northwood, (K11)..	■891	Rye, (L11).....	■1,196	Stratford, (H5)....	■794
Monroe, (F6).....	■56	Northwood Center, (K11).....	150	Rye Beach, (M12)..	550	Stratham, (L11)....	■542
Montcalm, (F9)....	100	(K11).....	150	Rye North Beach, (M11).....	100	Sugar Hill, (G7)....	380
Mont Vernon, (H12)■318		Northwood Narrows, (J11).....	150	Salem, (K12).....	■2,318	Sullivan, (F11)....	■206
Moultonboro, (J9)..	■758	Northwood Ridge, (K11).....	150	Salem Depot, (J12). 700		Sunapee (F10)....	■898
Moultonville, (K9).. 300		(K11).....	150	Salisbury, (H10)....	■390	Suncook, (J11)....	2,000
Mountainview, (K9) 300		North Woodstock, (H7).....	700	Salisbury Hts., (H10)140		Surry, (E11).....	■200
Munsonville, (F11). 100		(H7).....	700	Salmon Falls, (I11)1,700		Sutton, (C10).....	■632
Nashua, (H12)....	28,379	Nottingham, (K11)..	■520	Sanbornnton, (H9)...	■617	Swanzy, (E12)....	■1,593
Nelson, (F12).....	■171	Orford, (F8).....	■61	Sanbornville, (K9)..	500	Swiftwater, (F7)...	100
New Boston, (H12) ■768		Orfordville, (F8)....	210	Sandown, (K12)....	■280	Tamworth, (J8)....	■945
Newbury, (F10)....	■262	Ossipee, (K9).....	■1,122	Sandwich, (J8)....	■1,175	Temple, (G12)....	■263
New Castle, (M11)..	■728	Parkhill, (E12)....	200	Seabrook, (L12)....	■1,537	The Weirs, (J9)....	550
New Durham, (K10)..	■462	Pattenville, (G6)....	100	Shelburne, (K6)....	■178	Thornton, (H8)....	■477
Newfields, (L11)..	■470	Pelham, (J13).....	■974	Short Falls, (J11)..	140	Thorntons Ferry, (H12).....	130
New Hampton, (F9)■708		Pembroke, (J11)..	■2,563	Silver Lake, (K8)....	300	Tilton, (H10).....	■2,114
Newington, (L11)..	■627	Penacook, (H10)....	■3,100	Smithtown, (L12)...	100	Troy, (F12).....	■1,444
New Ipswich, (G13)..	■869	Pequaket, (J8)....	100	Snowville, (K8)....	220	Tuftsboro, (K9)....	■611
New London, (F10) ■701		Percy, (J5).....	140	Somersworth, (L10).6,688		Twin Mountain, (H6) 260	
Newmarket, (L11)■3,181		Peterboro, (G12) ■2,615		So. Acworth, (E11). 250		Union, (K10).....	400
Newport, (F10)....	■4,109	Piermont, (F8)....	■577	So. Barnstead, (J10) 100		Unity, (F10).....	■522
Newton, (K12)....	■872	Pike, (G7).....	510	So. Barrington, (K11)100		Wakefield, (K9)....	■1,335
Newton Jc., (K12)..	180	Pittsburg, (J3)....	■887	So. Charlestown, (E11).....	100	Walpole, (E11)....	■2,553
No. Branch, (G11)..	190	Pittsfield, (J10)....	■1,914	So. Danbury, (G10). 120		Warner, (G10)....	■1,051
No. Charlestown, (E10).....	240	Plainfield, (E9)....	■853	So. Danville, (K12). 180		Warren, (G8).....	■600
No. Chichester, (J11) 360		Plaistow, (K12)....	■1,268	So. Deerfield, (J11). 100		Washington, (F11). 308	
No. Conway, (K7)1,500		Plymouth, (H9)....	■2,353	So. Eppingham, (K9). 100		Water Village, (K9). 130	
No. Danville, (K12). 150		Ponemah, (H12)....	100	So. Hampton, (K12).230		Waterville, (J8)....	■95
Northfield, (H10) ■1,522		Portsmouth, (L11)13,569		So. Kingston, (K12). 140		Weare, (G11).....	■1,173
No. Hampton, (L12)■677		Potter Place, (G10) 300		So. Lee, (K11).....	200	Webster, (G10)....	■334
No. Haverhill, (G7). 590				So. Lyndeboro, (G12)520		Wentworth, (G8)..	■507
						W. Alton, (J9).....	100

or 59.2 per cent. By 1920 the urban population had increased to 279,761, or 60.88 per cent.

Of the total population of New Hampshire in 1910, 230,231, or 53.5 per cent, were native whites of native parentage; 103,117, or 23.9 per cent, were native whites of foreign or mixed parentage; 96,558, or 22.4 per cent, were foreign-born whites; and 564, or 0.1 per cent, were negroes. Of the population in 1920, 225,512, or 50.9 per cent, were native whites of native parentage; 125,586, or 28.4 per cent, were native whites of foreign or mixed parentage; 91,233 or 20.6 per cent, were foreign-born whites, and 621 or 0.1 per cent, were negroes. Of the foreign-born population French Canadians numbered 38,277; other Canadians, 13,997; Irish, 7,908; Poles, 3,997; Russians, 3,467; Greeks, 5,280; English, 4,367; Italians, 2,074.

There are 14 cities in New Hampshire whose aggregate population in 1920 was over 236,000, or over 50 per cent of the total population. The population of each of these cities was as follows: Berlin, 16,014; Clermont, 9,524; Concord, 22,167; Derry, 5,382; Dover, 13,029; Franklin, 6,318; Keene, 11,210; Laconia, 10,897; Manchester, 78,384; Nashua, 28,379; Portsmouth, 13,569; Rochester, 9,673; Somersworth 6,588.

Agriculture.—The leading industry of New Hampshire from the time of its first settlement to the last quarter of the 19th century was agriculture, and although it now occupies a second place it is still of great importance. The soil along the seacoast and in the river valleys is fertile, while the upland farms require careful treatment to render them fairly productive. According to the census of 1910, 56.2 per cent or nearly three-fifths of the entire area was devoted to agriculture and only the northern county, which contains nearly all the White Mountain division of the State, had less than two-fifths of its land area in farms. The number of farms has fluctuated slightly from decade to decade since 1860 and in 1910 was 27,053 or 2,271 less than in 1900. These farms contained 3,249,458 acres, of which 929,185 were improved land and 2,320,273 were unimproved. Between 1900 and 1910 the acreage of improved land decreased 147,694 acres or 13.7 per cent. This significant fact denotes a readjustment of methods to meet the competition of the West. Cereals and crops requiring large areas have given place to the more intensive forms of agriculture, such as dairying, fruit-growing, poultry-raising, and in the southeastern part of the State to market gardening.

In 1910 the value of all farm property, including land, buildings, implements, machinery, domestic animals, poultry and bees was \$103,704,196, an increase since 1900 of \$17,862,100 or 20.8 per cent; the value of the land in these farms was \$44,519,047, an increase since 1900 of \$9,020,287 or 25.4 per cent. In 1910 the average size of the farms in the State was 120.1 acres, approximately one-sixth of them being from 20 to 49 acres, nearly one-half between 50 and 174 acres, while those which exceeded 500 acres had increased between 1900 and 1910 by only six or less than 1 per cent. In 1910, of the total number of farms 25,174 or 93.1 per cent were cultivated by owners and managers, and 1,879 or 6.9 per cent by tenants; 6,234 or 25.6 per cent were mortgaged.

By 1920 the number of farms in the State had dropped to 20,523, or 6,530 less than in 1910. Land in farms dropped correspondingly from

3,249,458 acres in 1910 to 2,603,806 acres in 1920. The improved acreage in 1920 was 702,902, a decrease in 10 years of 226,283 acres. The percentage of land area in farms in 1920 was 45.0, as compared with 56.2 in 1910. However, the value of all farm property increased to \$118,656,115 in 1920. The value of land alone was \$47,425,331; of implements and machinery, \$9,499,322, and of livestock, \$19,160,923. The average acreage per farm was 126.9 and the average value per acre (land alone) \$18.21. Owners operated 18,604 of the farms; managers, 546, and tenants, 1,373. Mortgaged farms numbered 5,389, and the mortgage debt was \$6,820,551. Production in 1922 in bushels was as follows: Corn, 1,032,000; barley, 28,000; oats, 684,000; buckwheat, 25,000; potatoes, 1,400,000; apples, 775,000; hay (tame) 585,000 tons. Animals on the farms 1 Jan. 1923 were: Horses, 35,000; milch cows, 126,000; other cattle, 34,000; sheep, 18,000; swine 28,000.

Manufactures.—Throughout the colonial period these were limited to the common household industries, gristmills, sawmills and a few iron forges. During the first half of the 19th century the textile and several other important industries were begun, and utilizing the abundant water power of the State, grew so rapidly that before the close of that century manufactures took the first place among the industries.

According to the census of manufactures of the United States there were in New Hampshire, in 1914, 1,736 manufacturing establishments with a total capital of \$156,748,853 whose product was valued at \$182,843,863, the value added by the processes of manufacture, the best measure of the importance of the industry, being estimated at \$67,850,428, and paying \$40,642,393 to an average number of 78,993 wage-earners, of whom 70.4 per cent were males over 16 years of age, 29 per cent were females over 16 years of age and 0.6 per cent were under 16 years of age. In 1914 and 1909 the State ranked 29th and 28th, respectively, in value of products; 20th in average number of wage-earners and 28th and 27th, respectively, in value added by manufacture. The relative importance of the four largest of these industries arranged according to the value of their products in 1914 was as follows: The three most important branches of the textile industry—cotton goods, including cotton small wares, woolen and worsted goods, and hosiery and knit goods—ranked first with a product valued at \$55,115,067 or 30.1 per cent of the total value of manufactured products for the State and gave employment to 34,529 or 43.7 per cent of the total average number of wage-earners. The boot and shoe industry ranked second, with a product valued at \$46,694,765 and showed an increase of 18.4 per cent in value of products during the five-year period 1909-14. The paper and wood-pulp industry ranked third with a product valued at \$17,708,138. The substantial growth of this industry since 1899, is explained by the forests of pulp wood, large water power and increased demand for print paper. Lumber and timber products rank fourth with a product of \$16,554,468. In 1919 the number of manufacturing establishments in the State was 1,499, capitalized at \$329,166,870, which turned out products valued at \$407,204,934, of which sum \$167,677,317 represented the value added by man-

ufacture. Wage earners employed numbered 83,074 and wages paid totaled \$79,326,341. Materials used cost \$239,527,617, and the primary power employed totaled 349,138 horsepower. The State ranked 29th in value of products, 27th in value added by manufacture and 25th in the number of wage earners employed. Again from the standpoint of relative importance, the textile industry, including cotton goods, woollens and worsteds, ranked first, the product being valued at \$131,930,000. Boots and shoes continued to be the second industry with an output valued at \$73,871,000. Paper and wood pulp was third, the product being valued at \$41,826,000. Boot and shoe cut stock and findings took fourth place with a product valued at \$22,389,000. Lumber and timber products were fifth, their value being placed at \$14,992,000. This is one of the oldest and most important manufacturing industries and has by far the largest number of establishments of any industry in the State. The decrease in value of its product from 1914 to 1919, probably was due to the fact that much of the lumber formerly used in the industry is now being made into pulp to supply the growing demand of the paper industry. Among other important industries are foundry and machine-shop products; leather, tanned, curried and finished; flour-mill and grist-mill products; tobacco and cigars; marble and stone work; textile machinery and parts; bread and other bakery products; wooden packing boxes and furniture. An Employers' Liability and Workmen's Compensation Act, 1911, provides for the protection of wage-workers engaged in manual or mechanical labor in employments classified as dangerous and ensures them or their heirs compensation for injuries occasioned by illegal acts, omissions or negligence of their employers or fellow-workmen resulting in death or disability. A bureau of labor, established in 1893, was reorganized in 1911, and a commissioner of labor, its executive officer, is charged with the duty of enforcing all laws relating to labor in mechanical and mercantile establishments.

The hours of labor of females and minors under 18 years of age employed at manual or mechanical labor, except in specified in domestic, nursing, telephone and telegraph or farming occupations, are limited by an act of 1917 to 10¼ hours during any one day and to 54 hours in any one week, or if employed on night work to eight hours in any 24 or not more than 48 hours in any one week.

Mining and Quarrying.—Gold, silver, lead, zinc and iron are found, but none of them in sufficient quantity to make their working profitable. The total value of all mines and quarries in New Hampshire in 1909 amounted to \$1,308,597. Of this amount granite quarrying, the principal industry, reported products valued at \$1,205,811, which represented 92.1 per cent of the total. The estimated value of all the products of mines and quarries in 1919 was \$1,568,195, of which amount the principal quarrying industry, granite, reported products valued at \$1,427,979, or 91.1 per cent of the total and gave employment to 589 wage earners. The granite is used mainly for building and curbing and for monumental work. The principal quarries in the order of their importance are located in Hillsboro, Merrimac, Cheshire and Carroll counties. Other industries of this

group of minor importance are copper, mica and scythe-stones.

Forest Reservation and Public Parks.—In 1893 the State after extended investigation into its natural resources by temporary commissions established a permanent forestry commission to promote the conservation of those resources, to inquire into the effects of different methods of lumbering upon the timber supply, water power, climate and scenery, the damages due to forest fires and to establish wherever possible without expense to the State public parks. This commission, which from time to time has been granted additional powers, was reconstituted in 1911 and now consists of three persons appointed by the governor and council for a term of three years. Through the agency of this commission which appoints a State forester, New Hampshire within the last 25 years has secured the general adoption by its large lumber operators of scientific methods of forestry, adequate protection against the waste of forest fires and by the establishment of public parks and forest reservations, particularly at the sources of its rivers, the permanent conservation of its water power and its more equitable distribution. To this last and most important result private persons, municipalities and voluntary associations, such as the Society for the Protection of New Hampshire Forests and the Appalachian Mountain Club, have contributed numerous public parks and smaller reservations. The large State reservation is located in the heart of the White Mountains and to the northeast of the famous Crawford Notch. The White Mountain National Forest Reservation established pursuant to the Weeks Act of Congress, 1 March 1911, for protecting the headwaters of navigable streams of the United States, already includes large tracts in both the White Mountain and northern sections of the State, and by the provisions of that act is receiving frequent additions. The acreage included in these different forest reservations and public parks at the end of 1916 was as follows:

State forests and reservations.....	9,800 acres
Forests owned by towns and cities.....	5,329 "
Municipal parks and forests.....	420 "
Appalachian Mountain Club reservations.....	721 "
Society for Protection of New Hampshire forests (Reservations in New Hampshire)...	2,269 "
Conway Commons (partial State and town ownership).....	4,000 "
Acreage of Reservations in New Hampshire outside of National Forest.....	22,539 "
White Mountain National Forest.....	365,000 "
Total acreage of reservations and parks in New Hampshire.....	387,539 "

The addition of these large tracts to the public domain and their virtual dedication to the public use not only ensures a large conservation of the natural resources but also increases the State's attractions for tourists which long ago made it a summer play-ground and has given it the name of the "Switzerland of America."

Transportation.—The State has a good system of communications by highways and railways. The greatest mileage of both is in the central and southern or most populous parts and all their main lines except those in the Connecticut Valley converge upon the commercial centre of New England—Boston. In 1918 the total mileage of the highways of the State was 14,020 miles and of its railroad lines

1,221 miles. Until the beginning of the present century the highways of the State, except a few trunk-line toll turnpikes built and operated by private companies before the introduction of railroads, were built by the towns through which they ran and supported by taxation of their inhabitants. In 1905 the State began the systematic improvement of its main highways, with the co-operation and at the joint expense of the State and of its municipalities, and appointed a State engineer of highways now known as commissioner of highways. As a result of this policy and the repeatedly enlarged appropriations which during the interval have been made to give it effect, the State, in April 1918, had six trunk-line highways, three of them running from the Massachusetts State line northward; the *Merrimac Valley Road*, from Nashua to the line between Woodstock and Lincoln in the White Mountains; the *West Side Road*, from Winchester on the Connecticut to Colebrook on the same river; the *East Side Road*, from Seabrook through Pinkham and Dixville Notches in the White Mountains to Colebrook. Three of these trunk lines run east and west across the State; the *South Side Road* from Walpole on the Connecticut River to Portsmouth on the *East Side Road*; the *Rockingham Road* from Manchester on the Merrimac Valley Road to Salem on the Massachusetts State line; and the *Ossipee-Meredith Road* from the Merrimac Valley Road at Meredith to the East Side Road near the village of West Ossipee. These six trunk lines have a total mileage of 630 miles and are practically completed, and they for the most part follow the pre-existing town highways. The legislature in 1915 authorized the designation for future improvement of 10 additional east and west or cross-State highways. These as established have a total mileage of 451 miles, of which 150 miles already have been built. The legislature of 1917 authorized the designation of six more cross-State highways for improvement. The expense of this reconstruction, extension and improvement of the highways of the State since 1905 has been met by taxation and the issue of State highway bonds. The State makes an annual appropriation of \$125,000 for the Department of State Highways, and from 1914 to 1916 inclusive it also appropriated \$150,000 per year for trunk line construction, a total appropriation for trunk line and State-aid construction of \$275,000. The legislature of 1917 assented to the provisions of the Federal Aid Act for the construction of rural post roads passed by the 64th Congress, and has undertaken to expend for such purpose each year a sum equal to the amount of such Federal aid as it shall receive.

The first railroad in the State to begin operation was the Nashua and Lowell Railroad which was chartered in 1835. Between 1840 when the total railroad mileage of the State was only 22½ miles and 1883 the State granted numerous charters to railroad companies under which many short lines were constructed and with little public aid, State or municipal. In 1883 when the railroad mileage had increased to 1,041 miles, the State, reversing its earlier policy which assumed that competition between its railroads was essential for the public welfare, authorized the incorporation of railroads under the general law, and also their combina-

tion and consolidation within specified limits and subject to stringent regulation. As a result of this legislation, which was supplemented in 1889 by an act limiting the rates to be charged by all consolidating railroads to those in force in August 1883, the decade between 1880 and 1890 was marked by the combination and consolidation of the railroads within the State which left two of them, the Boston and Maine in the southeastern part and the Concord and Montreal in the central and northern part, practically dividing between them its entire railroad mileage. These two railroads thus in 1890 controlled 958 miles in the State, other railroads having control of only 168 miles. During the decade—1890–1900—the Boston and Maine Railroad Company secured a practical monopoly of the railroad mileage of the State, by acquiring control over the Maine Central system by stock ownership in 1891, by leasing the Concord and Montreal Railroad in 1895, and the Fitchburg Railroad in 1900. In 1907 the New York, New Haven and Hartford Company secured temporary control over the Boston and Maine Railroad system, but, as the result of a suit begun by the United States to enforce the Sherman Anti-Trust Law, was compelled to relinquish it in 1914. In 1916 the Boston and Maine Railroad Company was, upon petition to the United States Circuit Court, declared bankrupt and was being administered by a receiver when its control and administration was assumed by the United States, pursuant to its war policy, on 28 Dec. 1917. The total railroad mileage of the State in 1917 was 1,221 miles distributed as follows: Boston and Maine Railroad, 1,020; Maine Central Railroad, 100; The Atlantic and Pacific (Grand Trunk), 52.

Railroad and Public Service Commissions.

—In 1911 the State substituted for its Railroad Commission, which was established in 1844, a Public Service Commission, which consists of three members appointed by the governor and council for a term of six years. This commission has large supervisory and regulative powers, not only over railroads, but other public utilities, and is given adequate authority to enforce its orders to secure safe and adequate services and facilities and just and reasonable rates.

Government.—The constitution of the State which took effect on 2 June 1784 still is in force except so far as it has been modified by subsequent amendments. The only mode it prescribes for making amendments is through a constitutional convention, the qualified voters being called upon every seven years to vote upon the necessity of summoning a convention to revise the constitution. If summoned the delegates to it are chosen in the same manner and upon the same basis of representation of town, cities and wards and unincorporated places as are the members of the lower branch of the legislature. No proposal of such a convention for the alteration of the constitution becomes a part thereof until it shall have been approved by two-thirds of the qualified voters present and voting on the subject. Constitutional conventions have been held in 1791, 1850, 1876, 1889, 1902 and 1912, which have proposed numerous amendments to the organic law of the State, but those which have been adopted have wrought comparatively small change in

the general structure of the government or the agencies by which it is administered.

Legislature.—By this constitution legislative power is vested in a senate and house of representatives which together are styled the General Court, and assembles biennially on the first Wednesday of January in the odd years. The senate is composed of 24 members representing districts "as nearly equal as may be" and "by the proportion of direct taxes paid by the said districts." The house of representatives is composed of members apportioned according to the population in towns, cities, wards, and unincorporated places, one for a minimum population of 600 and one for each additional 1,200. Towns of less than 600 are entitled to one representative for such proportional part of the time as their population bears to 600. The retention of the town as the political unit for representation and the increase of population and subdivision of towns since 1784 have united to give New Hampshire the largest house of representatives of any State in the Union. That body consists of from 419 to 422 members. The members of both houses of the legislature are elected biennially in the even years in the month of November.

Executive.—The executive power is vested in a governor who is elected biennially on the same day as members of the legislature and whose term of office begins on the first Wednesday of the following January. Originally if no person received a majority of votes cast for governor the senate and house of representatives by joint ballot elected one of the two persons having the highest number of votes for that office. In 1913 the constitution was so amended that the governor may be elected by a plurality of votes. An Executive Council consisting of five persons, one from each of five districts into which the State is divided, is elected biennially on the same day as the governor by ballot to advise the governor and it shares with him the power of appointing all judges, the attorney-general, coroners and all officers of the navy and the militia, the governor and council having a negative on each other both in making nominations and appointments. They also share the power of pardoning offenses except cases of impeachment, the power of drawing money from the treasury, except for specified purposes, for the necessary support and defense of the State and the protection of its inhabitants, and the power of removing judges upon the address of both houses of the legislature. Other executive officers, a secretary of state, a treasurer, a commissary-general and a State printer are elected biennially by ballot of the two houses of the legislature in joint session. In case of a vacancy in the office of governor, the president of the senate and the speaker of the house of representatives in succession exercise the powers and duties of that officer.

Judiciary.—The courts of the State are a Supreme Court, consisting of a chief justice and four associates, having jurisdiction over issues of law; a Superior Court, consisting of a chief justice and four associates, having jurisdiction for the trial of issues of fact, the judges of this court attending the trial terms in a circuit of the shire towns which includes the entire State; 10 Courts of Probate, organized with a judge and register for each county;

municipal courts (one in each city and town having not less than 2,000 inhabitants), having limited and preliminary criminal jurisdiction and jurisdiction of civil causes in which not more than \$100 is claimed and the title of real estate is not in issue; justices of the peace, having preliminary and limited criminal jurisdiction in towns and places where no municipal court is established and jurisdiction in civil causes to the amount of \$13.33, provided the title to real estate is not involved. The public service commission, the tax commission and county commissioners also have preliminary and limited judicial functions. Admission to the bar requires three years of actual and certified study, followed by examination, both oral and written, before a standing board of examiners appointed by the Supreme Court. Certificates of graduation from law schools are not accepted in lieu of actual qualification, ascertained in the manner above stated. The Federal Circuit and District Courts are held at Concord, where the office of their clerk is located, at Portsmouth and at Littleton.

County Government.—For administrative and judicial purposes the State is divided into 10 counties with county-seats and population as follows:

COUNTIES	Pop. 1920	COUNTY SEAT	Pop. 1920
Belknap.....	21,178	Laconia.....	10,897
Carroll.....	15,017	Ossipee.....	1,122
Cheshire.....	30,975	Keene.....	11,210
Coos.....	36,093	Colebrook.....	1,811
		Lancaster.....	2,819
		Haverill.....	3,406
Grafton.....	40,572	Plymouth.....	2,353
		Lebanon.....	6,162
		Manchester.....	78,384
Hillsborough.....	135,512	Nashua.....	28,379
		Concord.....	22,167
Merrimac.....	51,770	Exeter.....	4,604
Rockingham.....	52,498	Portsmouth.....	13,569
Strafford.....	38,546	Dover.....	13,029
Sullivan.....	20,922	Newport.....	4,109

A board of three commissioners elected biennially by popular vote are the executive officers of each county. These officials also have certain judicial functions relative to the laying of highways, the settlement of paupers and issues of fact referred to them for trial by the Superior Court. The members of the legislature for each county, assembled in convention, are a legislative body for the county. Upon recommendation of the county commissioners they vote taxes for county purposes and direct their expenditure. Other county officers are judges of probate and medical referees (coroners), who are appointed by the governor and council, and registers of probate, solicitors, registrars of deeds, treasurers and sheriffs who are elected biennially by popular vote.

Municipal Government.—Each of the 11 cities of the State now is governed under charters of the ordinary American form by a mayor and subordinate administrative officers and a common council.

Town Government.—The State is divided into minor civil divisions, towns and 23 unincorporated places. The towns, which, as in the other New England States, are the territorial and political units or cells from whose multiplication and union the body politic was developed, now number 224. They are the smallest administrative units of the State and have

NEW HAMPSHIRE



State Capitol at Concord

NEW HAMPSHIRE



1 Star Island, Isles of Shoals

2 Bethlehem, White Mountains

large powers for local government, including those of general police, building and maintenance of highways, inquiry into need of poor relief, which is administered by the county, and the support of public schools. These towns retain their original form of pure democracies and are governed through a town meeting held annually in the month of March which elects town officers and votes all taxes for town purposes. These officers are three selectmen, who have general management for the year of town affairs and who also act as assessors, a treasurer, town clerk, constable, school trustees and some minor officers.

Suffrage and Elections.—The constitution now provides that every inhabitant who has reached the age of 21 years and who has resided in one town six months is entitled to vote, provided he or she is able to read the constitution in the English language and to write. An amendment to the constitution adopted in 1913 provided for the disfranchisement of all persons who shall have been convicted of treason, bribery or any wilful violation of the election laws. Voting at all elections is by ballot and is limited to duly qualified electors whose names are inscribed upon a certified check list. The total number of persons 21 year of age and over in 1920 was 281,026, representing 63.2 per cent of the population. Of such persons, 146,345 were native whites of native parentage; 52,136 were native whites of foreign or mixed parentage, 82,049 were foreign-born whites and 388 were negroes. Of the foreign-born whites of voting age, 36,621 were naturalized and 6,260 had taken out first papers.

Caucuses, Primaries and Conventions.—The State recognizes political parties and regulates them by general laws which include (1) a law prescribing the mode of holding caucuses and conventions in the larger cities and towns to nominate candidates to be voted for at city, town and school district elections, and (2) a Direct Primary Law which provides a uniform mode of making nominations of candidates for all town or city, county, State and national officers to be voted for at the biennial election held in the month of November in the even years, except presidential electors; prescribes the enrolment of party members by the regular supervisors of the check list; the conduct of the primary by the regular town or city election officers, and a State party convention for each party, to be held shortly before each biennial election, to adopt a party platform, nominate presidential electors and effect an organization for the following two years; and (3) a law prohibiting corporations to contribute to political parties, committees or individuals for any political purpose; and (4) a corrupt and illegal practices act which prohibits the payment, gift or promise of anything of value by any political committee or candidate to promote or defeat the election of any party or person, except for specified purposes, and which fixes the maximum expenditure allowable for each of them; and (5) a law requiring publicity of campaign receipts and expenditures by all political committees and all candidates for national offices and important State offices, with an itemized statement of their campaign expenditures. A Presidential Primary Law was enacted in 1913, which prescribes the mode of holding primaries for electing delegates to

the national conventions of political parties in each year thereafter when a President and a Vice-President of the United States are to be elected.

National Guard.—By the census of 1910 the total number of males of militia age, 18 to 45 inclusive, in New Hampshire was 90,357. The National Guard on 31 Aug. 1916 was composed of one regiment of infantry of 12 companies, a coast artillery corps of four companies, a troop of cavalry, a battery of field artillery and a signal corps, a field hospital corps or detachment, with a total force of 97 officers and 1,609 enlisted men. The legislature by an Act Concerning the Militia, approved 5 April 1917, recognized its whole military establishment to conform to the provisions of the National Defense Act passed by Congress 3 June 1916. By this concurrent legislation the State militia was divided into the unorganized militia, whose members were arranged according to age and marital conditions in four classes, with consequent liability to draft, and the National Guard, which while it received the aid and support of the United States under the National Defense Act was governed by the laws, rules and regulations of the United States in respect to the number of its enlisted men and officers, its organization, uniforming, equipping, training, discipline, the qualification, appointment, commissioning and promotion of its officers, and the period and qualifications for enlistment and discharge of its enlisted men. Officers and men in the National Guard when it was drafted on 25 July 1917 into the service of the United States was 2,766. On 31 May 1923 the National Guard had an authorized strength of 1,001 and an enlisted strength of 1,028 or 3 per cent above its quota.

Finance.—The report of the treasurer of the State for the fiscal year ending 31 Aug. 1917 showed a total of receipts and cash on hand of \$4,159,714.96; disbursements for the same year of \$4,017,324.13, leaving cash on hand of \$142,390.83. The net indebtedness of the State, 1 Sept. 1917, was \$1,431,002.73, an increase during the preceding fiscal year of \$362,048.71. The largest part of this increase was due to the general conditions caused by the European War.

At the beginning of the fiscal year 1921–22 the balance in the State treasury was \$789,041.32. Receipts during the fiscal year amounted to \$7,691,699.35; disbursements to \$6,793,157.72, leaving a balance at the beginning of the fiscal year 1922–23 of \$1,687,582.95. The bonded debt of the State at the beginning of 1923 was \$2,489,500. On the same date the floating debt was \$1,128,004.54, making the total debt \$3,617,504.54. The assessed value of the real property in the State in 1922 was \$456,584,737; of personal property, \$109,884,607.

Taxation.—The State always has raised the largest part of its revenue by taxation of specific kinds of property, real and personal. It also has made use, and increasingly during the last quarter of the century, of license and other excise taxes, including special taxes on corporations, and since 1905 has imposed a collateral inheritance tax. A tax commission known as a board of equalization was created in 1878, which, since its reorganization under its present name in 1911, consists of three members who are appointed by the Supreme

Court and commissioned by the governor for a term of six years. The duties of this commission include the formulation of inventories of all property subject to taxation, the assessment of railroad, telegraph, telephone, express and other specified corporate property, the general supervision over the administration of the assessment and taxation laws of the State and over all assessing officers, and every second year, beginning in 1912, the equalization of the valuation of the property in the several towns and cities in the State and in general the direction of the enforcement of all the tax laws of the State and the recommendation of any changes in them which in their judgment may be desirable.

Banks.—The first bank in the State was the New Hampshire Bank which was chartered 3 Jan. 1792 and located at Portsmouth. In 1820 the number of banks was five, in 1840, 28 and in 1860, 51. During the next decade all but three of these State banks took advantage of the provisions of the National Banking Act of 1862 and became national banks. The condition of all the reporting banks in New Hampshire, numbering 126, of which 56 were national banks, on 30 June 1922 as appears by the report of the Comptroller of the Currency for 1922, was as follows: total resources, \$231,388,000; loans and discounts, \$103,158,000, investments, \$111,826,000; a total capital, \$7,473,000; individual deposits, \$191,510,000; United States deposits, \$278,000; surplus, \$12,588,000; undivided profits, \$7,322,000.

Savings Banks.—The first savings bank in the State was the Portsmouth Savings Bank which was chartered 26 June 1823. In 1850 the number of such banks had increased to 12 when there were 13,000 open accounts averaging \$125 for each depositor. In 1893 their number was 70, and there were 174,000 open accounts averaging \$425 to each depositor. The total number of savings institutions in the State on 30 June 1917 was 67. According to the report of the State bank commission for 1917, the total amount of savings deposits in the savings banks, 56 in number, and the savings departments of trust companies, 11 in number, on that date was \$124,160,974.19.

On 30 June 1922, there were in the State 11 stock savings bank with deposits totaling \$14,030,000 and resources aggregating \$16,027,000; 45 mutual savings banks with deposits totaling \$123,380,000 and resources aggregating \$134,506,000 and 11 loan and trust companies with savings departments and saving deposits of \$12,164,000—total savings institutions, 67; total savings deposits \$149,574,000, an increase since 1917 of \$25,413,000. Savings depositors in stock savings banks in 1922 numbered 32,993 and the average due each was \$409.15. Depositors in mutual savings banks numbered 230,534 and the average due each was \$521.21.

Charities and Corrections.—The more important agencies of the State established for the dependent and delinquent classes are: (1) The State Hospital for the Insane at Concord for paying patients, and since 1 Jan. 1909, for the care and support of all its insane paupers; (2) the School for Feeble-Minded at Laconia; (3) the Industrial School at Manchester; (4) the Sanatorium for Consumptives, opened in 1909 at Glencliff in the town of Benton in the White Mountains; (5) the State prison at Concord.

The management of these five institutions since 1907 has been vested in a board of trustees, consisting of the governor ex officio, and four other persons appointed by the governor and council for a term of four years, their superintendents being appointed by this board. A board of charities and corrections, created by the legislature in 1895, provides for the suitable education, training and support of orphans or friendless or dependent or delinquent children, and since 1897 inspects all State and county charitable or correctional institutions, including county almshouses. The minor children whose guardianship is the chief duty of this board are placed by it in the New Hampshire Home for Orphans at Franklin or in some of the other 18 like homes in the State, or in private families, and since 1907 this board has been aided in the discharge of its duties by a Juvenile Court. A Soldiers' Home was established in 1890 at Tilton, for which the State makes an annual appropriation of \$15,000 and toward whose support the United States government pays \$100 a year for each soldier in residence. This home is open for all dependent soldiers honorably discharged, who have served in the army or navy of the United States in any of its wars.

Public Health.—A State board of health was established in 1881, which since 1889 also has served as a board of commissioners of lunacy and consists of the governor and attorney-general, ex officio, a civil engineer and three physicians. The active head of this board is its secretary, who is chosen by the board and is the registrar of vital statistics for the State. Its functions, enlarged from time to time, now include the investigation in a State laboratory of hygiene of the causes of disease, and a variety of field work throughout the State, such as the inspection of foods, dairies, grocery stores, slaughter-houses and the supervision of the administration and enforcement of health laws by local officials.

Education.—Public education in New Hampshire probably began in 1647, when the Massachusetts Bay Colony, which had assumed jurisdiction over the four settlements then existing in New Hampshire, ordained that every township should provide for its support. This law, re-enacted by the province of New Hampshire after its union with the Bay Colony was dissolved, continued in force with few changes until 1789, when the State, repealing all previous legislation on the subject, substituted for it a law which required the selectmen of each town to assess annually their inhabitants at a specified rate for the sole purpose of keeping an English grammar school or schools for teaching reading, writing and arithmetic, and required the appointment of duly qualified teachers. The present school system has been built upon the basis of this statute. In 1791 and at frequent intervals since then the State provided for increase of the rate of taxation for school purposes; in 1840 for the establishment of graded schools, in 1848 for the opening of high schools, the law now requiring all towns not maintaining such schools to pay the tuition, though with State aid, of their pupils qualified to enter them in high schools or academies in neighboring towns; in 1848 for the establishment of teachers' institutes; since 1868 for the establishment of the office of superintendent of public instruction whose incumbent has general visitorial, ex-

minating and supervising powers over all public schools; in 1870 for the establishment of a normal school at Plymouth and in 1909 of another such school at Keene, and by numerous other acts for the extension and improvement of public education. The present school law now makes the attendance of all children between the ages of eight and 14 compulsory, prescribes standard courses of eight or nine years in elementary schools and four years in high schools, including studies which will enable their pupils to meet the standard entrance requirements for college, and provides free tuition, textbooks and school supplies for all pupils in both elementary and high schools. From 1647 to 1805 the territorial unit for government and taxation for school purposes was the township; in 1805 when the dispersion of population throughout the towns had become general this unit was changed to a subdivision of the township known as the district, each town determining the number of its districts. In 1885 the growth of the factory system and the trend of population to villages and cities led the State to re-establish its original town system for the administration and support of public schools. The amount raised by town taxation for public schools is supplemented by the proceeds of a literary fund established in 1823 and derived from non-resident and savings bank taxes. This fund enabled the State to distribute to the towns in 1916 the sum of \$43,277.65, or 65 cents per scholar. In 1915-16 the total amount expended for public instruction, as reported by the Commissioner of Education of the United States, was \$2,148,985, the number of pupils enrolled in the public schools was 67,461, or 15.25 per cent of the total estimated population in that year.

In 1920 the number of persons of school age (between five and 20 years) in the State was 120,666 and the number reported as attending school was 80,127 or 66.4 per cent. The number of children in the State between five and 18 years in 1920 was given as 99,775. Of these the number enrolled was 64,205 and the daily average attendance was 53,245.

In 1920 there were 15,788 illiterates in the State, representing 4.4 per cent of the total population 10 years and over, as compared with 6.2 per cent in 1900. The percentage of illiteracy was 15.4 among foreign-born whites and 0.7 among native whites. For persons from 16 to 20 years of age, inclusive, whose literacy depends largely upon present school facilities and school attendance, the percentage of illiteracy was only 1.1. The State has many private secondary schools, academies and institutes. Two of these are among the most famous in the country, Phillips Academy at Exeter, established in 1783, and Saint Paul's School at Concord, founded in 1855. There are three higher institutions of learning. The oldest, Dartmouth College, located at Hanover on the Connecticut River, is the seventh oldest college in the country and was chartered in 1769 for "the education of Indian and other youth," but soon ceased to have Indian pupils except at rare intervals. In 1819, when it still was a "small college," the United States Supreme Court in the celebrated case, *Dartmouth College v. Woodward*, 4 Wheat. 518, which involved the power of New Hampshire to change the college charter without the consent of its trustees, rendered judgment for the college and by its effects refounded it and

also confirmed the rights and privileges of all private corporations in the United States. (See *DARTMOUTH COLLEGE CASE*). Its subsequent growth, especially during the last quarter of a century, its enlarged endowment and multiplying educational facilities have united to make it one of the largest colleges in the country. The New Hampshire College of Agriculture and the Mechanic Arts was established in 1866, pursuant to the provisions of the Morrill Land-Grant Act of Congress of 1862, and since 1891 has been located at Durham near Portsmouth. It is the highest educational institution under the direct control of the State and is coeducational. It is supported by annual appropriations by the State, the proceeds of grants under different acts of Congress from the United States and the income from its endowment by a citizen of Durham, which in 1922 amounted to nearly \$800,000. Anselm College established in 1895 at Manchester is a Catholic institution.

Libraries.—New Hampshire has been a pioneer in and sturdy supporter of the library movement. Perhaps the earliest mention we have of it is in connection with a lottery in Portsmouth in the year 1750 in aid of an association library. From 1792 to 1883, 220 libraries received special charters from the legislature. These were mostly private library corporations which have now given place to, or become merged in, the public library. The first free public library in the United States was established in Peterborough in 1833. The State was in 1849 the first to pass a law authorizing towns to aid in establishing and maintaining public libraries. This was followed logically by the second and third steps in the progress, namely, by the law of 1891 granting State aid to town libraries, and by the compulsory law of 1895, requiring every town to appropriate a certain proportion of its taxes for the support of a public library. In 1916 there were free public libraries in all except 12 of the towns of the State. The first legislative incorporation of a State library association was by New Hampshire in 1889. The number of books contained in the public libraries and accessible to the public, exclusive of reports and pamphlets, is 900,000. The State Library now occupies a separate establishment and in 1922 had a collection of 180,000 bound volumes.

Religion.—The principal Protestant denominations are the Congregationalists who aggregate approximately 20 per cent, the Baptists 17 per cent and the Methodists 12 per cent of all church members. The Roman Catholic population now is estimated to number approximately 130,000, or 30 per cent of the entire population of the State.

History.—Three of the four original towns, Portsmouth, Dover, Exeter and Hampton, occupied the interesting position of independent democracies between 1622, the year when Thomson's indenture was drawn and the first settlement definitely planned, and 1643, when they had all become, by their own choice or the necessities of their situation, constituent parts of the Massachusetts Bay Colony. This was the first union with Massachusetts Bay, and was conditional on certain important privileges and guarantees accorded to these towns by the Massachusetts General Court. The history of the period of this union is in a large measure identical with that of Massachusetts Bay. In

1679 the Masonian heirs succeeded in procuring from the home government orders for the establishment of a separate province for these four frontier towns and other lands in New Hampshire. John Cutt, a merchant of Portsmouth, was the first president, as the chief magistrate was then styled. The four towns were made a part of the dominion of New England in 1686. This government under Dudley and Andros survived only three years. From the spring of 1689 to the latter part of the winter of 1689-90 the New Hampshire towns governed themselves in the independent democratic fashion of the first period of their history. A second union with Massachusetts Bay was then effected and continued for two years. In 1692 the province government by royal commission was re-established and subsequently administered by appointees of the Crown until 1775. With the governor was associated a lieutenant-governor and a council appointed by the king. The legislative function was vested in a general assembly constituted of the governor, the council and the deputies, elected by freeholders. The right of veto was committed to the governor and the right of confirmation and disallowance of laws remained with the Crown. From 1699, when the Earl of Bellomont assumed the office of governor, to the termination of Belcher's administration 1741, the province and Massachusetts had the same governor. The provincial assembly was continued until the departure of Gov. John Wentworth in 1775. A succession of conventions beginning with that of 21 July 1774 finally resulted in the formal organization of a legislative body with a full representation of the people in view of the apparent necessity of establishing a new State government. The people of New Hampshire entered upon the active stages of a national movement for independence with deliberation and unanimity. Perhaps no other colony was so free from the so-called Loyalist element as was New Hampshire. The "Association Test" put every man on record, either for or against the common cause. The original files are preserved, and the names of those who dissented or refused to take an unequivocal position constitute a surprisingly short list.

The civil government of New Hampshire from the time of the departure of Governor Wentworth to the organization of a new form of government, 2 June 1784, under the constitution adopted in 1783, was purely legislative. The constitution of 1776, the first adopted by any of the 13 States, by its own independent action, was a brief instrument and evidently intended to be temporary, or, as it was officially stated at the time, "to continue during the present, unhappy and unnatural contest with Great Britain." It was adopted and promulgated on 5 Jan. 1776, by the fifth convention, chosen in the latter part of 1775, and it was never submitted for acceptance or rejection to, or formally ratified by, the people. During the period of the Revolution the administrators of the New Hampshire government were embarrassed by a serious defection in the western part of the State, and particularly in Grafton County. Many of the leading men of the Connecticut River towns were from

naturally in accordance with their education and experience in the commonwealth from which they had emigrated. The form of government temporarily adopted by the Fifth Provincial Congress was not acceptable to the majority of the inhabitants of these towns. The group of towns which include Gunthwait (now Lisbon) on the north and Lebanon on the south in Grafton County organized themselves into associations for purposes of civil and military government, and formally declined to recognize the new State government of New Hampshire. The contention of the "New Connecticut" party, so called, was, that upon the dissolution of political relations between the colonies and the mother country, and more especially in respect to the territory in controversy between New York and New Hampshire, the towns being the political units and the original source of political authority were invested with the right to determine for themselves the question whether to accord allegiance to one or the other of the disputing States, or to erect themselves into an independent State. They urged that inasmuch as the constitution of 1776 had never been submitted to the people, or to the towns for ratification, and had been accepted by a part of the towns only, it was operative only upon such as had elected to ratify its provisions. Their argument was presented with great skill and effectiveness, and although the movement ultimately failed to accomplish its purpose, its sponsors succeeded in making themselves felt as a political force to be reckoned with by three established States and the Continental Congress as well as the prospective commonwealth of Vermont. In 1783 a new State constitution, modeled closely upon the Massachusetts constitution of 1780, was adopted. This first permanent constitution of New Hampshire which took effect 2 June 1784, except as modified by amendments proposed by the subsequent conventions of 1791-92, 1850, 1876, 1889, 1902 and 1912, still remains in force. In this critical period of American history (1783-89) when the Federal convention of 1787 framed and submitted to the 13 States for adoption the present constitution of the United States, it became the organic law of the new nation on its ratification by New Hampshire, the ninth State, on 21 June 1788. John Langdon of New Hampshire was chosen president pro tempore of the first session of the United States Senate under the new Constitution, and to him fell the honor of informing Washington of his election to the presidency. In the next decade soon after the Federalist party arose it secured political control in this State, but gave place to the Anti-Federalists, then known as Republicans—the Jefferson party of that day—from 1805 to 1813, except in 1809-10, when Jeremiah Smith, Federalist, broke in upon the succession as governor. In 1813, 1814 and 1815 the Federalists were again in control of the State. In 1816 they met with irretrievable defeat, and thereafter the Jeffersonian Republicans, who later were styled the Democratic party, remained in power, excepting in the brief period of a temporary reverse in 1846, until permanently overthrown in 1855 by the American party, more commonly called the "Know-nothings." The first quarter of the 18th century was marked by ecclesiastical agitation. The

people of New Hampshire had become by the end of the colonial period almost entirely Congregationalists, and that denomination maintained its ascendancy as practically a state church during the following generation, the town ministers being called by the local church, approved in town meeting and supported by public taxation. Universalists, Baptists, Methodists and Free Thinkers now had become potent enough to assert themselves effectively in politics, and the contest against the state church reached its culmination in the so-called toleration act of 1819. Hosea Ballou, a New Hampshire minister, was the founder of Universalism in its modern form, and Benjamin Randall, another minister of this State, was the founder of the Free Baptist denomination. The latest addition to religious denominations by a resident and native of this State is that of Christian Science, the founder and chief exponent of which was Mary Baker Eddy. In 1819 the Supreme Court of the United States rendered its judgment in the historic Dartmouth College case (4 Wheaton, 518) which has been described as one "in its effects more far-reaching and of more general interest than perhaps any other judicial decision ever made in this country." Through this futile attempt by the State to amend the charter of Dartmouth College for the purpose of reorganizing the government of that institution, an inviolability of charters of private corporations never before enjoyed was secured. Incidentally the case served to make prominent and to bring into view of the whole country the fact that in Daniel Webster, Jeremiah Mason, Jeremiah Smith, Ichabod Bartlett, and their compeers, there was at the bar of New Hampshire, and on the bench of her highest court, a group of jurists whose law learning and forensic ability could not be surpassed at that day in the whole country. In 1826 occurred the anti-Masonic uprising, which soon affected politics, and for a time commanded serious attention. The second quarter of the 19th century was remarkable for the number of men of New Hampshire birth and residence who held commanding positions in shaping the destiny of the republic. The names of Webster, Cass, Woodbury, Pierce, Kendall, Chase, Hale, Atherton, Clifford, Tuck and Greeley constitute a conspicuous part of a long list that might be enumerated. The years between 1846 and 1861 were marked by the development of a strong reform sentiment, especially on the subjects of temperance and slavery. In the case of the former, the reform movement resulted in the prohibitory law of 1855, which became the accepted principle of liquor legislation until at length a reactionary sentiment expressed itself in the License Act of 1903. After 15 years experience under this act with its local option provision, the State again reversed its policy and enacted a "bone-dry" prohibition law which took effect 1 May 1918. In the case of the latter the anti-slavery movement found many earnest and devoted adherents, intense and uncompromising in their propaganda. The Freesoil vote had already appeared in 1841, and continued to be of more or less importance until 1856. Since 1856 when the Republican party secured control of the State, with the exception of a signi-

CHIEF EXECUTIVES.

	Title	Term
John Cutt.....	President.....	1680-81
Richard Waldron.....	Deputy-President.....	1681-82
Edward Cranfield.....	Lieutenant-Governor.....	1682-85
Walter Barefoote.....	Deputy-Governor.....	1685-86
Joseph Dudley.....	President-Governor.....	1686-87
Edmond Andros.....	Governor.....	1687-89
Simon Bradstreet.....	Governor.....	1689-92
John Usher.....	Lieutenant-Governor.....	1692-97
William Partridge.....	Lieutenant-Governor.....	1697-98
Samuel Allen.....	Governor.....	1698-99
Richard Coote, Earl of Bellomont.....	Governor.....	1699-1701
William Partridge.....	Lieutenant-Governor.....	1701-02
Joseph Dudley.....	President-Governor.....	1702-16
Samuel Shute.....	Governor.....	1716-23
John Wentworth.....	Lieutenant-Governor.....	1723-28
William Burnett.....	Governor.....	1728-30
Jonathan Belcher.....	Governor.....	1730-41
Benning Wentworth.....	Governor.....	1741-67
John Wentworth.....	Governor.....	1767-75
Matthew Thornton.....	President.....	1775-76
Meshech Weare.....	President.....	1776-85
John Langdon.....	President.....	1785-86
John Sullivan.....	President-Governor.....	1786-88
John Langdon.....	President-Governor.....	1788-89
John Sullivan.....	President-Governor.....	1789-90
Josiah Bartlett.....	President-Governor.....	1790-94

STATE GOVERNORS

John T. Gilman.....	Federalist.....	1794-1805
John Langdon.....	Democrat-Republican.....	1805-09
Jeremiah Smith.....	Federalist.....	1809-10
John Langdon.....	Democrat-Republican.....	1810-12
William Plumer.....	Democrat-Republican.....	1812-13
John T. Gilman.....	Federalist.....	1813-16
William Plumer.....	Democrat-Republican.....	1816-19
Samuel Bell.....	Democrat-Republican.....	1819-23
Levi Woodbury.....	Democrat-Republican.....	1823-24
David M. Morrill.....	Democrat-Republican.....	1824-27
Benjamin Pierce.....	Democrat-Republican.....	1827-28
John Bell.....	Democrat.....	1828-29
Benjamin Pierce.....	Democrat-Republican.....	1829-30
Matthew Harvey.....	Democrat.....	1830-31
Joseph M. Harper, Acting Governor.....	Democrat.....	1831
Samuel Dinsmoor.....	Democrat.....	1831-34
William Badger.....	Democrat.....	1834-36
Isaac Hill.....	Democrat.....	1836-39
John Page.....	Democrat.....	1839-42
Henry Hubbard.....	Democrat.....	1842-44
John H. Steele.....	Democrat.....	1844-46
Anthony Colby.....	Democrat.....	1846-47
Jared W. Williams.....	Democrat.....	1847-49
Samuel Dinsmoor.....	Democrat.....	1849-52
Noah Martin.....	Democrat.....	1852-54
Nathaniel B. Baker.....	Democrat.....	1854-55
Ralph Metcalf.....	American.....	1855-57
William Haile.....	Democrat.....	1857-59
Ichabod Goodwin.....	Republican.....	1859-61
Nathaniel S. Berry.....	Republican.....	1861-63
Joseph S. Gilmore.....	Republican.....	1863-65
Frederick Smyth.....	Republican.....	1865-67
Walter Harriman.....	Republican.....	1867-69
Onslow Stearns.....	Republican.....	1869-71
James A. Weston.....	Democrat.....	1871-72
Ezekiel A. Straw.....	Republican.....	1872-74
James A. Weston.....	Democrat.....	1874-75
Person C. Cheney.....	Republican.....	1875-77
Benjamin F. Prescott.....	Republican.....	1877-79
Natt Head.....	Republican.....	1879-81
Charles H. Bell.....	Republican.....	1881-83
Samuel W. Hale.....	Republican.....	1883-85
Moody Currier.....	Republican.....	1885-87
Charles H. Sawyer.....	Republican.....	1887-89
David H. Goodell.....	Republican.....	1889-91
Hiram A. Tuttle.....	Republican.....	1891-93
John B. Smith.....	Republican.....	1893-95
Charles A. Busiel.....	Republican.....	1895-97
George A. Ramsdell.....	Republican.....	1897-99
Frank W. Rollins.....	Republican.....	1899-1901
Chester B. Jordan.....	Republican.....	1901-03
Nahum J. Bachelder.....	Republican.....	1903-05
John McLane.....	Republican.....	1905-07
Charles M. Floyd.....	Republican.....	1907-09
Henry B. Quinby.....	Republican.....	1909-11
Robert P. Bass.....	Republican.....	1911-13
Samuel D. Felker.....	Democrat.....	1913-15
Rolland H. Spaulding.....	Republican.....	1915-17
Henry W. Keyes.....	Republican.....	1917-19
John H. Bartlett.....	Republican.....	1919-21
Albert O. Brown.....	Republican.....	1921-23
Fred H. Brown.....	Democrat.....	1923-

ficant revolt from it in 1872, and numerous transfers of party allegiance during the Free-

silver agitation in 1896, party alignments have been quite strictly maintained. Since 1856, the Republican party has had control of every department of the State government and carried every State election except in the years 1871, 1874, 1912 and 1922. In 1916 the Democratic party though failing to secure control of any department of the State government carried the State for its nominees for President and Vice-President, Wilson and Marshall, by a plurality of 56.

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JAMES FAIRBANKS COLBY,
Editor of Manual of Constitution of New Hampshire.

NEW HAMPSHIRE, University of, a State co-educational institution, founded in 1866 and located at Durham, N. H. Until, under legislative enactment, it was given its present name on 1 July 1923, it was known as the New Hampshire College of Agriculture and Mechanic Arts. Courses are offered leading to the degrees of Bachelor of Arts and Bachelor of Science. The university's grounds, buildings and equipment were valued in 1923 at \$1,880,300 and the same year its productive funds amounted to a total of \$1,030,000. Its income from various sources in 1922-23 was \$870,881. On 1 Dec. 1923 students enrolled numbered 1,121. Of these, 845 were men and 276 were women. At the same time the teaching staff numbered 90. A summer school is conducted by the university. The library contains over 47,000 volumes.

NEW HANOVER, an island of the Bismarck Archipelago (q.v.), about 40 miles long and 20 miles broad, northwest of New Ireland, or New Mecklenburg (q.v.), from which it is separated by Byron Strait.

NEW HARMONY, Ind., town, in Posey County, on the Wabash River, and on the Illinois Central Railroad, about 25 miles in direct line northwest of Evansville. The first settlement was made by a German community called Harmonists (q.v.), in 1815. In 1824 Robert Owen purchased the village and domain and the Harmonists returned to Pennsylvania. The next year Owen established a "Preliminary Society" and issued a general invitation to all "the industrious and well disposed of all nations" to join the new community which was to be governed and conducted on new plans. All goods were to be held in common, but their use was regulated by age; "moral lectures" were to replace religious worship; the young were to be educated by trained teachers, and this education was to begin when the children were two years of age. The whole experiment proved a failure; those who accepted the invitation were not all "well disposed" and many were far from "industrious." In 1826 Owen assumed control of the community and established order; but in a few months dissensions

arose, three communities were formed of the original one, and soon after the "community idea" was abandoned. One of the leaders, William Maclure, purchased part of the land and established an industrial school which also was a failure. Thomas Say was a member of the community and here was issued in 1830 his work on conchology. The geologist, David D. Owen, also resided here. The free library of the Workingmen's Institute, established in 1838, is in a most flourishing condition and contains about 16,000 volumes. The town has some manufacturing establishments, chief of which are flour and lumber mills and brick works. The electric-lighting plant is the property of the municipality. Pop. 1,126. Consult Lockwood, G. B., 'The New Harmony Communities' (New York 1905).

NEW HAVEN, Conn., city and county-seat of New Haven County, and the largest city in the State. It is popularly called "the City of Elms" from the magnificent elm trees planted there over 100 years ago. New Haven lies at the head of New Haven Bay, four miles distant from Long Island Sound. It is on the New York, New Haven and Hartford Railroad, 36 miles from Hartford and 74 miles from New York City.

Topography.—The city lies on a level sandy plain, bordered on the east and west by the West and Quinnipiac rivers. It has an area of 23 square miles. "The Old Green" is a public square in the centre of the city, about which the original settlers lived, and used at night as a corral for their cattle. It also for years was the public burial ground. The bones of thousands lie there to-day. Near the city limits rise East Rock and West Rock, 360 and 400 feet in height respectively, from the summits of which a fine view of the city and surroundings may be obtained. East Rock, which has been made into a park, is crowned at its summit by a monument dedicated to the Connecticut soldiers and sailors who fell in the Civil War. The entire park system in New Haven embraces nearly 1,200 acres. The sewer system is most complete, including 95 miles of sewer.

Streets and Avenues.—Chapel street, the business promenade, extends in a northwesterly direction throughout the length of the city. The homes and dwelling-houses are generally surrounded by gardens, and many of them are almost hidden from view among trees. The number of magnificent elms with which the principal avenues are planted were mostly set out about the close of the 18th century by James Hillhouse, or through his influence and example. Early residents laid out the city with four streets running nearly north and south and four streets running east and west, thus dividing the city into nine squares each a quarter mile long, the central block being a public square, and roadways were built at various angles, with "The Old Green" as a common centre. There are 225 miles of streets and avenues.

Prominent Buildings.—Here is the seat of Yale University (q.v.), with its numerous halls, dormitories schools and special buildings which are celebrated in educational and historical annals. The Yale Campus, which lies directly west of "The Old Green," is a rectangle containing two city blocks. A series of college buildings form an enclosed court about the

campus. Two of these buildings, Vanderbilt and Osborn Halls, are among the chief architectural attractions of the city, though Woolsey Hall is the most beautiful of all the university buildings. The Sheffield Scientific School and the departments of law and medicine are a little removed from the campus. The Hopkins Grammar School, founded in 1660, is also located here. Other buildings and institutions are the Art School; the Peabody Museum; the State Normal School; the Hotel Taft; the Boardman Manual Training School; the Hillhouse High School; New Haven Hospital; Grace Hospital; Saint Francis Roman Catholic Orphan Asylum; The University Library (1,000,000 volumes); the Public Library, containing 117,000 volumes; New Haven Orphan Asylum and the Young Men's Institute. Here are also the archives and libraries of the New Haven Colony Historical Society and the American Oriental Society.

Churches and Schools.—New Haven has several churches, some of which were built as early as 1800. In the old burying ground in Grove street are the graves of Noah Webster, Theodore Winthrop, Eli Whitney, F. B. Morse, Timothy Dwight, Roger Sherman, Lyman Beecher and other celebrities. The churches are divided among the following denominations: Congregational, Methodist Episcopal, Protestant Episcopal, Roman Catholic, Baptist, Lutheran, Jewish, and Universalist, Unitarian and others. There are 55 public school buildings in the city, with a daily attendance of about 30,000. The school system is maintained at a cost of \$850,000 annually.

Trade and Commerce.—New Haven up to the middle of the 19th century was an important shipbuilding centre, but this industry has gradually diminished. Shipbuilding interests were seriously crippled by the Embargo (q.v.) and the War of 1812. There is an excellent natural harbor here which has been improved and enlarged at State and Federal expense. New Haven has lines of steamships to New York and is the commercial and distributing centre for a large section of the State. In manufacturing New Haven ranks first among Connecticut cities, and has many and varied industries, including clocks, watches, hardware, firearms, ammunition, wagons, carriages, engines and boilers, automobiles, rubber goods, wearing apparel, iron foundries, machine shops, box factories, wire work factories, canneries and packing-houses. The headquarters and repair shops of the New York, New Haven and Hartford Railroad are also located here. According to the last census, New Haven industries represent a capital of \$52,014,000 with an annual production valued at \$51,071,000. Over 27,000 persons are employed in the 590 factories of the city and over \$16,238,000 are annually paid in wages. The city has a dozen national banks, and numerous trust companies, State banks, savings banks and buildings and loan companies.

Government.—The city maintains municipal government under a special charter of 1897, which controls all municipal affairs, including the old school district of New Haven; but the 13th ward of New Haven, Westville, is independent of the city in the management of its schools. A mayor, elected every two years, is the city's chief executive, and he has the power to appoint a majority of the municipal administrative officers. The city affairs are adminis-

tered by a board of aldermen of 21 members, which appoints the assistant city clerk. The sheriff, city treasurer, collector of taxes, city clerk and comptroller are elected every two years by popular vote. The board of selectmen consists of seven members elected for the purpose of admitting electors to the voting privilege. The administration of the school district is in the hands of a board of education of nine members, appointed by the mayor. The fire and police departments of the municipality are managed by boards of commissioners, the latter bi-partisan. The central clearing house is the board of finance, which fixes the rate of taxation and makes the appropriations.

Municipal Finances.—The assessed valuation of real and personal property is about \$148,500,000, including exemptions. The provided debt of the city amounts to \$4,120,648. The city expends each year for maintenance and general expenses \$2,300,000; of which the largest item is \$1,046,000 for schools; police department, \$256,453; fire department, \$275,000; street cleaning and public works, \$383,500; lighting, \$88,000; charity, \$133,000.

History.—New Haven was settled in 1638 by a company of Puritans chiefly from London under Theophilus Eaton, their first governor, and the Rev. John Davenport. It was a distinct colony until 1660, when after a protracted struggle it was united with Connecticut under the charter of 1662. It was incorporated as a city in 1784. In its earliest days New Haven was called Quinnipiac by the Indians. It was also called Roodenberg by some of the early colonists. The Indian chief Momacguin sold a large tract of land here to the London company, receiving in return an assortment of coats, hatchets, spoons and knives. Treaties were signed by both parties, the Indians agreeing not to "terrify, disturb or injure" the settlers, who in turn promised to protect the Indians, and allow them to hunt in portions of the ceded territory. Another tract 10 miles wide by 12 miles long was purchased six months later, and in June 1639 a fundamental and written constitution was adopted by the settlers. The privilege of voting and holding office was strictly limited to church members. In both civil and church affairs the Bible was the only recognized law.

Theophilus Eaton, the first governor of the New Haven Colony, was re-elected and retained the office until his death in 1658. The city of New Haven was incorporated in 1784 and Roger Sherman was its first mayor. He was mayor and United States senator when he died. The boundary of the Connecticut Independent Colony under its charter of 1662 embraced the towns of Milford,* Stamford, Guilford and Branford known as the "New Haven Colony," and in 1665 the New Haven towns submitted to the Connecticut charter. In 1701 New Haven was made a joint capital with Hartford, and remained as such until 1874. Yale College was removed from Saybrook to its present site in 1716. The town was captured 5 July 1779 by a British force under Generals Tryon and Garth after a sharp skirmish. In this engagement the Americans lost 29 killed and 17 wounded, while the British loss was 70 killed and 40 wounded. After its incorporation as a city New Haven began to make rapid strides. Steamboat communication was opened with New York in 1815,

and the first railroad entered the town in 1839.

Population.—In 1800 New Haven had a population of 4,049; (1850) 20,345; (1870) 50,840; (1880) 62,882; (1890) 81,208; (1900) 108,027; (1910) 133,605; (1920) 162,519, including about 93,000 of foreign birth or parentage.

Bibliography.—Atwater, E. E., 'History of the City of New Haven' (1887); Barber, 'History and Antiquities of New Haven' (1870); Bartlett, 'Historical Sketches of New Haven' (1897); Lambert, 'History of the Colony of New Haven' (1838); Levermore, 'Republic of New Haven' (1886); and 'Papers of the New Haven Colony Historical Society' (1865-1902); New Haven *Year Books* and reports of its Chamber of Commerce.

NEW HAVEN COLONY. See NEW HAVEN, CONN.

NEW HEBRIDES, hēb'ri-dēz, a group of islands in the south Pacific, east of Australia, extending from lat. 13° to 20° S., and from long. 165° to 170° E.; area, about 4,900 square miles. The largest ones are Mallicolo and Espiritu Santo (q.v.). Tanna has an active volcano; and in consequence probably of volcanic action, Aurora, one of the most fertile, sank out of sight in 1871. Some of the group are of coral formation. They are all wooded and hilly, ebony and sandalwood being obtained; their chief products are maize, millet, yams, bananas, coconuts and sweet potatoes. The chief animal is a small pig, not larger when full-grown than a rabbit. The native inhabitants, belonging to the Papuan race, are in general degraded and very ferocious, except on Aneityum and others in the south of the group, on which cannibalism and headhunting were rampant until the advent of Presbyterian missionaries in 1848, who achieved so marvelous a success as to excite the wonder and admiration of Protestant Christianity. There are also successful French Catholic missions on the islands. These islands, according to the Anglo-French convention of 1906, are under the joint control of a mixed commission of French and British officials. The population is decreasing; in 1916 it was about 70,000. They were discovered by the Portuguese in 1606, and named by Captain Cook in 1774. Consult Elkington, 'The Savage South Seas' (1907); Grimshaw, 'Fiji and its Possibilities' (1907); and Paton's, 'Letters and Sketches from the New Hebrides.'

NEW HOPE CHURCH, Ga., the scene of an engagement during the Civil War between the forces of the Confederate Johnston and the Federals commanded by Sherman. The engagement was but one of the very many fought in Sherman's drive on Atlanta in the spring and summer of 1864. The engagement at New Hope Church took place 24 May 1864, and for a time the fighting was intense, the Confederates being protected by log barricades and having a good supply of well-posted artillery.

NEW IBERIA, i-bē'ri-ā, La., town, parish-seat of Iberia Parish, on the Bayou Teche, and on the Southern Pacific Railroad, about 100 miles in direct line west of New Orleans. A short railroad extends to Avery Island, where there is a valuable salt-mine. It is in a fertile agricultural section, in which the chief products are the pepper, from which tabasco sauce is made, cotton, sugarcane, corn, rice, vegetables

and berries. It has considerable manufactures; some of the industrial establishments are machine-shops, a knitting-mill, shipyards, foundries, wagons, brick works, soap factories, cottonseed-oil mills, factories for different lumber products and tabasco sauce factory. The town is in a section of the State mentioned by Longfellow in 'Evangeline.' It has a government building, a city-hall and a large public market. Its educational institutions are the public and parish schools for white and colored children, a high school and a public high school library. The city, which has adopted the commission form of government, owns and operates the electric-light plant and the waterworks. Pop. (1900) 6,815; (1910) 7,499; (1920) 6,278.

NEW IRELAND. See NEW MECKLENBURG.

NEW JERSEY, the "Garden State," and one of the original 13, adopted the Federal Constitution by unanimous vote in convention 18 Dec. 1787. The State is bounded on the north and east by New York and the Atlantic Ocean, on the south and west by Delaware and Pennsylvania. Of the 487 miles of total frontier, only 48 miles are defined by natural boundaries. Capital, Trenton. Area, 8,224 square miles, of which 710 square miles is water surface. The extreme length of the State is 166 miles, the narrowest portion being 33½ miles. Pop. (1900) 1,883,669; (1910) 2,537,167; (1915, State census) 2,844,342; (1920) 3,155,900.

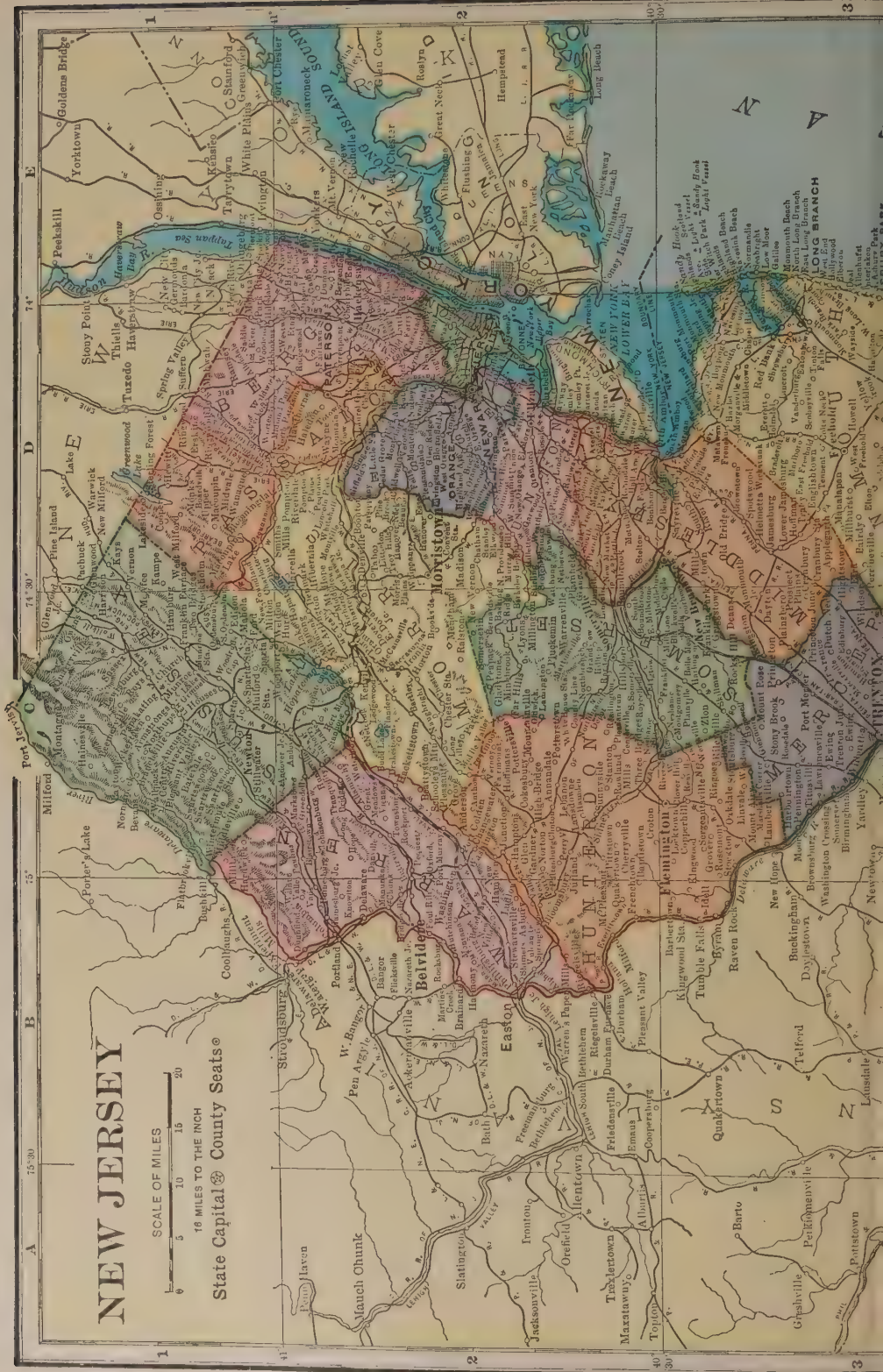
Topography and Geology.—The topographic features and geological structure of the State are intimately related and are explanatory of the surface conditions. New Jersey is characterized as being on the Atlantic slope of the continent and is divided into four topographic zones: (1) Appalachian, including the Kittatinny Mountain and Valley. (2) Highlands. (3) Red sandstone or Triassic area. (4) Coastal plain.

The Appalachian zone includes the Kittatinny or Blue Mountain and the Kittatinny Valley, occupying the northwestern portion of the State. This range is level-topped, narrow, rough, rocky and heavily wooded. It extends across New Jersey from the New York State line, where it is known as the Shawangunk Mountain, to the Delaware River at the Delaware Water Gap. At High Point, near the northernmost point of the State, it is 1,804 feet high, which is the greatest elevation of the State. The Kittatinny Valley, 10 to 13 miles wide, is shut in by the Kittatinny Mountain on the northwest and by the Highlands on the southeast. It is characterized by high, rolling hills and minor valleys, pleasing landscapes and beautiful farming country. This valley is continuous, on the northeast, with the valley of Orange County in New York, and to the southwest stretches away into the great Cumberland Valley of the Atlantic slope of the continent.

The Highlands cross New Jersey in a general north-northeast and south-southwest direction. The surface of this zone is hilly-mountainous, and is made up of several parallel ridges, separated by deep and generally narrow valleys. The latter are like the Kittatinny Valley—smooth—and are largely cleared and in farms. The mountain ranges are remarkably

NEW JERSEY

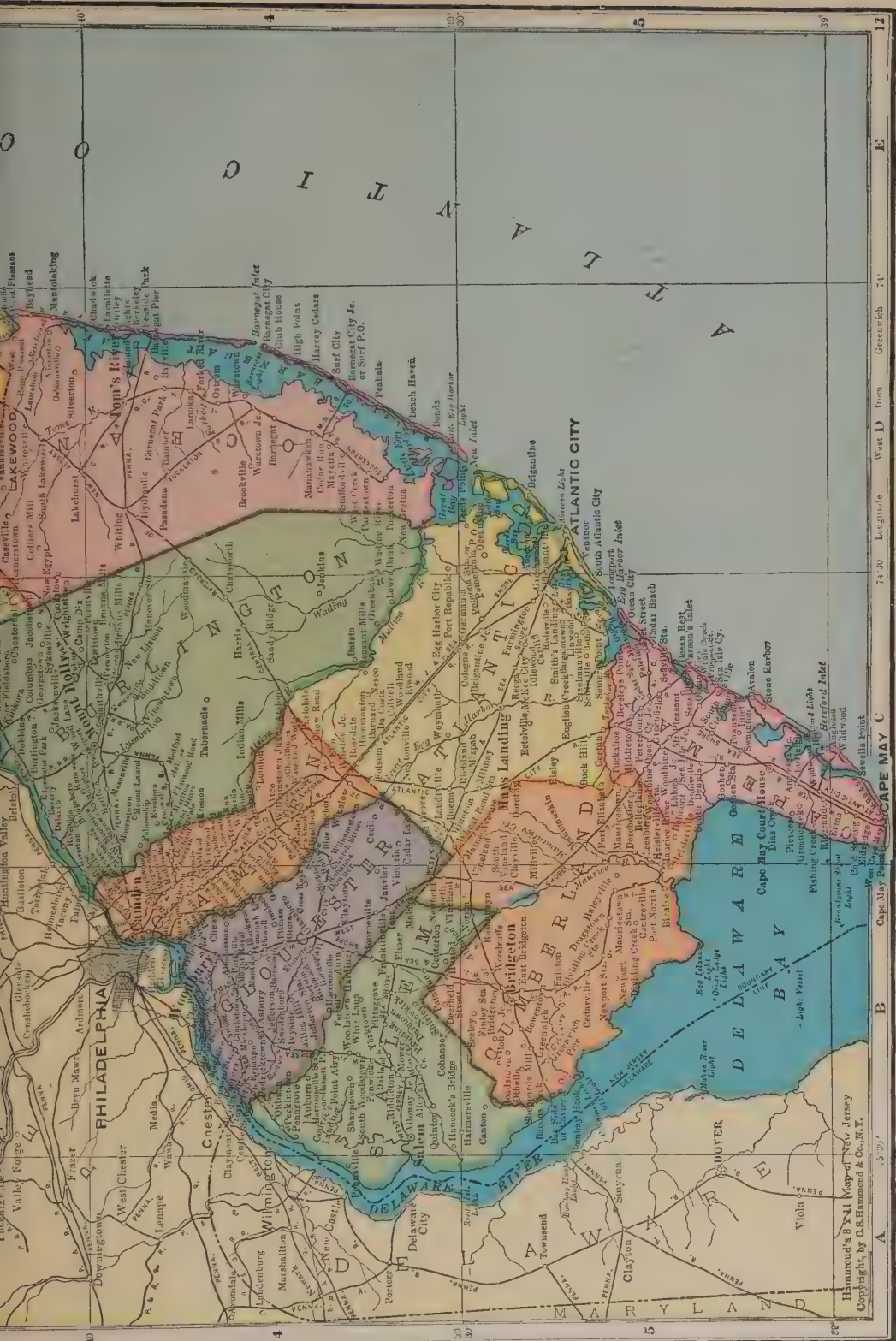
Absecon, (D5)....	702	Bridgeboro, (C3)...	280	Deal, (D3).....	420	Fort Lee, (E2)....	5,761	Holmdel, (D3)....	850
Adelphia, (D3)...	450	Bridgeport, (D4)...	280	Deal Beach, (E3)...	180	Franklin, (C1)....	4,075	Holmeson, (D3)...	100
Aldine, (B4)....	150	Bridgeport, (B4)...	640	Deerfield Street, (B4)	150	Franklin Park, (C3)	230	Homestead, (D2)...	350
Allaire, (D3)....	100	Bridgeton, (B5)...	14,323	Delair, (B4).....	230	Franklinville, (B4)	300	Hopatcong, (C2)...	179
Allamuchy, (G2)...	200	Briggsville, (B2)...	100	Delanco, (C3)....	750	Freehold, (D3)...	4,768	Hope, (C2).....	350
Allendale, (D1)...	1,165	Brielle, (D3).....	392	Delawanna, (D2)...	710	Frenchtown, (B2)...	1,104	Hopewell, (C3)...	1,339
Allenhurst, (E3)...	343	Brigantine, (D5)...	20	Delaware, (B2)...	440	Freneau, (D3)....	200	Hornertown, (D3)	200
Allentown, (C3)...	634	Broadway, (C2)...	200	Delford, (D2)....	1,286	Garfield, (D2)...	19,381	Hudson Hgts., (D2)	1,500
Allenwood, (D3)...	160	Brookdale, (D2)...	250	Delmont, (C5)...	175	Garwood, (D2)...	2,084	Hurffville, (B4)...	200
Alliance, (B5)....	400	Brookside, (C2)...	160	Demarest, (E2)...	654	Georgetown, (C3)...	100	Hyson, (D3).....	150
Alloway, (B4)....	600	Browns Mills, (C4)	300	Dennisville, (C5)	300	Gibbsboro, (C4)...	300	Imlaystown, (D3)...	150
Almonesson, (B4)...	200	Browtown, (D3)...	200	Denville, (D2)...	630	Gibbstown, (B4)...	200	Iona, (B4).....	100
Alpha, (B2).....	2,140	Budd Lake, (C2)...	120	Dias Creek, (C5)...	250	Gladstone, (C2)...	1,226	Irvington, (D2)...	25,488
Alpine, (E2).....	350	Buddtown, (C4)...	250	Dividing Creek,		Glassboro, (B4)...	2,100	Iselin, (D2).....	100
Ancora, (C4)....	300	Buena, (C4).....	50	(B5).....	500	Glendora, (D3)...	250	Island Heights, (D4)	194
Andover, (C2)....	417	Burleigh, (C5)...	150	Dorchester, (C5)...	100	Glen Gardner, (C2)	818	Jacksonville, (C3)	100
Anglesea, (C5)...	170	Burlington, (C3)...	9,049	Dorothy, (C5)...	200	Glen Ridge, (D2)...	4,620	Jacobstown, (C3)...	100
Anndale, (C2)...	380	Butler, (D2)....	2,886	Dover, (C2)....	9,803	Glen Rock, (D2)...	2,181	Jamesburg, (D3)...	2,052
Anthony, (C2)...	100	Buttzville, (C2)...	330	Drakestown, (D2)...	200	Glenwood, (D1)...	300	Janvier, (B4)....	200
Ardena, (D3)....	500	Calwell, (D2)...	3,993	Dumont, (E2)...	2,537	Gloicester City,		Jefferson, (B4)...	110
Arlington, (D2)...	10,000	Califon, (C2)...	513	Dundee Lake, (D2)	400	(B4).....	12,162	Jenkins, (D4)....	100
Asbury, (B2)....	580	Camden, (B4)...	116,309	Dunellen, (D2)...	3,394	Goshen, (C5)....	350	Jersey City, (D2)	298,103
Asbury Park, (E3)	12,400	Campaw, (D1)...	100	Dutchneck, (C3)...	100	Grantwood, (E2)...	1,600	Jobstown, (C3)...	200
Ashland (C4)....	320	Canton, (B5)....	190	East Atlantic City,		Grassey Sound, (C5)	100	Johnsburg, (C2)...	150
Atco, (C4).....	600	Cape May, (C5)...	2,999	(D5).....	12	Great Meadows, (C2)	150	Juliustown, (C3)...	1,000
Athenia, (D2)....	410	Cape May Court		E. Millstone, (C2)...	427	Greencrest, (C5)...	200	Kearnsburg, (D3)...	1,321
Atlantic City, (I15)	50,707	House, (C5)....	800	E. Newark, (D2)...	3,057	Greenpond, (C2)...	100	Kearny, (D2)....	26,724
Atlantic Highlands,		Cape May Pt., (C5)	121	E. Nutley, (D2)...	700	Green Village, (D2)	170	Kenilworth, (D2)...	1,312
(D3).....	1,629	Carlstadt, (D2)...	4,472	E. Orange, (D2)...	50,710	Greenwich, (B3)...	1,000	Kenvil, (C2)....	350
Atsion, (C4)....	100	Carlton Hill, (D2)...	100	East Paterson,		Grenloch, (B4)...	200	Keyport, (D3)...	4,415
Auburn, (B4)....	180	Carmel, (B5)....	750	(D2).....	2,441	Griggstown, (C4)	330	Kingsland, (D2)...	800
Audubon, (B4)...	4,740	Carpentersville, (B2)	210	E. Rutherford,		Groveville, (C3)...	300	Kingston, (C3)...	300
Aura, (B4).....	130	Carteret, (D2)...	4,500	(D2).....	5,463	Guttenberg, (D2)...	6,726	Kingwood, (C3)...	100
Avalon, (C5)....	197	Cassville, (D3)...	220	Eatontown, (D3)...	1,200	Hackensack, (D2)...	17,667	Kinkora, (C3)...	100
Avenel, (D2)....	100	Cedarbrook, (C4)	400	Edgewater, (E2)...	3,530	Hackettstown, (C2)	2,936	Kirkwood, (C4)...	160
Avon by the Sea,		Cedar Grove, (D2)	670	Edgewater Park,		Haddonfield, (B4)	5,646	Kresson, (C4)...	300
(H6).....	647	Cedar Lake, (C4)	110	(C3).....	200	Haddon Hgts., (B4)	2,950	La Fayette, (C1)...	400
Bakersville, (C5)...	150	Cedar Run, (D4)...	200	Egg Harbor City,		Hainesport, (B1)...	300	Lake Como, (E3)...	230
Baptistown, (C2)...	120	Cedarville, (B5)...	1,500	(C4).....	2,622	Hainesport, (C4)...	500	Lakehurst, (D3)...	1,000
Bargaintown, (C5)...	100	Centerton, (C4)...	100	Elberon, (E3)...	160	Hainesville, (C1)...	300	Lakewood, (D3)...	4,000
Barnegat, (D4)...	850	Centerton, (B4)...	130	Eldora, (C5)....	100	Haledon, (D2)....	3,435	Lambertville, (C3)	4,660
Barnegat City, (D4)	600	Changewater, (C2)	210	Elizabeth, (D2)...	95,783	Haleville, (B5)...	330	Landing, (C2)...	120
Barnsboro, (B4)...	200	Chapel Hill, (D3)	200	Ellisburg, (B4)...	110	Hamburg, (C1)...	806	Landisville, (C4)...	200
Barrington, (B4)...	1,333	Charlotteburg, (D1)	100	Ellisdale, (C3)...	275	Hamilton Sq., (C3)	430	Laurel, (D4)....	200
Basking Ridge, (C2)	640	Chatham, (D2)...	2,421	Elm, (C4).....	230	Hammoncton, (C4)	6,417	Laurel Springs, (B4)	100
Bayhead, (D3)...	273	Chatsworth, (D4)...	400	Elmer, (B4)....	1,115	Hampton, (C2)...	916	Laurelton, (D3)...	100
Bayonne, (D2)...	76,754	Cheesequake, (D3)	200	Elwood, (C4)...	150	Hancocks Bridge,		Lavallette, (D4)...	117
Bayville, (D4)...	100	Chesterhill, (C4)	287	Emerson, (D2)...	973	(B4).....	130	Lawnside, (B4)...	300
Beach Haven, (D4)	329	Chester, (C2)...	1,100	Englewood, (E2)...	11,627	Hanover, (D2)....	400	Lawrence Sta., (C3)	250
Beachwood, (D4)...	40	Chesterfield, (C3)	150	Englewood Cliffs,		Hanover Neck, (D2)	220	Lawrenceville, (C3)	300
Beatystown, (C2)	170	Chews, (B4)....	440	(E2).....	594	Hardingville, (B4)...	100	Layton, (C1)....	320
Bedminster, (C2)...	130	Chrome, (D2)....	900	English Creek, (C5)	300	Hardwick, (C1)...	100	Lebanon, (C2)...	260
Beemerville, (C1)...	250	Cinnaminson, (B4)	150	Englishtown, (D3)...	641	Harlingen, (C3)...	200	Ledgewood, (C2)...	400
Beesleys Point, (C5)	175	Clarksboro, (B4)...	200	Erma, (C5)....	230	Harmony, (B2)...	250	Leeds Point, (D5)...	300
Belford, (D3)....	500	Clarksburg, (D3)...	250	Essex Fells, (D2)...	598	Harrington, (E2)...	627	Leesburg, (C5)...	250
Belleplain, (C5)...	100	Clayton, (B4)...	1,905	Estelville, (C5)...	100	Harrison, (D2)...	15,721	Leonardo, (D3)...	200
Belleville, (D2)...	15,660	Clementon, (C4)...	500	Everett, (D3)...	100	Harrisonville, (B4)	300	Leonia, (E2)....	2,979
Belmar, (E3)....	1,987	Clermont, (C5)...	300	Everittstown, (B2)	150	Hartford, (C4)...	100	Liberty Corner, (C2)	260
Belvidere, (B2)...	1,793	Cliffside, (D2)...	5,709	Evesboro, (C4)...	100	Harvey Cedars, (D4)	65	Lincoln, (C2)...	200
Bergenfield, (E2)...	3,667	Cliffwood, (D3)...	130	Ewan, (B4)....	250	Hasbrouck Heights,		Lincroft, (D3)...	100
Berkley Hgts., (D2)	300	Clinton, (D2)...	26,470	Ewingville, (C3)...	250	(D2).....	2,895	Lindenwald, (C4)...	1,756
Berlin, (C4)....	800	Closter, (E2)...	950	Fairfield, (D2)...	150	Haskell, (D1)....	700	Linwood, (C5)...	300
Bernardsville, (C2)	1,000	Cokesbury, (C2)...	100	Fairhaven, (D3)...	1,295	Haworth, (D2)...	748	Little Falls, (D2)...	3,600
Beverly, (C3)....	2,562	Cold Spring, (C5)...	150	Fairlawn, (D2)...	120	Hawthorne, (D2)...	5,135	Little Ferry, (D2)...	2,715
Birmingham, (C4)	220	Colesville, (C1)...	200	Fairmount, (C2)...	100	Hazen, (B2).....	180	Little Silver, (D3)...	400
Bivalve, (B5)....	450	Collingswood, (B4)	8,714	Fairton, (B5)....	500	Hazlet, (D3)....	200	Little York, (D2)...	150
Blackwells Mills,		Colonia, (D2)....	100	Fairview, (E2)...	4,882	Heislerville, (C5)...	420	Livingston, (D2)...	550
(C3).....	230	Colts Neck, (D3)...	150	Fanwood, (D2)...	724	Helmetta, (D3)...	687	Locust, (D3)....	150
Blackwood, (B4)...	600	Columbia, (B2)...	200	Far Hills, (C2)...	300	Herbertsville, (D3)	200	Lodi, (D2)....	8,175
Blairstown, (C2)...	800	Columbus, (C3)...	590	Farmingdale, (D3)	474	Hewitt, (D1)....	210	Long Branch, (E3)	13,521
Bloomfield, (D2)...	22,019	Cookstown, (C3)...	180	Fieldsboro, (C3)...	530	Hibernia, (D2)...	1,400	Longport, (D5)...	100
Bloomington, (D1)	2,193	Copperhill, (C3)...	100	Finderne, (C2)...	100	High Bridge, (C2)...	1,795	Long Valley, (C2)...	580
Bloomsbury, (B2)...	650	Coytesville, (E2)...	750	Finesville, (B2)...	150	Highland Park,		Lower Bank, (C4)...	150
Blue Anchor, (C4)	250	Cranbury, (D3)...	800	Fish House, (B4)...	100	(D3).....	4,866	Lower Squankum,	
Bogota, (D2)....	3,906	Cranford, (D2)...	2,000	Fishing Creek, (C5)	180	Highlands, (E3)...	1,731	(D3).....	250
Boonton, (D2)...	5,372	Creamridge, (D3)...	100	Flanders, (C2)...	510	Highpoint, (D4)...	300	Ludlow, (B2)....	200
Bordentown, (C3)	4,371	Cresskill, (E2)...	942	Flemington, (C3)...	2,590	Highwood, (E2)...	2,674	Lumberton, (C4)...	850
Boundbrook, (C2)...	5,906	Crosskeys, (B4)...	250	Florence, (C3)...	1,800	Hillsdale, (D1)...	950	Lynchhurst, (D2)...	1,350
Braddock, (C4)...	200	Crosswicks, (C3)...	400	Folsom, (C4)....	217	Hilton, (D2)....	220	Lyons Farms, (D2)	400
Bradely, (D3)...	150	Croton, (C2)....	110	Fords, (D2)....	750	Hoboken, (D2)...	68,166	McAfee Valley, (D1)	200
Bradley Beach,		Daretown, (B4)...	150	Forked River, (D4)	500	Hoboken, (D1)...	586	McKee City, (C5)...	140
(E3).....	2,307	Dayton (C3)....	390			Holland, (B2)....	100	Madison, (D2)...	5,523
Branchville, (C1)...	588								



NEW JERSEY

SCALE OF MILES
0 5 10 15 20
16 MILES TO THE INCH

State Capital @ County Seats @



Hammond's 8 M. Map of New Jersey
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NEW JERSEY - Cont'd.

Magnolia, (B4)...	1,245	Navesink, (D3)...	600	Pennington, (C3)...	865	Seabright, (E3)...	856	Union, (D2).....	1,900
Mehwah, (D1)...	550	Neptune City, (D3)	539	Penns Grove, (B4)	6,060	Sea Girt, (D3)...	110	Upper Montclair,	
Maine Avenue, (C5)	150	Nesco, (C4)...	100	Pennsville, (A4)...	400	Sea Isle City, (C5)	564	(D2).....	1,800
Malaga, (B4)...	400	Neshanic, (C3)...	300	Pensaiken, (B4)...	500	Seaside Hgts., (N4)	154	Upper Saddle River,	
Manahawkin, (D4)	700	Netcong, (C3)...	1,800	Perrineville, (D3)	200	Seaside Park, (D4)	179	(D1).....	251
Manalapan, (D3)...	300	Newark, (D2)...	414,524	Perth Amboy, (D3)	41,707	Seaville, (C5)...	200	Vanhiseville, (D3)	320
Manasquan, (D3)...	1,705	New Bedford, (D3)	230	Petersburg, (C5)...	180	Secaucus, (D2)...	5,423	Vauxhall, (D2)...	600
Mantoloking, (E3)	750	Newbridge, (D2)...	530	Phillipsburg, (B2)	16,923	Sergeantsville, (C3)	200	Ventnor, (D5)...	2,193
Mantua, (B4)...	200	New Brunswick,		Pine Brook, (D2)...	280	Sewaren, (D2)...	100	Vernon, (D1)...	200
Mapleshade, (C4)	200	(D3).....	32,779	Pittman, (B4)...	3,385	Sewell, (B4)...	200	Verona, (D2)...	3,039
Maplewood, (D2)...	600	New Durham, (D2)	4,100	Pittsgrove, (B4)...	110	Shadyside, (E2)...	800	Vienna, (C2)...	300
Marcella, (D2)...	130	New Egypt, (C3)...	800	Pittstown, (C2)...	150	Sharptown, (B4)...	230	Villapark, (D3)...	100
Margate City, (D5)	249	Newfield, (B4)...	500	Plainfield, (D2)...	27,700	Shiloh, (B5)...	400	Vincetown, (C4)	900
Markboro, (C2)...	100	Newfoundland, (D1)	570	Pleasant Mills, (C4)	100	Short Hills, (D2)...	350	Vineland, (B5)...	6,799
Marlboro, (D3)...	400	New Gretna, (D4)	450	Pleasantville, (C5)	5,887	Shrewsbury, (D3)	400	Waldwick, (D1)...	1,296
Marlton, (C4)...	700	New Hampton, (C2)	130	Pluckemin, (C2)...	150	Sicklerville, (B4)	230	Wallington, (D2)...	5,715
Marmora, (C5)...	200	New Lisbon, (C4)	130	Pt. Pleasant, (D3)	900	Silver Lake, (D2)	250	Wallpack Center, (C1)	100
Martinsville, (C2)	150	New Market, (D2)	500	Pt. Pleasant Beach,		Silverton, (D3)...	100	Wanaque, (D1)...	2,916
Masonville, (C4)...	150	New Milford, (E2)	300	(D3).....	1,575	Singac, (D2)...	210	Waretown, (D4)...	300
Matawan, (D3)...	1,910	New Monmouth,		Pointville, (C3)...	300	Smiths Landing, (C5)	400	Warren Paper Mills,	
Maurer, (D2)...	520	(D3).....	100	Pomerania, (C5)...	200	Smiths Mills, (D2)	200	(B2).....	150
Maurice River, (C5)	1,100	Newport, (B5)...	850	Pompton Lakes,		Smithville, (C4)...	375	Warrenville, (C2)	130
Mauricetown, (B5)	560	New Providence,		(D1).....	2,008	Somers Point, (C5)	843	Washington, (C2)	3,341
Mayetta, (D4)...	100	(D2).....	1,203	Pompton Plains, (D2)	320	Somerville, (C2)...	6,718	Watchung, (D2)...	100
Mays Landing, (C5)	1,800	Newton, (C1)...	4,125	Port Colden, (C2)	310	South Amboy, (D3)	7,897	Waterford Works,	
Maywood, (D2)...	1,618	Newtonville, (C4)	100	Port Elizabet, (C5)	200	Southard, (D3)...	400	(C4).....	300
Medford, (C4)...	1,200	New Vernon, (C2)	110	Port Mammouth,		So. Boundbrook,		Waterloo, (C2)...	130
Medford, (C2)...	969	New Village, (B2)	150	(D3).....	650	(C2).....	1,302	Wayne, (D2)...	210
Menlo Park, (D2)...	350	Norma, (B5)...	100	Port Morris, (C2)	560	So. Branch, (C2)...	200	Wayside, (D3)...	200
Merchantville, (B4)	2,749	No. Arlington, (D2)	1,767	Port Murray, (C2)	310	So. Cape May, (C5)	100	Weehawken, (D2)	13,488
Merchuten, (D2)...	3,334	No. Branch, (C2)	250	Port Norris, (B5)	1,350	So. Dennis, (C5)...	200	Wenonah, (B4)...	918
Mickleton, (B4)...	130	No. Caldwell, (D2)	466	Port Republic, (C4)	340	So. Orange, (D2)	7,274	W. Caldwell, (D2)	1,085
Middlebush, (C3)...	130	Northfield, (C5)	1,127	Pottersville, (C2)...	200	So. Plainfield, (D2)	300	W. Cape May, (C5)	967
Middlesex, (D3)...	1,852	No. Hackensack, (D2)	350	Princeton, (C3)...	5,917	So. River, (D3)...	6,596	W. Collingswood,	
Middletown, (D3)	200	No. Haledon, (D2)	887	Prospect Park, (D2)	4,292	So. Seaville, (C5)	300	(B4).....	600
Middle Valley, (C2)	200	No. Paterson, (D2)	1,300	Prospect Plains, (C3)	100	So. Vineland, (C5)	500	W. Creek, (D4)...	275
Midland Park, (D2)	2,243	No. Plainfield, (D2)	6,916	Quakertown, (B2)	250	Sparta, (C1)...	800	West End, (E3)...	150
Midvale, (D1)...	420	Northvale, (E2)	827	Quinton, (B4)...	900	Spotswood, (D2)	704	Westfield, (D2)...	9,063
Millford, (D2)...	656	No. Wildwood, (C5)	807	Rahway, (D2)...	11,042	Springfield, (D3)	600	W. Freehold, (D3)	230
Millbrook, (C1)...	100	Northwood, (E2)	820	Ramsey, (D1)...	2,090	Spring Lake Beach,		W. Hoboken, (D2)	40,074
Millburn, (D2)...	3,000	Nutley, (D2)...	9,421	Rancocas, (C3)...	330	(E3).....	1,009	W. Long Branch,	
Millington, (C2)...	300	Oakhurst, (D3)...	300	Raritan, (C2)...	4,457	Springtown, (B2)...	330	(D3).....	966
Millstone, (C3)...	178	Oakland, (D1)...	497	Readington, (C3)...	200	Stanhope, (C2)...	1,031	W. Milford, (D1)	210
Milltown, (D3)...	2,573	Oaklyn, (B4)...	1,148	Reaville, (C3)...	300	Stanley, (D2)...	210	Westmont, (B4)...	600
Millville, (B5)...	14,691	Oak Ridge, (D1)...	110	Red Bank, (D3)...	9,251	Stanton, (C2)...	120	West New York,	
Milton, (C1)...	330	Oak Tree, (D2)...	200	Richfield, (D2)...	210	Stanwick Ave., (C4)	400	(D2).....	29,926
Minebrook, (C2)...	100	Ocean City, (C5)...	2,512	Richland, (C5)...	180	Steelmanville, (C5)	300	W. Orange, (D2)...	15,573
Minehill, (C5)...	100	Oceanange, (D4)	69	Richwood, (B4)...	180	Stephensburg, (C2)	180	W. Paterson, (D2)	1,858
Minotola, (C2)...	500	Ocean Grove, (E3)	3,100	Ridgefield, (E2)...	1,560	Sterling Forest, (D1)	250	W. Point Pleasant,	
Monmouth Beach,		Oceanic, (D3)...	600	Ridgefield Park, (E2)	8,575	Stewartville, (B2)	560	(D3).....	290
(D3).....	410	Oceanport, (D3)	400	Ridgewood, (D2)...	7,580	Stillwater, (C1)...	120	W. Portal, (B2)...	250
Monmouth Jc., (C3)	400	Oceanview, (C5)...	150	Riegelsville, (B2)...	500	Stirling, (C2)...	540	Westville, (B4)...	2,380
Monroe, (C1)...	100	Oceanville, (D5)...	300	Ringoes, (C3)...	330	Stockholm, (D1)	430	Westwood, (D2)...	2,597
Monroeville, (B4)	110	Ogdensburg, (C1)	939	Ringwood Manor,		Stockton, (C3)...	519	Weymouth, (C4)...	973
Montague, (C1)...	200	Old Bridge, (D3)	900	(D1).....	1,025	Stone Harbor, (C5)	159	Wharton, (C2)...	2,877
Montclair, (D2)...	28,810	Old Tappan, (E2)	404	Rio Grande, (C5)	250	Stoutsbury, (C3)...	100	Whippany, (D2)...	970
Montvale, (E1)...	779	Oldwick, (E4)...	300	Risley, (C5)...	200	Stratford, (B4)...	100	White House, (C2)	100
Montville, (D2)...	690	Oradell, (E2)...	800	River Edge, (D2)	380	Succasunna, (C2)...	610	White House Sta-	
Moonachie, (D2)...	1,194	Orange, (D2)...	33,268	Riverside, (D2)...	1,077	Summit, (D2)...	10,174	tion, (C2)...	350
Moorestown, (C4)	4,000	Ormond, (C5)...	100	Riverside, (C3)...	3,800	Sussex, (C1)...	1,318	Whitesville, (D3)...	200
Morganville, (D3)	180	Orston, (B4)...	180	Riverton, (C3)...	2,341	Swainton, (C5)...	310	Wilburtha, (C3)...	200
Morris Plains, (C2)	450	Osbornville, (D3)	660	Rivervale, (D1)...	350	Swedesboro, (B4)	1,838	Wildwood, (C6)...	2,790
Morristown, (D2)	12,548	Overbrook, (B4)...	150	Roadstown, (B5)...	220	Sykesville, (C3)...	130	Wildwood Crest,	
Morsemere, (D2)	300	Oxford, (C2)...	2,600	Robbinsville, (C2)	130	Tabor, (D2)...	200	(C5).....	161
Mountainside, (D2)	493	Palisades, (E2)...	250	Rochelle Park, (D3)	300	Tansboro, (C4)...	480	Williamstown, (C4)	1,600
Mountainview, (D2)	420	Palisades Park, (E2)	2,633	Rockaway, (D2)...	2,655	Teaneck, (D2)...	3,000	Windsor, (C3)...	300
Mountainville, (C2)	150	Palmyra, (B3)...	2,500	Rocksburg, (B2)...	100	Tenafly, (E2)...	5,650	Winslow, (C4)...	250
Mt. Airy, (C3)...	100	Papackating, (C1)...	100	Rocky Hill, (C3)...	305	Tennent, (D3)...	100	Woodbine, (C5)...	1,406
Mt. Arlington, (C2)	213	Parkertown, (D4)	150	Roebling, (C3)...	750	Teterboro, (D2)...	24	Woodbridge, (D2)	4,500
Mt. Bethel, (C2)...	200	Park Ridge, (E1)...	1,481	Roosevelt, (D4)...	11,047	Thorofare, (B4)...	130	Woodbury, (B4)...	5,801
Mt. Ephraim, (B4)	300	Parlin, (D3)...	150	Roseland, (D2)...	609	Three Bridges, (C2)	300	Woodbury Heights,	
Mt. Freedom, (C2)	200	Parry, (B4)...	130	Roselle, (D2)...	5,737	Tinton Falls, (D3)	200	(B4).....	481
Mt. Holly, (C3)...	4,800	Parshippany, (D2)...	230	Roselle Park, (D2)	5,438	Titusville, (C3)...	300	Woodcliff Lake,	
Mt. Hope, (D2)...	390	Passaic, (D2)...	63,841	Rosenhayn, (B5)...	600	Toms Rivers, (D4)	2,200	(D1).....	587
Mt. Laurel, (C4)...	250	Paterson, (D2)...	135,875	Rumson, (D3)...	1,658	Totowa, (D2)...	1,864	Woodyme, (B4)...	1,515
Mt. Olive, (C2)...	100	Patterson, (C2)...	300	Rutherford, (B4)...	100	Towaco, (D2)...	150	Wood Ridge, (D2)	1,923
Mt. Pleasant, (B2)	150	Paulsboro, (B4)...	4,352	Runnertown, (D2)	9,497	Townley, (D2)...	300	Woodstown, (B4)	1,589
Mt. Rose, (C3)...	120	Peapack-Gladstone,		Saddle River, (D1)	506	Tremley, (D2)...	150	Woodsville, (C3)...	100
Mt. Tabor, (D2)...	200	(C2).....	1,226	Salem, (B4)...	7,435	TRENTON, (C3)	119,289	Wortendyke, (D1)	450
Mullica Hill, (B4)	510	Pedricktown, (B4)	600	Sayreville, (D3)...	5,000	Tuckahoe, (C5)...	800	Wrightstown, (C3)	5,288
Murray Hill, (D2)	100	Peermont, (C5)...	100	Schoolleys Mtn., (C2)	180	Tuckerton, (D4)...	1,106	Wyckoff, (D1)...	390
National Park, (B4)	1,000	Peezsburg, (E2)...	370	Scotch Plains, (D2)	600	Turnersville, (B4)	180	Yardville, (C3)...	350
Naumbright, (C2)...	220	Pemberton, (C4)...	800	Scullville, (C5)...	200	Union, (D2).....	20,651	Yorktown, (B4)...	180

uniform in height. This division may be considered as a seaward-sloping table-land, whose northwest side has an elevation of 1,000 to 1,500 feet above the ocean and its southeastern side 600 to 900 feet above the sea. In the northern part there are several lakes elevated amid the mountains—Hopatcong, Greenwood, Macopin, Splitrock, Green, Wawayanada and Budd's being the more important of these natural upland sheets of water.

The Red Sandstone Plain or Triassic Area, also called the Piedmont plain, is bounded on its northern border by the Highlands. On the southeast, this third great topographic zone merges into the clays and marls of the coastal plain. It is 67 miles long and 30 miles wide at the Delaware River. The traprock ridges, known as Palisades, Watchung, Sourland, Cushetunk and other mountain ranges, rise abruptly above the general level of the sandstone plain. They are generally forested, whereas the sandstone country is nearly cleared and in farms. These mountains rise 400 to 900 feet above sea-level. The drainage is largely by the Hackensack, Passaic and Raritan rivers and their tributaries.

The fourth zone, known as the coastal plain, includes all the country southeast of the Triassic sandstone area and borders the ocean. This zone is about 100 miles long from Sandy Hook to Salem City, and is 10 to 20 miles wide. The surface is hilly in part, but with gentle slopes, except where some of the streams have cut their way through its earthy beds and formed steep-sided stream valleys. The Navesink Highlands and the Mount Pleasant Hills are the highest lands in this zone. The drainage is by many tributaries westward into the Delaware and by the Atlantic Coast streams into the Atlantic Ocean. In the northwestern part of this zone there are clay beds and greensand marls, which make the outcrop on the surface in places; on the southeast there are sands, clays and gravels and fringing the sea a narrow range of sand hills or coastal dunes. Within the coastal plain lie the "Pines," a wooded area of so great an extent as to contribute largely to the forest acreage of New Jersey. In lots of 10 acres and over, there are 2,070,000 acres of woodland, with only 2,000,000 acres of improved land in farms. The famous sea-wide resorts of the State fringe the coastal plain.

As set forth by Prof. John C. Smack, the geologic structure of New Jersey is so related to the topography that observations concerning the physical features give a satisfactory clue to such structure. All of the larger geological formations of the United States, except coal, occur in parallel zones, as has been indicated. These formations extend from northeast to southwest and a section line across the State from Port Jervis southeast to the ocean crosses them nearly at right angles to their trend. The oldest geological formations in the State are the crystalline rocks of the Highlands. Granite, gneisses and other crystalline schistose rocks and beds of magnetic iron ore make up the mass of these mountain ranges. These rocks are generally much tilted in position, almost on edge and are also much faulted. They strike northeast and southwest and dip to the southeast or northwest. The iron ores and zinc ores which are mined in the State are found in these formations. The granite, gneiss

and crystalline limestone or marble, used in building, are also from these Highland formations.

The Palæozoic rocks are found in the valleys included in the Highlands, in the Kittatinny Valley and Kittatinny Mountain and in the Green Pond and Copperas mountains. Cambrian, Silurian and Devonian are represented and the rocks are limestones, slates, sandstones and silicious conglomerates. The magnesian limestones and the slates constitute wide belts in the Kittatinny Valley, the Musconetcong, Pohatcong, Pequest and other valleys. The Kittatinny Mountain mass consists of sandstones and conglomerates of the Oneida and the Medina epochs of the Silurian Age. In the valley of the Upper Delaware, west of this mountain, there are narrow belts of waterlime, Lower Helderberg and Upper Helderberg, fossiliferous limestones, with Marcellus shale as the highest member of the Devonian within the State. The Green Pond Mountain rocks also have been referred to the Oneida horizon. The limestones and slates are the formations on which the rich wheat lands of Warren County and the dairy farms of Sussex are situated. Stone for building, slate for roofing and flagging stone and limestone for lime and cement, are quarried in the Palæozoic areas. Copper, lead and zinc ores and barite, limonite or brown hematite and glass sand have been worked in many localities.

The red shales and sandstones and the included trap-rocks of the northern-central part of the State are referred to the Juras-trias of Mesozoic time. The sandstone beds dip in general toward the northwest, at a low angle of inclination in the sandstone. The erupted trap-rocks form long ranges of steep-sloping hills or mountains, often crescentic in form. A great deal of excellent sandstone for building and stone for road-making is quarried in this formation. Copper ores occur in the sandstone near the trap-rock or at their junction. Barite also has been mined in the sandstone at one locality.

The cretaceous rocks of the State include the clay district of Middlesex County and the greensand marl developed in Monmouth County and thence southwest to Salem County. A large amount of clay is dug in the Raritan clay district. The greensand marl, dug in shallow pits generally and in numberless localities, has had a wide use locally as a fertilizer.

The formations of the coastal plain zone, later than the cretaceous beds, are greensand marls of the Eocene, clays and sands of the Miocene and the clays, sands and gravels of the post-Tertiary. They are recognized in a fourfold division and are known as Beacon Hill, Bridgton, Pensauken and Cape May formations. Clays and sands for brick, terra-cotta and pottery, marls for fertilizer, glass sands and gravel for road-building are dug in these formations.

In the northern part of the State there are surface formations of glacial epochs and the terminal moraine of the last glacial ice is traced from Perth Amboy by Morristown and Hackettstown to Belvidere on the Delaware.

Alluvial deposits of recent time are recognized in the river valleys and in the tidal marshes and in some of the fresh-water swamps.

Economic Geology.—To the early settlers the mineral wealth of the State was well known. Before the Revolution, copper, "bog" iron, brick clay and glass sand were exploited. At the present time New Jersey is the only State of any importance as a mineral producer in which the utilization of its clay resources constitutes the chief industry and represents over 50 per cent of the total value of all minerals produced. The clay products of this State, moreover, include every variety of brick and tile and every variety of pottery produced in the United States as classified by the National Geological Survey. The clay-working industry reached high record in the calendar year 1921, when the total value of the clay products was \$27,214,685, of which \$11,421,609 was represented by the output of the brick and tile establishments and \$15,793,076 by the output of the potteries. The State ranked first in the production of china and sanitary ware; second in the value of pottery products; third in the value of all clay products; among the first five States in the production of most of the varieties of clay products. Clay for the manufacture of ordinary brick is dug in 20 out of the 21 counties of the State. Mercer County is the most important clay-working county. Its principal product is sanitary ware. Trenton is the centre of the pottery industry. Middlesex County, ranking second, is the principal producer of common brick, architectural terra-cotta, fireproofing tile (other than drain tile) and fire brick. Bergen County ranks third in the manufacture of common brick; Burlington, Camden, Gloucester, Mercer and Middlesex counties produce fire clay; Mercer and Ocean counties, saggar clay; Camden, Essex, Monmouth, Morris and Union counties, pottery clay; and Middlesex County (at Woodbridge, Sayreville and South Amboy), ball and slip clay.

Based upon the recoverable metallic content of the ore mined New Jersey is one of the most important producers of zinc and zinc-ore mining is second in importance among the State's mineral industries. In the quantity of zinc contained in the ores mined, New Jersey ranks second among all the States, being exceeded only by Missouri. The value of the metallic content of the zinc ore mined in 1912 was \$9,626,191. In 1922 the State produced more zinc than all the other Eastern States, the total being nearly 112,894,000 pounds. The centre of this industry is the famous Franklin Furnace district in Sussex County, where mining has been carried on continuously for more than 60 years.

Third in importance among the mineral industries is the manufacture of Portland cement, the plants in the vicinity of Phillipsburg, in Warren County, being the eastern end of the celebrated Lehigh district of Pennsylvania. The value of the output in 1912 was \$3,052,098; in 1913, \$3,638,755; in 1921, \$4,820,538.

The principal quarry product is trap rock, used chiefly for road making and concrete, the Palisades region and especially Somerset, Passaic, Hunterdon, Essex and Hudson counties yielding the largest output. The total value of all stone, exclusive of serpentine quarried in the State in 1921 was \$2,634,738, nearly 80 per cent of which was that of the trap rock product.

Limestone, used in the manufacture of cement, as crushed stone for concrete and macadam and for blast furnace flux, is quarried chiefly in Sussex County, with smaller quantities in Hunterdon and Warren counties. Granite and sandstone are also produced in small quantities, the former in Warren, Passaic and Sussex counties and the latter chiefly in Bergen and Mercer counties.

New Jersey is one of the four leading States in the production of molding sand, the output in 1917 having a value of \$651,279; building sand yielded \$545,437; and in 1921 sand and gravel yielded \$2,436,298. Building and molding sands are dug in many counties, particularly along the eastern borders; fire sand for fire brick is produced in Middlesex County; filter sand in Burlington and Cape May counties; and glass sand in Camden, Cumberland, Gloucester and Middlesex counties.

Iron ore shipped from the mines in 1917 had a value of \$2,341,160. Iron ore sold to furnaces in 1921 had a value of \$551,688. Other commercial products of the State are occasional gems, lime, manganiferous zinc residuum, mineral paints, mineral waters, sand-lime brick, slate and talc.

The following shows the variations in the values of all mineral products in the most notable years: 1912, \$37,195,940; 1913, \$37,271,129; 1914, \$31,756,503; 1921, \$47,429,290.

Agricultural Interests.—Possessing a great diversity of soils and a somewhat notable variation in temperature, New Jersey has ever occupied a distinctive position as an agricultural community. The average yearly temperature ranges from 49.6° in the Highlands to 53.0° on the sea coast. The average annual precipitation, including melted snow, is 47.18 inches in the Highlands and 45.92 inches on the sea coast. Aside from the staple crops the fruits of the State have a large sale in the nearby markets of Philadelphia and New York. Peaches and apples are extensively grown in the northern and northwestern portions of the State, while pears are cultivated in the midland counties. These fruits are common, however, in all sections. The southern counties produce large acreages of strawberries, raspberries and blackberries, while cranberries are a staple product of boggy areas in Burlington and Ocean counties. Grapes are grown extensively in the southern section of New Jersey, while plums, cherries and currants are common in all sections. Huckleberries are of spontaneous growth and are gathered in large quantities. In truck farming, watermelons and cantaloupes, the Hackensack variety of the latter competing with the Colorado product, are grown on the large plantations and small farms near Philadelphia and New York. Market gardening, owing to the reasonable price of land and extensive stone-road system and quick, cheap and safe transportation by rail and boat, is a profitable industry in New Jersey, more particularly in the vicinity of New York. Commercial floriculture gives to the State a pre-eminence. Dairy-ing is largely confined to the northern, central and southwestern portions of the State. The poultry farms of New Jersey are near the markets of Philadelphia and New York. The forest lands, including stump and brush lands to merchantable timber, of the State occupy about 2,000,000 acres; the cleared farm land about the

same acreage; 1,200,000 acres of forest land is coniferous, pitch pine on the uplands and white cedar in the swamps. This is the region known as the "Pines," extending from Lakewood on the north to Cape May County on the south and embracing a number of health resorts. The northeastern Highlands, with 210,000 acres, the Kittatinny Mountain with 58,000 acres, the Palisade Mountain with 11,000 are the remaining large forest areas. The forest products are worth about \$4,000,000 annually. The State renders directly and indirectly great assistance to agricultural interests by the media of an agricultural college located in New Brunswick, experiment stations, a board of agriculture, grange and horticultural society. Reports, institutes and lectures are the means of disseminating information.

According to the United States census of 1920, the State had a total of 29,702 farms, comprising 2,282,585 acres, of which 1,555,607 were improved. The value of the land was reported as \$142,182,498; buildings, \$108,141,488; implements and machinery, \$25,459,205; and livestock, \$36,064,757; total value of all farm property, \$311,847,984, an increase of \$57,015,283 in 10 years. The staple crops in the preceding year, in the order of production values, were potatoes, \$21,670,546; corn, \$14,480,577; hay and forage, \$14,017,095; wheat, \$3,087,324; rye, \$1,722,461; oats, \$1,403,453; and buckwheat, \$182,009. Small fruits had a farm value of \$3,526,203. Crop reports for the calendar year 1922 showed: Corn, 236,000 acres, 9,912,000 bushels, \$6,938,000 farm value; winter wheat, 77,000 acres, 1,540,000 bushels, \$1,694,000, value; oats, 72,000 acres, 2,232,000 bushels, \$1,228,000, value; barley, 10,000 acres, 220,000 bushels, \$253,000, value; rye 61,000 acres, 1,159,000 bushels, \$985,000, value; cranberries, 11,000 acres, 200,000 barrels, \$3,950,000 value; tame hay, 303,000 acres, 483,000 tons, \$8,778,000, value; potatoes, 95,000 acres, 16,435,000 bushels, \$11,833,000, value; sweet potatoes 20,000 acres, 3,500,000 bushels, \$2,520,000, value; apples, 2,610,000 bushels; peaches 2,000,000 bushels, and pears, 405,000 bushels. At the beginning of 1923 the livestock on farms comprised 72,000 horses, valued at \$9,288,000; 6,000 mules, valued at \$786,000; 153,000 milch cows, valued at \$13,511,000; 32,000 other cattle, valued at \$1,242,000; 10,000 sheep, valued at \$75,000, and 132,000 swine, valued at \$2,310,000.

Manufactures.—The great manufacturing districts of New Jersey are located in the immediate vicinity of New York and Philadelphia. Within the limits of the city of Newark (q.v.) alone there are made a wider variety of articles than in any other city in the United States. Newark is famous for leather, jewelry, hats and celluloid, Paterson for silks and locomotives, Passaic for woolen and worsted goods, Jersey City for tobacco products and soap, Trenton for pottery of all grades, structural steel and iron and rubber goods, Camden for shipbuilding and chemicals, Elizabeth for sewing machines and shipbuilding, New Brunswick for hosiery, Perth Amboy and its vicinity for bricks and terra-cotta, Bridgeton, Millville, Vineland and smaller towns for glass. It should be noted here that the foregoing localized industries characterized the pre-war period. With the first shock of battles in Europe a very large number of industrial plants began engaging in the manufacture of war munitions

and after the United States entered the war every plant that could turn out any such products, irrespective of its original purpose, was rushed with war orders. A suggestion of this abnormal industrial activity is given in the article on the city of Newark. While much of the operations for the Entente Allies at first and for them and the United States later on was prudentially screened from the general public, it was no secret that many of the great manufacturing plants in the various cities of New Jersey were working incessantly to make the world safe and fit to live in. And among the many instances of most effective service in the State that rendered at the shipbuilding plant at Camden, where, on 5 May 1918, the steel naval collier *Tuckahoe* was launched just 27 working days after her keel plates were laid, is deserving of special mention.

A healthful development of the manufacturing interests of New Jersey is shown in a comparison of the United States census reports for the operating years 1909 and 1919. According to the census of the former year there were in the State 8,817 manufacturing plants having annual products exceeding \$500 in value and conducted on the factory system, which excludes small hand trades. These plants employed \$977,172,000 capital, an increase of \$499,870,000 in 10 years, and 371,265 persons; paid \$720,033,000 for materials used in manufacturing and \$218,046,000 for services and yielded products valued at \$1,145,529,000, an increase of \$592,523,000 in 10 years. The industries and products of largest values were smelting and refining copper, \$125,651,000; silk and silk goods, \$65,430,000; foundry and machine shop products, \$65,398,000; slaughtering and meat-packing, \$37,583,000; woolen, worsted and felt goods, \$33,939,000; and wire, leather, electrical supplies, tobacco, chemicals and malt liquors. The census of manufactures in 1919 yielded the following summaries: Plants, 11,057; operatives, 602,170; invested capital, \$2,815,577,127; paid for materials, \$2,270,473,279; paid for services, \$771,732,612; and value of products, \$3,672,064,987. In the period of 1914-19 the increase in the capital investment was 108.2 per cent and in the value of products, 161.1 per cent.

Oyster and Fish Industry.—Of the other industries outside those of an agricultural and manufacturing character, the oyster and fish industry is most conspicuous. From the mouth of the Raritan River to Sandy Hook, from Barnegat Bay to Cape May and thence in Delaware Bay to Salem, are about 15,000 acres of productive oyster beds. From the famous Maurice River oyster beds alone \$2,275,000 worth of these bivalves, have been shipped in a single year. From the Atlantic Ocean and Delaware Bay quantities of clams and fish are sent to nearby markets. Shad and sturgeon are caught in Delaware Bay and river.

Communications.—The State is well equipped with transportation facilities. In 1923 it was served by nine great railroad systems, operating on 2,461 miles of track, exclusive of switching and terminal mileage. Besides their main lines these systems operated a considerable number of small subsidiary lines. The main companies were the Pennsylvania; Delaware, Lackawanna and Western; Erie; Central of New Jersey; Lehigh Valley; Philadelphia and Reading; Baltimore and Ohio; West Shore,

Ontario and Western. The State was also entered by regular trains from New York City using the Pennsylvania and the Hudson and Manhattan tubes. In 1918, after the national government had taken over the railroad systems of the country, there was a rerouting of a number of roads operating in New Jersey to speed up war transportation necessities, a transfer of their regular lines being made to the Pennsylvania tunnels. Within the State are the two gateways, Jersey City and adjacent cities leading to Greater New York and Camden to Philadelphia. All the above companies have terminal facilities in Jersey City, Weehawken and Hoboken. Every railroad entering New York city from the west and south transports its passengers through New Jersey. There are nearly 1,000 miles of cable, electric and horse railroad in the State, a large percentage of the trackage being under the control of the Public Service Corporation. A continuous trolley service has been established between Jersey City and Camden, uniting Philadelphia and Greater New York. These roads have cost nearly \$150,000,000. In conjunction with the counties, townships and cities and assessments upon abutting property-owners, New Jersey has aided in the construction of upwards of 1,000 miles of good roads penetrating every section of the State and usable at all seasons of the year. In the apportionment of Federal funds to the States for the construction and maintenance of public roads, under the Act of Congress, approved 11 July 1916, New Jersey was allotted \$59,212.68 for the fiscal year ending 30 June 1917, increased to \$177,357.22 for the fiscal year ending 30 June 1919, which was the third allotment. Under the law, the several allotments are based (1) one-third in the ratio of area, (2) one-third in the ratio of population, and (3) one-third in the ratio of mileage of rural delivery and star routes. The Congressional appropriations were fixed at \$1,000,000, to be apportioned annually up to and including the fiscal year ending 30 June 1926. The canal systems of the State embrace the Delaware and Raritan, extending from Bordentown to New Brunswick, and the Morris, extending from Jersey City to Phillipsburg and uniting with the canal system of the Commonwealth of Pennsylvania. The total mileage is 173.34. The total valuation of railroad and canal property within the State for taxation was fixed at \$357,308,543 for the year 1917, and on this valuation \$5,754,337.59 was levied for State purposes and \$2,439,143.59 for local uses—a total of \$8,193,481.18, an increase in a year of \$715,061.06.

State Institutions.—New Jersey has a group of educational reformatory and eleemosynary institutions of which it may well be proud, especially as a number of them have served as models for other States. The State capitol is at Trenton, which was selected as the seat of government in 1790, and in its present form represents a number of additions. Trenton is also the seat of the State arsenal, State Hospital, a State Normal School, State Home for Girls, the State Prison and the State School for the Deaf. There are also a second State hospital at Morris Plains, State normal schools at Newark and Upper Montclair, a State Home for Boys at Jamesburg, a Home for Disabled Soldiers at Kearny, a

Home for Disabled Soldiers, Sailors or Marines and Their Wives at Vineland, a Home for the Care and Training of Feeble-Minded Women at Vineland, a Training School for Feeble-Minded Children at Vineland, a State Village for Epileptics at Skillman, a State Reformatory at Rahway, a State Tuberculous Sanitarium at Glen Gardner, a Manual Training and Industrial School for Colored Youth at Bordentown, a State Reformatory for Women at Clinton and a State Colony for Feeble-Minded Males at New Lisbon. Other functions assumed by the State include an Agricultural College and Experiment Station at New Brunswick, in connection with Rutgers College, teachers' institutes, school libraries, the preservation of fish, game and oysters, the care of the lives of employees in factories and workshops, an extensive geological survey, the preservation of historic sites, of the Palisades of the Hudson River and of public documents, and the removal of children from improper influences.

Seaside Resorts.—The diversified scenery and climate of the State has led to the establishment of many resorts in all parts of New Jersey. Along the sea coast, Cape May has been noted as such for about a century, to be soon followed by Long Branch. Atlantic City has reached an organized existence of over 70 years and represented in growth and attractiveness the most conspicuous example of municipal sea-shore development to be found in the world. Asbury Park and Ocean Grove were established about 1870. Within the last quarter of a century, practically every foot of beach-front from Sandy Hook to Cape May has been subjected to a greater or less degree of development. Schooley's Mountain was a popular summer resort fully a century ago. Budd's and Hopatcong lakes have also had a long life of prosperity; Greenwood Lake, partly in New Jersey and partly in New York, is widely noted as a summer residential and bungalow centre; and Lakehurst has become in recent years a well-known summer and all-year locality.

Education.—As early as 1662 a schoolmaster was settled among the Dutch landowners in what is now Jersey City; about 10 years later schools were erected in Newark, Woodbridge, Amboy, Elizabethtown, Freehold and Piscataway, while in 1683 the Society of Friends at Burlington set aside rents from an island in the Delaware for the purposes of public education. In 1817, after nearly 20 years' agitation, the legislature created the first school fund. The management of the schools of the State is vested in a State Board of Education appointed by the governor. This board appoints superintendents for each of the 21 counties of the State. Although the constitution requires that the State shall provide free instruction for all children between the ages of 5 and 18, the State has extended the age from 4 to 20. Courses in kindergarten and manual training have been extensively adopted, particularly in the large industrial centres.

In the school year 1921-22 the enrollment in the public schools was 678,734; the average daily attendance, 538,088; length of school year, 183 days; total number of teachers, 20,874; average monthly salary of teachers, \$128.20; estimated value of all property used for public school purposes, \$75,000,000; expenditures of

NEW JERSEY



1 Looking toward the Delaware Water Gap from Manunka Chunk

2 Falls of the Passaic, Paterson

the year for schools, \$60,160,331. There were 70 public and several private high schools; 3 public normal schools; and 7 universities, colleges and technological schools. The latter comprised Princeton University, at Princeton, opened in 1746; Rutgers College, at New Brunswick, opened in 1766; Seton Hall College, at South Orange, opened in 1856; Stevens Institute of Technology, at Hoboken, opened in 1871; Saint Peter's College, at Jersey City, opened in 1878; Upsala College, at Kenilworth, opened in 1893; and the College of Saint Elizabeth for Women, at Convent Station.

Of the many private schools in the State among the most conspicuous are Lawrenceville School (John C. Green Foundation), one of the most famous in the country, Princeton Preparatory School, Peddie Institute at Hightstown, Pennington Seminary, all in the county of Mercer. Other schools are Saint Mary's Hall in Burlington, the West Jersey Academy and South Jersey Institute at Bridgeton, Newark Academy, Hasbrouck Institute at Jersey City, Bordentown Military Academy, Blair Presbyterian Academy at Blairstown, Centenary Collegiate Institute at Hackettstown. There are theological institutions at New Brunswick, at Princeton, at Madison and at Newark.

Churches.—Throughout the colonial period of New Jersey three lines of religious activity were noticeable. In the eastern portion, the various phases of Calvinism were transplanted over-sea by the settlers. The Hollanders, the Scotch and many of the English emigrants, and the French Huguenots found a common bond of association in Calvinism. Ultimately Presbyterianism, outside of the sphere of Dutch influence, became dominant. In the western portion of the colony the Society of Friends held sway, with strength in Monmouth County, a part of the eastern portion. The Church of England never obtained a strong hold in the colony, its main congregations being at Burlington, Trenton, Perth Amboy, Elizabeth and Newark. During the middle part of the 18th century, Whitefield and Tennant, as Calvinists, and John Woolman, the apostle of the abolition movement in America, paved the way for future changes. Following the Revolution, the Methodist Episcopal Church, with its democratic teachings, recruited largely from the Society of Friends and from many of the Presbyterian congregations. With the coming of the Irish and German emigrants into New Jersey, in the period of extension of transportation systems (1830-60), the Roman Catholic Church made great advance.

In 1916, the United States Census Bureau, reporting the religious statistics of the country that year, credited New Jersey with 3,000 religious organizations, having together 1,337,983 communicants, about 3,000 church edifices, church property valued at \$90,000,000 and 3,000 Sunday schools, with 50,000 officers and teachers and over 400,000 scholars. The strongest denominations numerically were the Roman Catholic, 790,764; Methodist Episcopal, 131,211; Presbyterian (U. S. A.), 102,290; Baptist (U. and Nat. Con.) 80,918; Protestant Episcopal, 67,996; Reformed (in America), 38,772; Lutheran (Gen. Coun.), 19,680, and Congregationalist, 10,839.

Banks and Banking.—The State legislature granted charters to two banks, one in Newark and one in Trenton in 1804. In 1812 a general

banking law was passed for the protection of depositors, the law remaining in force until 1850, when other laws were passed. The legislature established a department of banks and insurance in 1891 and the banking law was again revised in 1899. Since 1880 New Jersey has been a favorite State for trust companies and for the organization of large corporations. Savings banks were first established in 1828. In 1876 a law was passed regulating these institutions.

In 1913 Congress passed a National Banking Act and constituted a Federal Reserve Board which divided the country into 12 districts. The act made it obligatory on all National banks and permissible for all State banks and trust companies to acquire membership in the new organization. Under this act New Jersey was divided into two parts, all of the State north of Trenton being assigned to Federal Reserve District No. 2, of which New York is the central reserve city, and the rest of the State to District No. 3, of which Philadelphia is the central reserve city. The following is a summary of all national banks in New Jersey reporting under the act of Congress, 15 Sept. 1922; number of banks, 228; capital stock, \$29,762,000; total assets, \$623,002,000; surplus, \$28,063,000; total deposits, \$523,447,000. The State banks numbered 27 with aggregate resources of \$57,335,000; capital stock of \$2,950,000; surplus, \$2,190,000; individual deposits, including unpaid dividends and postal savings, \$47,853,000. Trust companies numbered 135, with resources and liabilities aggregating \$666,038,000.

In 1916 Congress passed an act providing for the establishment of a Federal Land Bank System for the special benefit of the agricultural portions of the country. The act divided the country into 12 districts, each with an executive centre. New Jersey, under this act, was apportioned to District No. 1, of which Springfield, Mass., was made the centre, and up to 31 Oct. 1917, loans had been applied for in the State to the amount of \$604,745. The mutual savings banks in the State on 30 June 1922 held \$185,111,000 in deposits to the credit of about 361,000 depositors, and one stock savings bank held \$21,118,000 in deposits for about 40,000 depositors.

Finances.—The finances of the State are in most excellent condition. The bonded debt amounts to \$22,000,000 for which interest and a sinking fund are provided. There is no State tax levied. The financial receipts of the State are largely derived from the tax on railroads and miscellaneous corporations which pay a large share of the total revenue. These figures show a steady increase in wealth and material prosperity. Other important sources of revenue are State fees from the officers of the clerks in Chancery and Supreme Courts, the collateral inheritance tax, from the office of commissioner of banking and insurance, from the office of secretary of state, from the State Prison and State Reformatory and from the oyster commission.

The net valuation for taxation of real and personal property listed by local assessors and county boards of taxation in 1922 was \$3,797,507,447, an increase in a year of \$277,666,178. The net valuation did not include bank and trust company stock, which was separately assessed at three-fourths of 1 per cent. and for 1922 was taxed at approximately \$110,000,000.

Population.—New Jersey began to obtain rapid growth in population about the year 1840; the absolute increase being the greatest in the decade from 1890 to 1900, due largely to the immigration of foreigners and the suburban New York population. The growth of population is given by the Federal government census as follows: (1790) 184,139; (1820) 277,426; (1850) 489,555; (1860) 672,035; (1870) 906,096; (1880) 1,131,116; (1890) 1,444,933; (1900) 1,883,669; (1910) 2,537,167; (1920, Federal census) 3,155,900.

Following is a list of the counties in New Jersey with their population for 1900, 1910 and 1920:

COUNTY	Square Miles	1900	1910	1920
Atlantic.....	567	46,402	71,894	83,914
Bergen.....	236	78,441	138,002	210,703
Burlington.....	869	58,241	66,565	81,770
Camden.....	222	107,643	142,029	190,508
Cape May.....	256	13,201	19,745	19,460
Cumberland.....	511	51,193	55,153	61,348
Essex.....	127	359,053	512,886	652,089
Gloucester.....	326	31,905	37,368	48,224
Hudson.....	43	386,048	537,231	629,154
Hunterdon.....	437	34,507	33,569	32,885
Mercer.....	226	95,365	125,657	159,881
Middlesex.....	312	79,762	114,426	162,334
Monmouth.....	479	82,057	94,734	104,925
Morris.....	475	65,156	74,704	82,694
Ocean.....	583	19,747	21,318	22,155
Passaic.....	198	155,202	215,902	259,174
Salem.....	359	25,530	26,999	36,572
Somerset.....	305	32,948	38,820	47,991
Sussex.....	529	24,134	26,781	24,905
Union.....	103	99,353	140,197	200,157
Warren.....	362	37,781	43,187	45,057
Total....	7,525	1,883,669	2,537,167	3,155,900

The largest cities in the State with their population in 1900, 1910 and 1920 are as follows:

	1900	1910	1920
Newark.....	246,070	347,469	414,216
Jersey City.....	206,433	267,779	297,864
Paterson.....	105,171	125,600	135,866
Trenton.....	73,307	96,815	119,289
Camden.....	75,935	94,538	116,309
Elizabeth.....	52,130	43,409	95,682
Hoboken.....	59,364	70,324	68,166
Bayonne.....	32,722	55,545	76,754
Passaic.....	27,727	54,773	63,824
Atlantic City.....	27,838	46,150	50,682
West Hoboken.....	23,094	35,403	40,068
East Orange.....	21,506	34,371	50,587

Government.—The general government of the State is administered under a constitution adopted by the people in 1844, and amended by special elections in 1875 and 1897. Amendments to become a law, or a part of the constitution, must receive the approval of the majority of the members of two consecutively chosen legislatures of the State, and must then be submitted to the people. A majority vote of the electors of the State is necessary for adoption. Five years is the time that must elapse between the submission of amendments to the people. Duly qualified voters are all citizens who have resided in the State one year, and in the county five months. The law requires the registration of voters. State elections are held annually on the Tuesday after the first Monday in November. In 1923 the State had 12 representatives in the Lower House of Congress.

Legislature.—There are 21 State senators composing the upper house of the legislature, one from each county, and the term of office is

three years. There are 60 members of the house of representatives, elected from the counties on the basis of population. The term of office of a member of the lower house is one year. The compensation of both senators and representatives is \$500 per annum. The legislature meets annually without limit of session. Revenue bills originate in the lower house.

Executive.—The governor is chosen by popular vote and for a term of three years; compensation \$10,000. He cannot be re-elected without an intervening three years. He has power to call extra sessions of the legislature, or of the senate without the representatives. He has the usual veto power which may be overruled by a majority vote of all the members of the legislature. He grants pardons and reprieves in conjunction with the chancellor and six judges of Errors and Appeals. The State treasurer and comptroller are appointed for three years at a joint session of the legislature. The governor, subject to the approval of the senate, appoints for terms of five years the secretary of state, attorney-general, clerk of Supreme Court, clerk of the Court of Chancery, and keeper of the State prison.

Judiciary.—The constitution vests the judicial authority of the State in a Court of Errors and Appeals in the last resort of all causes; a Court for the Trial of Impeachments; a Court of Chancery; a Prerogative Court; a Supreme Court; Circuit Courts; and such inferior courts as may be established by law. The Court of Appeals consists of the chancellor, the justices of the Supreme Court and six judges, or a major part of them, appointed for six years. The lower house of the legislature has the sole power of impeaching, and the upper house tries all impeachments. The Court of Chancery consists of the chancellor and normally eight vice-chancellors. The Supreme Court consists of a chief justice and eight associate justices. Circuit Courts are held in every county, with eight judges in all. There are also 26 District Courts. The Special Court of Pardons consists of the governor, chancellor and lay judges of the Court of Errors and Appeals.

Local Government.—The counties and towns are governed under general laws, and special laws cannot be passed unless by amendment of the constitution. The justices of the peace are elected for five years by vote of the electors of the townships. The counties elect surrogates and clerks for terms of five years. The counties elect, also, sheriffs and coroners for three years, but such officers cannot be re-elected without an intervening three years. The cities and townships are required to have local boards of health. Within the past decade the commission form of government had been adopted by popular vote in many cities and towns including: Atlantic City, Bayonne, Belleville, Beverly, Bordentown, Haddonfield, Hawthorn, Hoboken, Irvington, Jersey City, Long Branch, Millville, Newark, New Brunswick, Nutley, Ocean City, Orange, Passaic, Phillipsburg, Rahway, Ridgefield Park, Ridgewood, Trenton, Vineland, and Wallington.

History.—Based upon the conclusions reached by a group of scientists of international reputation, it may be stated that Man, known as "Glacial," "Argellite," and "Palæo-

lithic,⁹ resided within the limits of New Jersey, at the close of the Age of Ice. The proofs offered are the presence of non-intrusive stone implements, remains of extinct quadrupeds, used by primitive man as food, and human skulls and bones, all of which have been found in and near the city of Trenton. At this point, a large deposit of river wash, particularly sand and gravel, indicates that at one time the mouth of the Delaware River was directly south of Trenton. In the river wash the above mentioned evidences of human occupancy have been found. The culture point attained by these earliest inhabitants was probably that reached by Man in the Stone Age in Europe.

The Indians whom the Dutch and Swedes found in New Jersey were known as the Lenni-Lenapé, members of the great Algonquin family. They were comparatively few in number, scattered in shifting communities along the river valleys and the sea coast. Less warlike than the Indians of New England or of Virginia, the Lenni-Lenapé, later known as the Delawares, made some progress in agriculture and in the elementary arts. With the Dutch and Swedes, the Indians maintained comparatively peaceful relations, although a traders and settlers' war in the Raritan Valley, before the coming of the English, is a matter of record. After the English conquest of 1664, the Indian, although kindly treated by the Society of Friends in West Jersey, and tolerated by the Calvinists in East Jersey, could not withstand the effects of European civilization. Consumption, smallpox, venereal diseases, and alcoholism drove him down to the depths. Distrustful of the efforts made by the missionaries, his personal liberty restrained by legislation and social custom, the Indian was enslaved, and by intermarriage with the negro, lost his identity. In 1758, most of the New Jersey Indians were removed to the first reservation ever established within the limits of the present United States—that located at Edgepelick, Brotherton or Indian Mills in the "Pines" of Burlington County. At the opening of the 19th century the Indians were removed to New York, and thence after various wanderings to Indian Territory. Lenni-Lenapé of the full blood are now extinct in New Jersey.

Holland, politically and religiously free, and struggling with Sweden for supremacy as a world power, located upon Manhattan Island, her principal fort and trading post in the New World. Her navigators explored the coasts of New Jersey, and to one of the great rivers, the North, was given the name of Hudson. Cornelius Jacobsen Mëy sailed up the Delaware, then known as the South River, and commemorated himself by the name Cape May. By discovery and occupancy Holland laid claim to the soil of New Jersey. From New Amsterdam, farmers and traders established themselves in what is now Hudson and Bergen counties. By 1650 colonist had penetrated the river valleys emptying into all the waters of the Greater New York Harbor. Settlements were attempted on the Delaware. The efforts of the Dutch, in the colonization of New Jersey, were only successful in the northeastern portion of the State, where the church, speech and lines of political thought of the fatherland firmly impressed themselves upon the community until recent years.

Gustavus Adolphus, in his scheme of Swedish colonization for North America, utterly disregarded the presence of the Dutch in New Jersey. For about 15 years after 1640, several groups of Swedish settlers occupied the valley of the Delaware, locating principally in the vicinity of Philadelphia. The communities of Swedes in New Jersey, isolated and neglected by the home government and harassed by the Dutch, finally submitted, with their associates in Pennsylvania and Delaware, to the domination of Holland. From 1655 to 1664, New Jersey remained under the absolute control of Holland.

Recognizing the fact that Dutch control of the valleys of the Hudson and the Delaware separated New England from the southern colonies, Charles II, king of England, granted to his brother, James, Duke of York, a vast domain in North America, including much of what is now New England, New York and New Jersey. An English naval expedition, in the summer of 1664, sent to New Amsterdam, secured the capitulation of the Dutch. To John, Lord Berkeley and Sir George Carteret, two faithful adherents of the House of Stuart during the Protectorate, the Duke of York made a transfer of what is practically the territory of New Jersey.

In recognition of Carteret's defense of the island of Jersey, against the Cromwellian forces, the Berkeley-Carteret grant was called New Jersey. The policy of the proprietors was to attract settlement, which was accomplished by exploiting the natural advantages of the colony, granting a liberal frame of government and providing for allotments of free or low-priced land. There was a very pronounced New England movement into the valleys of the Passaic and smaller streams, and by the introduction of social, political and religious views of the Congregationalists, the eastern portion of the colony became a partial reproduction of New England itself. Within a few years Berkeley disposed of his interests to a company largely composed of members of the Society of Friends. A partition being desirable, a line was run from Little Egg Harbor to a point near the Delaware Water Gap. Henceforth, after 1676, begins the political history of East and West Jersey. To Carteret fell East Jersey; while West Jersey became the property of the members of the Society of Friends. After 1676, the western portion of the State was open to English settlement, the dominant spirit being William Penn. The communities established in the Delaware River valley were isolated, and a plantation life, not unlike that of Virginia and Maryland, lacking certain religious characteristics, was developed. The county in West Jersey became the political unit, as the town became the political unit in East Jersey. Both the Jerseys passed later under the domination of Boards of Proprietors, who exercised broad governmental powers, and, until the present, held title to unoccupied lands. From 1664 to 1702, when both boards relinquished governmental rights to the Crown, there was a constant spirit of popular unrest, and one complete and one attempted change in government. In 1673 New Jersey was recaptured and occupied for a few months by the Dutch. When James, Duke of York, became King James II, he endeavored, by means of Sir Edmund Andros, to upset the proprietary gov-

ernments, the matter not being finally settled, favorably to the proprietors, until 1681. In the meantime, internal disturbances growing out of quit-rent agitations, affected the peace of the two proprietaries. The period from 1702 to the outbreak of the American Revolution was undisturbed by any dramatic incidents. The growth of Philadelphia and New York, as commercial centres, tended to develop the agricultural interests of New Jersey. As early as 1710 the tendency to draw the active forces of the colony into the two cities was apparent, leading to Benjamin Franklin's famous aphorism, uttered soon thereafter, that New Jersey was like a cider barrel, tapped at both ends. The usual colonial quarrels between the Crown officers and the popular branch of the legislature were reflected in New Jersey, as elsewhere. Landed interests dominated the governor's council, small property owners were disfranchised, business enterprises were restricted, if not prohibited, by legislation in Parliament, and by taxation, commerce on the high seas was suppressed by the navigation acts, metallic currency was withdrawn from the colony,—a score of causes, mainly economic, operated to produce the resort to arms.

While loyal to the Crown, there were, nevertheless, mutterings of discontent, of ill-concealed defiance of law officers and a spirit of restlessness, restrained by the wave of patriotism evoked by the French and Indian war, but which swept on with increasing force after the opening of the year 1770. The most notable events of this period, from 1702 to 1775, were the suppression of piracy in the vicinity of New York and Cape May; the establishment of a continuous land and water route from Philadelphia and New York; the erection of ferries and post roads; the appearance in the northern, central and western parts of the colony, of Huguenot, Scotch-Irish and Palatinate emigrants; the chartering of Princeton University and Rutgers College; the establishment of the first Indian reservation in the United States in Burlington County, the religious revival of George Whitefield, and the promulgation of John Woolman's abolition doctrine; the massacres by the Indians in Sussex County, and the erection of a series of barracks, owing to their need in the French and Indian war, in various parts of the State. The opening of the American Revolution found New Jersey divided in sentiment. The Calvinistic element, represented so largely in East Jersey, took the initiative. The spirit of war, as in New England, appeared in the town meeting. The professional classes, the members of the Society of Friends and the large merchants were either opposed to war or were non-combatants. A minority awaited the results of agitation. The strength of the element loyal to the home government may be shown from the fact that upon 2 July 1776, when New Jersey asserted her statehood, the constitution contained a proviso that the document should not be operative in case of a reconciliation between England and New Jersey. William Franklin, the last colonial governor of New Jersey, remained loyal to the Crown, and, banished from New Jersey, sought refuge among Tory sympathizers in New York City, becoming the adviser of those planning movements of Tory invaders in the State. Largely conducted in the northern central portion of New Jersey, under the control of Crown

sympathizers, these raiders gained the name of "Pine Robbers." During the Revolution, nearly 100 battles and skirmishes were fought upon the soil of the State. Most conspicuous were the battles of Trenton (26 Dec. 1776), Princeton (3 Jan. 1777), Red Bank (22 Oct. 1777), Monmouth (28 June 1778), and Paulus Hook (19 Aug. 1779). Among minor engagements of importance were the fights at Bound Brook (13 April 1777), Egg Harbor (15 Oct. 1778), Hancock's Bridge (21 March 1778), Tom's River (24 March 1782), the burning of Bordentown (8 May 1778), and no less than a score of engagements in and around Elizabeth and Newark and nearby territory. During the war occurred the "retreat across the Jerseys" and Washington's two winter occupations of Morristown. At the close of the war, New Jersey was sadly impoverished. Her spirit was distinctively Federal. She participated in the Annapolis Convention, her representatives advocated the "New Jersey plan" at Philadelphia, in the framing of the Federal Constitution, which she adopted without a dissenting voice. With the opening of the 19th century, New Jersey became a political storm-centre. As a Federalist leader, Alexander Hamilton had wielded a powerful influence in the State. He had been active in the establishment of the Society for the Improvement of Useful Manufactures, out of which grew the city of Paterson, and had urged the development of Paulus Hook (the site of Jersey City). He was closely allied with the Federal elements until then in control of New Jersey politics. Arrayed against him was Aaron Burr, son of the Rev. Aaron Burr, sometime president of the College of New Jersey, now Princeton University. The end of the antagonism between Burr and Hamilton came in a duel fought in 1804, at Weehawken, N. J. The activities in politics were reflected in industrial life. Before the second war with England, a chain of State banks was established, bridges crossed the rivers between Philadelphia and New York, steamboats were to be found upon the Delaware and Hudson rivers, highways were extended to every accessible part of the State, and the development of water power led to the establishment of many small factories. The second war with England blighted the prospects of growth. Although no engagements occurred upon her soil, New Jersey, as much for the protection of Philadelphia and New York, as for her own interest, furnished militia to garrison forts on the Delaware and at Sandy Hook. The position of the State led to overland transportation of military supplies between the North and South, for the reason that the Atlantic seaboard was blockaded by British fleets. From this condition and owing to the demand for good roads, the first railroad charter ever granted in the United States passed the legislature in the year 1815. This, in connection with the revival of agitation concerning internal waterways, led to the constructing of the Camden and Amboy Railroad and the Delaware and Raritan Canal, now a part of the standard lines of the Pennsylvania Railroad system across the State of New Jersey.

The development of the industrial era, following the close of the War of 1812, broken by the panics of 1817, 1837 and 1857, marked the growth of Newark, Jersey City, Paterson, Eliza-

beth, New Brunswick, Trenton and Camden. The period of social unrest characteristic of Jacksonian dominance in politics led to the adoption of a new State constitution in 1844, pronounced reforms of a penalogical and charitable character, the extension of the public school system and the growth of railroads. The Civil War found New Jersey ready to respond to the call for troops. To the cause of the Union she

PRESIDENTS OF THE SENATE WHO SERVED AS ACTING GOVERNORS DURING TEMPORARY ABSENCE OF REGULAR GOVERNORS:

William M. Johnson....	Republican.....	1900
Edmund W. Wakelee....	".....	1904
Joseph S. Frelinghuysen..	".....	1909
Ernest R. Ackerman.....	".....	1911
John D. Prince.....	".....	1912
John W. Slocum.....	".....	1914
Walter E. Edge.....	".....	1915
George W. F. Gaunt.....	".....	1916-17

GOVERNORS OF NEW JERSEY ONLY

Lewis Morris.....		1738-46
John Hamilton (president of the council).....		1746-47
John Reading (president of the council).....		1747
Jonathan Belcher.....		1747-57
John Reading (president of the council).....		1757-58
Francis Bernard.....		1758-60
Thomas Boone.....		1760-61
Josiah Hardy.....		1761-62
William Franklin.....		1762-76

GOVERNORS OF THE STATE

William Livingston.....	Federalist.....	1776-90
William Paterson.....	".....	1790-92
Richard Howell.....	".....	1792-1801
Joseph Bloomfield.....	Democratic-Republican.....	1801-02
John Lambert (acting).....	".....	1802-03
Joseph Bloomfield.....	".....	1803-12
Aaron Ogden.....	Federalist.....	1813
William S. Pennington.....	Democratic-Republican.....	1813-15
Mahlon Dickerson.....	".....	1815-17
Isaac H. Williamson.....	Federalist.....	1817-29
Garret D. Wall (de- clined).....	Democrat.....	1829
Peter D. Vroom.....	".....	1829-32
Samuel L. Southard.....	Whig.....	1832-33
Elias P. Seeley.....	".....	1833
Peter D. Broom.....	Democrat.....	1833-36
Philemon Dickerson.....	".....	1836-37
William Pennington.....	Whig.....	1837-43
Daniel Haines.....	Democrat.....	1843-44
Charles C. Stratton.....	Whig.....	1845-48
Daniel Haines.....	Democrat.....	1848-51
George F. Fort.....	".....	1851-54
Rodman M. Price.....	".....	1854-57
Wm. A. Newell.....	Republican.....	1857-60
Charles S. Olden.....	".....	1860-63
Joel Parker.....	Democrat.....	1863-66
Marcus L. Ward.....	Republican.....	1866-69
Theodore F. Randolph.....	Democrat.....	1869-72
Joel Parker.....	".....	1872-75
Joseph D. Bedle.....	".....	1875-78
George B. McClellan.....	".....	1878-81
George C. Ludlow.....	".....	1881-84
Leon Abbett.....	".....	1884-87
Robert S. Green.....	".....	1887-90
Leon Abbett.....	".....	1890-93
George T. Werts.....	".....	1893-96
John W. Griggs.....	Republican.....	1896-98
Foster M. Voorhees (act- ing).....	".....	1898
David O. Watkins (act'g)	".....	1898-99
Foster M. Voorhees.....	".....	1899-1902
Franklin Murphy.....	".....	1902-05
Edward C. Stokes.....	".....	1905-08
John Franklin Fort.....	".....	1908-11
Woodrow Wilson.....	Democrat.....	1911-13
James F. Fielder (acting)	".....	1913
Leon R. Taylor (acting).....	".....	1914
James F. Fielder.....	".....	1914-17
Walter E. Edge.....	Republican.....	1917-19
William N. Runyon.....	".....	1919
Edward I. Edwards.....	Democrat.....	1919-22
George S. Silzer.....	".....	1923-

furnished 88,305 men, or within 10,501 of her entire militia, and for the organization, subsisting, supplying, supporting and transporting her troops she paid nearly \$3,000,000. Following the war came a period of prosperity. The agri-

cultural advantages of the southern portion of the State, first practically promoted at Vineland and latterly fully disclosed by the success of the Jewish settlement at Woodbine, revolutionized a large area south of Camden. The overplus of population of Philadelphia and New York sought permanent and temporary homes in New Jersey, while the industrial centres of the northern and eastern portions of the State grew with unprecedented rapidity. The present prosperity of the State is largely due to the changes which have occurred in the last three decades.

Woman suffrage was permitted under the original constitution until 1807, when the legislature restricted the suffrage to white male citizens. School suffrage was granted to women in 1887; a full suffrage amendment to the constitution was defeated in a popular election in 1914; and a presidential suffrage bill was introduced in the senate, referred to the judiciary committee and reported unfavorably in 1916. Local option on the liquor traffic was permitted, with fees ranging from \$100 to \$1,000. Prohibitionists were unusually active in 1917-18, and several large communities voted "dry." A new election law substitutes a blanket ballot for separate party ballots; voting machines have been discarded; a very rigid employer's liability law has been recently enacted; grand and petit juries are now drawn by a chancellor's commissioner and the sheriff of the county; the corrupt practices act has been amended with greater severity than before and juries may now recommend life imprisonment for first-degree murder instead of the death penalty as before.

After the United States entered the World War the rail and water advantages of its location quickly attracted the attention of the National government to the constructive opportunities that New Jersey afforded. Large areas of the Hackensack meadows and the meadow land in the southern suburb of Newark were speedily acquired for extensive industrial plants. Great ship-building operations were undertaken in both sections; the shipyards at Camden were taken over, and the waters of Newark and Delaware bays and the Passaic and Hackensack rivers soon became the scenes of intensive war activities. A great army cantonment, Camp Dix, was established at Wrightstown, and an embarkation camp at Dumont, N. J., was quickly doing its "bit" in grand fashion.

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NEW JERSEY, College of. See PRINCETON UNIVERSITY.

NEW JERSEY FOREIGNERS, in *American humor*, an allusion to New Jersey as a foreign country, and to New Jerseymen as foreigners; a saying handed down from the time when Joseph Bonaparte, ex-king of Spain and Naples, after the downfall of Napoleon, sought an asylum in the United States. As an alien he was obliged to obtain a special act of legislature to enable him to hold real estate. Pennsylvania refused, but New Jersey consented, and he established himself in princely magnificence at Bordentown. Hence men of other States used to declare that the Jersey-men, with their foreign prince, were foreigners.

NEW JERSEY PLAN, in *American history*, a plan for a Federal Constitution proposed at the Convention of 1787 by William Paterson (q.v.), of New Jersey. The resolution provided for the enlargement and correction of the Articles of Confederation; that Congress should remain a single body, and should regulate taxation and commerce, and should choose the executive; that requisitions from States should be continued; that a judiciary should be established; that naturalization should be uniform; that the executive should coerce refractory States or individuals; and other provisions of less importance. This plan was unfavorably reported from the committee to whom it was referred; but a compromise was ultimately effected.

NEW JERSEY TEA. See CEANOTHUS.

NEW JERUSALEM, the name given by the Apostle John in the book of Revelation to heaven.

NEW KENSINGTON, Pa., the centre of a tri-borough composed of New Kensington, Parnassus and Arnold, in Westmoreland County, located on the Alleghany River and on the Pennsylvania Railroad, 18 miles northeast of Pittsburgh. It is described as "The Queen City of Westmoreland County," "The Metropolis of the Allegheny Valley," and industrially is known as the home of aluminum, having the largest aluminum mill in the United States. There are also two mills of the American Sheet and Tin Plate Company, the American Window Glass Company, one of the largest plants in the country, two large railway equipment plants, besides a number of other important industries exploiting the mineral and other wealth of the neighborhood, with an output of steel and iron manufactures, brick, white lead, lumber, furniture, etc. The borough is distinguished by its imposing public buildings, handsome residential sections, fine schools, churches and benevolent institutions. The borough celebrated its

silver jubilee of 25 years of prosperity in 1916. Pop. (1920) 11,984.

NEW LEBANON, N. Y., town in Columbia County, 24 miles southeast of Albany, on the Rutland Railroad. The people are engaged in agriculture and manufacturing, the products being patent medicines, brooms, chairs, baskets, lumber and flour. Nearby are fine thermal springs around which a popular resort has grown called Lebanon Springs. Another adjacent settlement is the Shaker village, Mount Lebanon.

NEW LEINSTER, lēn'ster, or līn'ster. See STEWART ISLAND.

NEW LEXINGTON, Ohio, village, county-seat of Perry County, on the Pennsylvania and the Toledo and Ohio Central railroads, about 50 miles east by south of Columbus. It is in an agricultural section and in the vicinity are coal fields and deposits of fire clay and natural gas. The manufactures are chiefly brick and other clay products. There is considerable trade in farm products, brick, clay and coal. It is the seat of Saint Aloysius Academy. The waterworks are municipally owned and operated. Pop. (1920) 3,157.

NEW LIGHT, a fish. See CRAPPIE.

NEW LIGHT and OLD LIGHT, the names generally used to designate the two parties in the Presbyterian Church whose difference of opinion in regard to the power of the civil magistrate in matters of religion caused the disruption of the Associate Synods of Scotland in the latter part of the 18th and the beginning of the 19th centuries. The terms were again used for the two parties in the similar controversy in the Reformed Presbyterian Church in the United States which caused the division of that body in 1833. See PRESBYTERIAN CHURCH IN THE UNITED STATES.

NEW LISBON, or LISBON, Ohio. See LISBON.

NEW LISKEARD; līs'kārd, Canada, town in Ontario, at the head of Lake Timiskaming and five miles north of Haileybury, on the Timiskaming and Northern Ontario Railroad. It is a growing town with a public library, hospital, foundries, saw-mills, grist-mills and brick-yards. It is provided with an electrical lighting system and waterworks. Pop. 3,000.

NEW LONDON, Conn., city, port of entry, one of the county-seats of New London County, on the Thames River and on the Central Vermont and the New York, New Haven and Hartford railroads, about three miles from Long Island Sound and 50 miles in direct line southeast of Hartford. It has regular steamer connection with New York, with Greenport and Sag Harbor on Long Island and, in the summer, with Block Island. A State-owned pier, for which the State appropriated \$1,000,000 has greatly increased the facility of its fine harbor. When contemplated improvements are completed, vessels of 37-foot draft can be accommodated.

In 1646 John Winthrop, the younger, founded Naumag, and in 1658 the name was changed to New London. Prior to the Revolution it was of considerable commercial importance and had established trade with the coast towns of the nearby colonies and with the West

Indies. During the war it suffered from attacks by the British. On 6 Sept. 1781 a British force under command of Benedict Arnold attacked the town, destroyed the wharves and many of the buildings and killed a number of people. The principal battle occurred across the river on Groton Heights. In memory of this attack, a shaft 127 feet high has been erected at the place (see GROTON) where the massacre occurred. The town was incorporated in 1784. The first session of the Catholic Summer School of America (q.v.) was held in New London.

New London has a number of large manufacturing establishments, chief of which are machine shops, foundries, printing-press works, silk-mills, cotton-gin factory, brass and copper tube works, bedquilt factory and shipyards, submarine engine works, large, new Groton shipyards. Some of the historic places of interest are the Old Town mill, built in 1646, the schoolhouse where Nathan Hale was once a teacher, and the Hempstead House, Old Fort Griswold, George Washington House. A government naval station is on the other side of the river now an important base for submarines. New London is the seat of the Internal Revenue Cutter School of Instruction located at Old Fort Trumbull. Also the seat of Connecticut College for Women opened for students in 1915. New London and vicinity is an important summer resort, several thousand visitors being added to its population during the season. It has beautiful country roads for autoing and is also the centre of the Connecticut lobstering and fishing industries. The annual boat race between Harvard and Yale universities occurs on the Thames in June. It has a vocational high school, public and parish schools, the New London County Historical Society and Library and a public library. The government is administered under a charter of 1894, revised in 1905, which provides for a mayor who holds office three years and a council. The school board is chosen by popular vote. Pop. (1900) 17,548; (1910) 19,659; (1920) 25,688. Consult 'Historic New London' (in *New England Magazine*, Vol. V); Caulkins, 'History of New London'; Starr, 'Centennial Sketch of New London.'

NEW LONDON, Wis., town in Waupaca County, 20 miles north of Appleton on the Wolf River and on the Chicago and Northwestern and the Green Bay and Western railroads. It has an electric-light plant, waterworks, a Carnegie library, school buildings and an attractive city hall. New London manufactures bee-hives, furniture and machinery. It also has a condensed-milk plant and lumber mills. Pop. (1920) 4,667.

NEW MADRID, Mo., city, county-seat of New Madrid County, on the Mississippi River and on the Saint Louis Southwestern Railroad, about 130 miles in direct line south by east of Saint Louis and about 50 miles below Cairo, Ill. It has regular steamboat connection with all the river ports. It was settled by Americans in 1788, when the Spanish owned east of the Mississippi. During the Civil War it was used as a Confederate station until 14 March 1862, when it was abandoned and became a Federal possession. It is situated in a productive agricultural region in which the principal crops are cotton, grain and fruit. Stock-raising is also important. It has extensive lumber interests.

The trade is chiefly in lumber, staves, veneer, grain, fruit, livestock and cotton. Pop. 1,908.

NEW MARKET, Battle of. In co-operation with General Grant's Wilderness campaign and the movements of General Crook, who was marching from West Virginia on Staunton, Va., General Sigel, commanding the Union forces in the Shenandoah Valley, on 9 May 1864, marched from Martinsburg up the Valley pike with General Sullivan's infantry, General Stahel's cavalry and five batteries of artillery, in all about 6,500 men and 28 guns. He arrived at Woodstock on the 11th, his cavalry pushing on to Mount Jackson, where, on the 14th, it encountered some of Imboden's cavalry, forced it across the Shenandoah, and followed as far as New Market. Colonel Moor, with parts of Sullivan's division and cavalry, joined the advanced cavalry at New Market late in the evening, and a skirmish ensued, in which artillery was used. Twice during the night strong demonstrations were made on Moor, which he repulsed. General Breckinridge, commanding the Confederate troops in the valley, hearing of Sigel's advance, had collected at Staunton a force of 5,000 men, including the cadets of the Virginia Military Institute, with eight guns, and at daylight of the 15th drew up two miles south of New Market to give battle. Moor had, besides 300 cavalry and two guns, two regiments of his own brigade and two of Colonel Thoburn's. Stahel came up in the morning and took command, and as it neared noon Sigel arrived with the rest of his army, and made disposition for battle. Moor was left in his advanced position, with his own two regiments and a small body of cavalry to hold Breckinridge in check, until Sigel could complete his dispositions, which were well made. Thoburn's brigade constituted the main line, along which were the batteries. The cavalry was behind the centre and on the left flank. The line extended across the pike on rising ground, another slope in front being held by Moor. Breckinridge formed line with Echols' brigade on the right and Wharton's on the left, the Institute Cadets and the 62d Virginia between the two. Imboden's cavalry and a six-gun battery were on the extreme right. McLaughlin's artillery occupied a sharp ridge left of and parallel to the pike and opened furiously upon Sigel's guns, which as furiously responded. Breckinridge advanced, and Moor, being overlapped on both flanks, fell back in some disorder, and Breckinridge, without pausing, pressed on and attacked Thoburn, who, charging from his right, checked him, Sigel's guns using shell and canister with great effect. Meanwhile Imboden crossed Smith's Creek and, moving down its east bank, gained the top of a small hill opposite Sigel's left, placed his guns on it, and at short range opened a rapid fire upon Sigel's massed cavalry, which immediately fell back, and Sigel ordered his entire line to fall back half a mile. Imboden's guns were now turned on the flank of the infantry, Breckinridge pressed on in front, and the contest was desperate and at close quarters, Von Kleiser's battery being particularly destructive to the centre of Breckinridge's line held by the Cadets. An order to charge the battery was given, the Cadets and the 62d Virginia went forward in fine style, and with great loss captured the battery; the rest of the line advanced,

and Sigel retreated, followed a short distance by Breckinridge. At Rude's Hill, nearly three miles from the field, Sigel halted and formed line; Breckinridge soon came up; there was an exchange of artillery firing; and at 7 P.M. Sigel abandoned Rude's Hill, crossed the Shenandoah, burned the bridge, and continued his retreat down the valley to Cedar Creek, which was reached early in the morning of the 17th. The Union loss was 93 killed, 482 wounded and 256 missing. The Confederate loss was 42 killed, 484 wounded and 13 missing. Consult 'Official Records' (Vol. XXXVII); Pond, 'The Shenandoah Valley in 1864' (New York 1883); The Century Company's 'Battles and Leaders of the Civil War' (Vol. IV); Wise, 'The Battle of New Market.'

E. A. CARMAN.

NEW MECKLENBURG, mēk'lēn-bērg, formerly NEW IRELAND, the second largest island of the Bismarck Archipelago (q.v.), 35 miles northeast of New Guinea and to the northeast of New Pomerania, from which it is separated by Saint George Channel. It has an estimated area of nearly 5,000 square miles; is mountainous and forested, with a fertile coastal belt; with the exception of a small European trading station on the north coast it is inhabited by wild Papuan tribes.

NEW MEXICO, the 47th State admitted to the Union (1912), lies between lat. 31° 20' and 37° N. and long. 103° and 109° 2' W. It is bounded on the north by Colorado, on the east by Oklahoma and Texas, on the south by Texas and Mexico, and on the west by Arizona. Area, 122,271 square miles (78,374,400 acres), of which one-third is public lands. The territory was organized 25 Nov. 1850, under act of 9 Sept. 1850. Capital, Santa Fé.

Political Divisions.—The following table gives the counties, with their area, property assessment, population and county-seats:

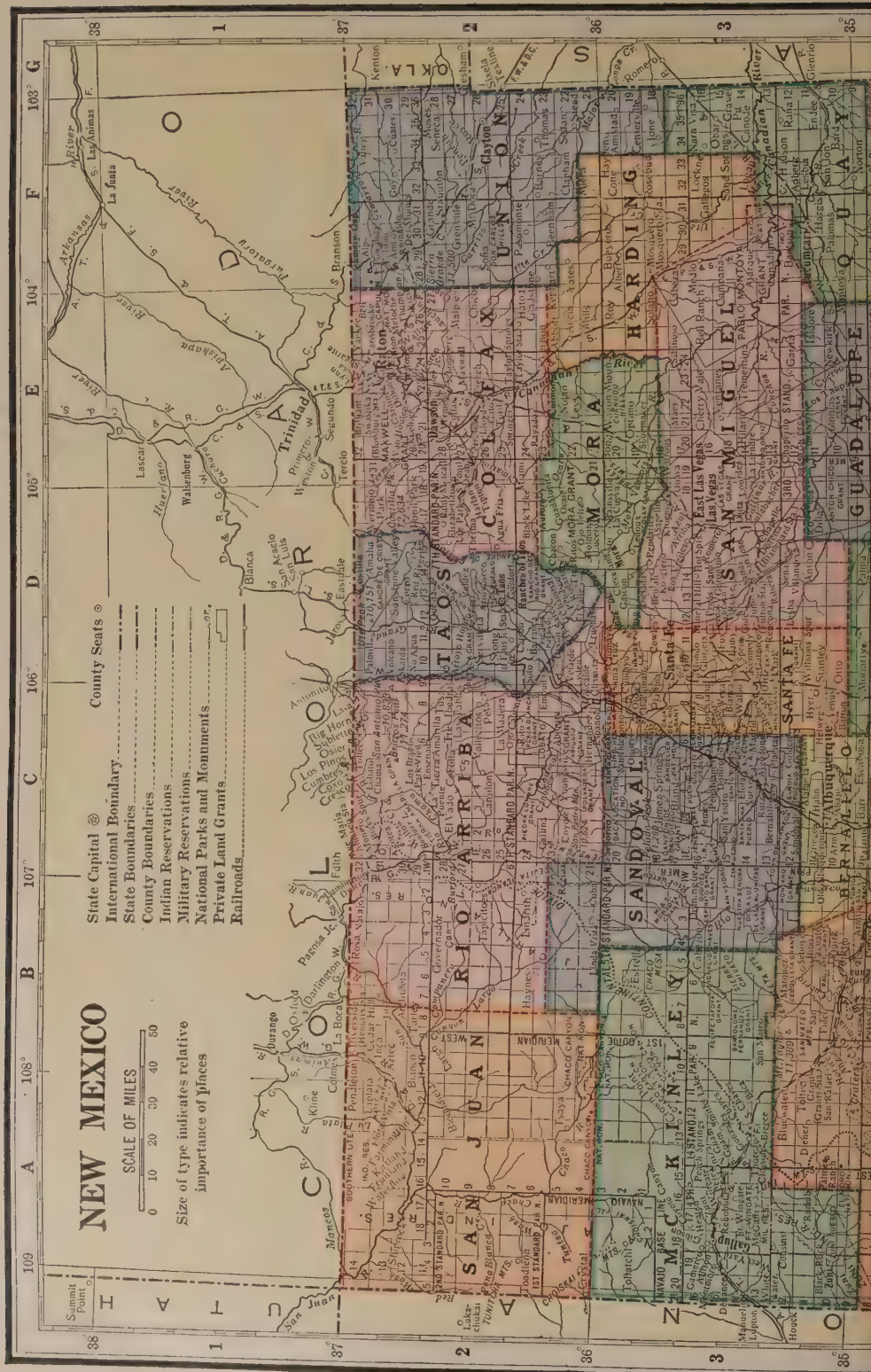
Topography.—New Mexico occupies a lofty plateau which reaches its greatest elevation in the north and west and slopes to the south and to the southeast, where lies the western part of the Llano Estacado, or staked plain, no part of the plateau being less than 3,000 feet above sea-level. The altitude of Santa Fé, in the north, is 6,998 feet, that of Albuquerque on the Rio Grande, near the middle of the State, 5,008 feet, while Carlsbad (formerly Eddy), on the Rio Pecos, is 3,122 feet. From the vast table-land, both east and west of the Rio Grande, rise numerous sierras and more or less isolated peaks belonging to the Rocky Mountain system. The Sangre de Cristo range of Colorado extends southward into New Mexico to lat. 35° 30', the various component ridges being the Culebra, Cimarron, Taos, Santa Fé, Mora, Las Vegas, Raton, etc. The principal peaks are Cerro Blanco (14,269), Truchas (13,150), Taos (13,145), Costilla (12,634), Baldy (12,623), Lake (12,380) and Mora (12,020). Southward from these and extending eastward are numerous isolated sierras—the Sandia, Manzano, Gallinas, Jicarilla, Caballo, Oscuro, San Andres, Organ, Blanca, Capitan, Sacramento, Hueco, Guadalupe and many lesser mountains. West of the Rio Grande and within its immediate drainage is another broken sierra, extending southward from the Colorado line, its principal component groups being the Petaca, Valles, Gallinas, Nacimiento, Jemez, San Mateo, Magdalena, Socorro, Black, Mimbres, Florida and Potrillo mountains. In the northwest the Carrizo, Tunicha and Choiska mountains, forming part of the continental divide, extend into the State from Arizona, as do the San Francisco and Peloncillo ranges in the southwest; while lying between the western boundary and the mountains of the Rio Grande area are the Zúñi, Datil, Little Diablo, Black, Tularosa,

COUNTY	Area (sq. m.)	Property assessment	Population		County seat	Popula- tion, 1918*
			1910	1918*		
Bernalillo.....	1,214	\$21,274,013	23,606	34,000	Albuquerque.....	20,000
Chaves.....	6,084	20,933,095	16,850	21,000	Roswell.....	9,000
Colfax.....	3,798	26,364,429	16,460	22,500	Raton.....	5,500
Curry.....	1,406	10,513,508	11,443	15,000	Clovis.....	4,000
Doña Baca.....	2,340	6,967,123			Ft. Sumner.....	800
Eddy.....	3,821	18,359,074	12,893	16,750	Las Cruces.....	3,500
Eldorado.....	4,174	10,019,151	12,400	14,500	Carlsbad.....	2,000
Grant.....	7,428	29,701,777	14,813	25,000	Silver City.....	3,500
Guadalupe.....	3,024	11,719,638	10,927	13,500	Santa Rosa.....	1,031
Lea.....	4,290	7,190,010			Lovington.....	500
Lincoln.....	4,779	10,176,380	7,822	9,000	Carrizozo.....	1,200
Luna.....	2,976	12,852,530	3,913	7,000	Deming.....	4,000
McKinley.....	5,506	10,830,481	12,963	14,000	Gallup.....	3,000
Mora.....	2,571	10,089,236	12,611	16,000	Mora.....	1,000
Otero.....	6,689	10,537,410	7,069	9,500	Alamogordo.....	2,000
Quay.....	2,905	13,076,074	14,912	18,000	Tucumcari.....	3,000
Rio Arriba.....	5,871	7,992,076	16,719	17,500	Tierra Amarilla.....	1,000
Roosevelt.....	2,439	9,213,529	12,064	13,500	Portales.....	1,300
Sandoval.....	3,871	6,054,720	8,579	9,300	Bernalillo.....	800
San Juan.....	5,476	4,414,443	8,504	10,000	Aztec.....	700
San Miguel.....	4,798	21,211,832	22,930	30,000	Las Vegas.....	8,000
Santa Fé.....	1,973	10,872,929	14,770	15,750	Santa Fé.....	7,000
Sierra.....	3,118	5,814,765	3,536	5,000	Hillsboro.....	500
Socorro.....	15,070	18,333,614	14,761	17,000	Socorro.....	1,750
Taos.....	2,252	5,136,781	12,008	13,000	Taos.....	1,500
Torrance.....	3,369	10,112,270	10,119	12,500	Estancia.....	500
Union.....	5,370	16,018,961	11,404	16,200	Clayton.....	1,500
Valencia.....	5,659	15,169,042	13,320	14,500	Los Lunas.....	700
Totals.....	122,271	\$360,961,891				

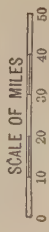
* Estimated.

NEW MEXICO

Abiquiu, (C2)....	500	Capitan, (D5)....	100	Cuervo, (E3)....	300	Gallup, (A3)....	3,920
Acme, (E5)....	120	Carlsbad, (E6)....	2,205	Dawson, (E2)....	4,000	Gardiner, (E2)....	970
Alameda, (C3)....	400	Carrizozo, (D5)....	104	Dayton, (E6)....	280	Gibson, (A3)....	400
Alamogordo, (C6)	2,363	Carthage, (C5)....	150	Deming, (B6)....	3,212	Gila, (A6)....	350
Albert, (F3)....	180	Casaus, (D3)....	200	Des Moines, (F2)...	200	Glenwood, (A5)...	100
Albuquerque, (C3)....	15,157	Cedarhill, (B2)...	180	Dexter, (E5)....	333	Glorieta, (D3)...	250
Alcalde, (D2)....	300	Central, (A6)....	510	Dilia, (D3)....	150	Golden, (C3)....	330
Algodones, (C3)...	280	Cerrillos, (C3)...	110	Domingo, (C3)...	100	Grady, (F4)....	120
Alma, (A5)....	130	Cerro, (D2)....	500	Dona Ana, (C6)...	750	Guadalupita, (D2)	300
Anthony, (C6)....	250	Chacon, (D2)....	200	Duran, (D4)....	150	Hagerman, (E5)...	476
Anton Chico, (E3)	850	Chama, (C2)....	300	East Las Vegas, (E3)....	4,304	Hatch, (B6)....	100
Arroyohondo, (D2)	490	Chamberino, (C6)	600	Elida, (F5)....	300	Heaton, (A3)....	300
Arroyo Seco, (D2)	400	Chamisal, (D2)...	150	Elizabethtown, (D2)	320	Hillsboro, (B6)...	600
Artesia, (E6)....	1,115	Chamita, (D2)...	410	El Rito, (C2)....	650	Hope, (E6)....	430
Atrisco, (C3)....	540	Chaperito, (E3)...	380	Endee, (F3)....	100	Hot Springs, (B5)...	455
Aurora, (D2)....	100	Chilili, (C4)....	400	Espanola, (C3)...	550	Isidore, (E3)....	200
Aztec, (A2)....	489	Chimayo, (D3)...	320	Estancia, (D4)...	578	Isleta, (C4)....	1,000
Baldy, (D2)....	120	Cimarron, (E2)...	481	Fairview, (B5)...	240	Jarales, (C4)....	850
Bayard, (A6)....	200	Clayton, (F2)...	2,157	Farmington, (A2)...	728	Jemez, (C3)....	525
Belen, (C4)....	1,306	Cleveland, (D3)...	620	Fierro, (A6)....	700	Jemez Springs, (C3)	200
Bent, (D5)....	300	Cloudcroft, (D6)...	250	Floravista, (B2)...	240	Jicarilla, (D5)...	130
Bernalillo, (C3)...	770	Clovis, (F4)....	4,904	Folsom, (F2)....	484	Kelly, (B4)....	620
Bibo, (B3)....	200	Colmor, (E2)....	240	Fort Bayard, (A6)	550	Kingston, (B6)...	130
Bland, (C3)....	620	Columbus, (B7)...	2,110	Fort Stanton, (D5)	200	Lacueva, (D3)...	570
Bloomfield, (B2)...	250	Cordova, (D2)....	350	Fort Sumner, (E4)	777	Laguna, (B4)....	1,000
Blossburg, (E2)...	190	Corona, (D4)....	200	Fort Wingate, (A3)	550	Lajoya, (C4)....	350
Brice, (C6)....	100	Costilla, (D2)...	500	Fruitland, (A2)...	450	Lake Arthur, (E5)	141
Buckman, (C3)...	200	Coyote, (C2)....	100	Galisteo, (D3)....	730	Lake Valley, (B6)	220
Canjilon, (C2)....	100	Cubero, (B3)....	350	Gallina, (C2)....	260	Lakewood, (E6)...	250
		Cuchillo, (B5)....	200			Laluz, (D5)....	450

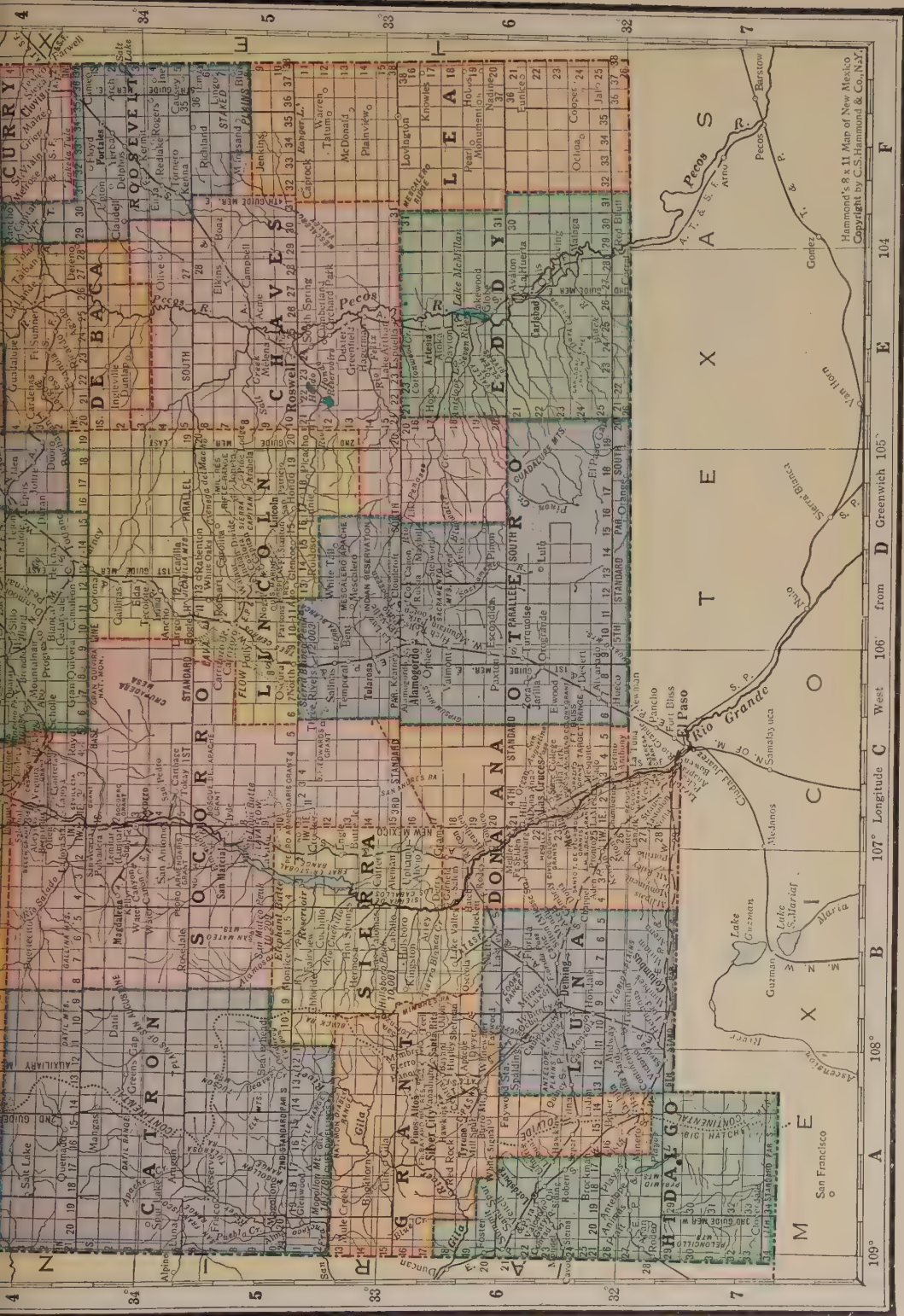


NEW MEXICO



Size of type indicates relative importance of places

- State Capital
- International Boundary
- County Seats
- State Boundaries
- County Boundaries
- Indian Reservations
- Military Reservations
- National Parks and Monuments
- Private Land Grants
- Railroads



Hammond's 8 x 11 Map of New Mexico
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NEW MEXICO - Cont'd.

La Mesa, (C6)....	300	Monticello, (B5)...	400	Punta, (D4).....	100	Santa Rosa, (E4) .	1,093
Lamy, (D3).....	150	Montoya, (F3)...	300	Questa, (D2).....	650	Sapello, (D3)....	360
Laplata, (A2)....	230	Mora, (D3).....	1,400	Ramah, (A3).....	150	Searna, (B3).....	220
Largo, (B2).....	110	Mosquero, (F3)...	100	Ranches of Taos,		Sherman, (B6)....	100
Lascruces, (C6)...	3,969	Mountainair, (C4)	577	(D2).....	1,400	Silver City, (A6)..	2,662
Las Palomas, (B5)	230	Mountain Park, (D6)	320	Raton, (E2).....	5,544	Socorro, (C4)....	1,256
Las Vegas, (D3)..	3,902	Nara Visa, (F3)...	200	Red River, (D2)..	210	Springer, (E2)....	915
Lenitar, (B4)....	430	Nogal, (D5).....	170	Redrock, (A6)....	100	Steeplerock, (A6)	100
Liberty, (A2)....	250	Nutt, (B6).....	100	Reserve, (A5)....	100	Steins, (A6).....	320
Lincoln, (D5)....	1,100	Ocate, (E2).....	200	Ribera, (D3).....	150	Tajique, (C4)....	320
Logan, (F3).....	100	Old Albuquerque,		Ricardo, (E4)....	150	Taos, (D2).....	1,800
Lordsburg, (A6) .	1,325	(C3).....	750	Rincon, (C6)....	280	Tecolote, (D3)...	510
Los Lunas, (C4) .	460	Organ, (C6).....	260	Rosedale, (B5)...	150	Texico, (F4).....	381
Lovington, (F6)...	411	Orogrande, (D6) .	100	Roswell, (E5)....	7,033	Tierra Amarilla, (C2)	990
Lucero, (D2)....	200	Pajarito, (C3)....	390	Roy, (E3).....	564	Torreón, (C4)....	700
Lumberton, (C2)..	470	Paraje, (B5).....	290	Ruidoso, (D5)....	350	Tome, (C4).....	1,000
Luna, (A5).....	200	Parkview, (C2)...	980	Sabinal, (C4)....	320	Truchas, (D2)....	100
Madrid, (C3)....	430	Pecos, (D3).....	540	San Acacia, (B4)..	100	Tucumcari, (F3)..	3,117
Magdalena, (B4)	1,867	Penablanca, (C3) .	100	San Antonio, (C4)..	370	Tularosa, (C5)....	1,096
Manzano, (C4)...	650	Penasco, (D2)....	890	San Antonio, (C5).	650	Tyrone, (A6)....	3,500
Maxwell, (E2)....	384	Peralta, (C4)....	570	Sandoval, (C3)...	620	Valencia, (C4)...	460
Mayhill, (D6)...	290	Petaca, (D2)....	350	San Jose, (D3)...	610	Vallecitos, (C2)..	620
Melrose, (F4)....	364	Picacho, (E5)....	390	San Juan, (C4)...	400	Vaughn, (D4)....	888
Mescalero, (D5)..	160	Pinos Altos, (A6) .	1,100	San Lorenzo, (B6).	330	Wagonmound, (E3)	875
Mesilla, (C6)....	1,900	Placitas, (C3)....	200	San Marcial, (B5).	1,000	Watrous, (E3)....	250
Mesilla Park, (C6)	200	Pojuaque, (D3)...	800	San Mateo, (B3)..	330	Weed, (D6).....	520
Miera, (F2).....	450	Polvadera, (B4)...	420	San Rafael, (A3)..	700	Whiteoaks, (D5)..	300
Mimbres, (B6)...	300	Portales, (F4)....	1,154	Santa Cruz, (D3) .	680	Willard, (D4)....	421
Mogollon, (A5)...	900	Puerto de Luna,		SANTA FE, (C3) .	7,236	Youngsville, (C2)	100
Monero, (C2)....	180	(E4).....	1,100	Santa Rita, (B6)..	1,900	Zuni, (A3).....	1,600

Mogollon, Pinos, Burro, Pyramid, Big Hatchet, Hacheta and Animas ranges, with many others of lesser note. See BOUNDARIES OF THE UNITED STATES.

Climate.—The climate is very dry and healthful, and has made the State justly celebrated as a resort for those afflicted with pulmonary troubles. The annual mean temperature ranges from 42.4° at Winsors, San Miguel County (8,000 feet), to 65° at Carlsbad, Eddy County (3,122 feet). The highest temperature averages approximately 112° at Carlsbad (25 June), and the lowest—12° at Bluewater, Valencia County (2 Feb.). The total precipitation on the average ranges from 22.42 inches at Carlsbad, to 4.66 inches at Deming, Luna County. Nearly half the precipitation (10.5 inches) at Carlsbad occurred in July. The greatest rainfall occurs between May and August, the least between February and April. The number of rainy days on the average ranges from 78 at Santa Fé to 18 at Albuquerque; average, about 40 days. The prevailing winds are southwest, west, southeast and east. Although the summer temperature is sometimes high, especially in the southern part, owing to the dryness of the atmosphere the heat is never oppressive and the nights are always cool.

Rivers.—The streams of northeastern, eastern and central New Mexico flow into the Mississippi and the Gulf of Mexico, while those of the western portion empty into the Gulf of California. The largest river is the Rio Grande, which flows generally southwesterly from the Colorado boundary to lat. 33°, then southeasterly across the Mexican line. This river has several unimportant tributaries within the State—the Chama, Jemez and Rio Puerco from the west and several of even less significance from the east. The Pecos has its source in the Las Vegas Mountains, flows southeasterly, then generally southward, almost paralleling the western escarpment of the staked plain, and southeasterly across the Texas border, finally joining the Rio Grande. The Canadian, with its several headstreams, drains northeastern New Mexico and passes out of the State in lat. 35° 25', forming a branch of the Arkansas. The western part is drained entirely by headwaters of the Colorado—the San Juan, the Zúñi and the Gila. The Rio Mimbres, which heads in the Florida Mountains, is, like all except the largest streams, non-perennial, and indeed even the channel of the lower Rio Grande is frequently dry.

Forests.—Several of the mountain ranges, particularly those of the north and in Lincoln and western Socorro, Grant and McKinley counties, are covered with timber, the most valuable being pine, although oak, juniper, cedar, birch, maple and other trees are common. The Pecos River, Lincoln and Gila River forest areas have been reserved by the United States, but grazing of cattle is allowed under certain conditions. Piñon and cedar are abundant in the foot-hills throughout the State; mesquite is found in the southeastern part, east of the Pecos, while the saguaro or giant cactus forms a feature of the landscape in the southern and southwestern parts, where there are also groves of oak and walnut. Along all the water-courses cottonwoods are abundant, and occa-

sionally willows and sycamores are found. Yucca, the roots of which are used as a substitute for soap, is everywhere abundant.

Agriculture.—In many of the valleys and mountain ranges (where the latter are not of exposed basalt are nutritious grasses—at least 14 varieties, mostly gramma, being found—affording fairly abundant food for the large flocks and herds. Bear, deer, mountain lions, wildcats and antelope (prong horn) are found in the mountains, and rabbits, hares, coyotes and prairie-dogs are common in the plains. The valley lands are fertile, but as the State lies within the arid region agriculture is conducted largely through irrigation. Irrigation in this State, until recent years, has been of a primitive character and was carried on by those dwelling here centuries ago, as evidenced by remains of ancient ditches, but the magnitude and possibilities of the system are not generally realized, and even yet the real irrigation systems of New Mexico are in their infancy, though certain sections have them well developed. Throughout the State many dams have been built to conserve the flood water and a large acreage is thus made fertile. Government irrigation projects include the Elephant Butte Dam with a storage capacity of 2,680,000 acre feet; and the Carlsbad System, which has reclaimed 24,500 acres of fertile land. The Storie Dam, a private enterprise at Las Vegas, will irrigate 12,000 acres. The Mimbres Valley and the lower Pecos region have been reclaimed by the use of artesian wells. While possessing important mineral resources, New Mexico is pre-eminently an agricultural country, 41 per cent of the population pursuing gainful occupations, being engaged in farming and stock-raising. The following table shows the acreage, yield and value of crops in 1910 and 1920:

	1910	1920
Number of farms in State.....	35,676	29,844
Approximate land area in State (acres).....	78,401,920	.....
Improved land in farms (acres).....	1,467,191	1,711,224
Total acreage of farms in State.....	11,270,021	24,409,633
Average acreage per farm.....	315.9	817.9
Value of farm land and buildings.....	\$111,430,000	\$221,814,212
Value of farm land.....	98,806,497	196,341,050
Value of buildings.....	13,024,502	25,473,162
Value of implements and machinery.....	4,122,312	9,745,369
Average value per acre of land and buildings.....	9.93	9.09
Average value per acre of farm land.....	8.77	8.04
Number of farms irrigated.....	12,795	11,390
Acreage irrigated.....	461,718	538,377
Per cent of number of farms irrigated.....	35.9	38.2
Per cent of improved land in farms irrigated.....	31.5	31.4
Capital invested in irrigation systems.....	\$9,154,897	\$18,210,412
Average cost of operation per acre.....	-\$1.36	\$2.41

The principal crops for 1922 were: Corn, 2,475,000 bushels; oats, 930,000 bushels; potatoes, 200,000 bushels; spring wheat, 660,000 bushels; barley, 140,000 bushels; apples, 750,000 barrels; broom corn, 1,500,000 tons.

New Mexico is the ninth State in the Union in the number of sheep of shearing age, with 2,062,000 in 1923, having a farm value, 1 Jan. 1923, of \$13,197,000. It produced in 1922 9,600,000 pounds of wool.

The returns for livestock for 1923 were as follows:

	Number	Value
Horses.....	181,000	\$8,145,000
Mules.....	21,000	1,386,000
Milch cows.....	47,000	2,350,000
Burros (1920).....	5,937	117,763
Cattle.....	838,000	18,352,000
Sheep.....	2,062,000	13,197,000
Goats (1920).....	226,862	1,091,076
Swine.....	89,000	890,000

Mineral Resources.—The mining industry is important. From 1860 to 1890 \$17,600,000 in gold was produced. The mineral output in 1922 was gold, \$374,000; silver, 700,000 ounces; copper, 31,000,000 pounds; lead, 2,600,000 pounds; zinc, 4,500,000 pounds. Coal mining is extensively carried on. The output of coal in 1921 (mostly bituminous) was 2,453,482 short tons, valued at \$9,585,000. The coal area lies chiefly in Socorro, McKinley, Santa Fé, Colfax and Rio Arriba counties, in the northern and western parts of the State. The coal-bearing formations aggregate 1,850,000 acres, of which about 40 per cent is probably productive. Iron, salt, gypsum, clay, soda, ochre, potash, mica, marble, molybdenum, tungsten and vanadium are also found as are turquoise, garnets, opals and chalcodony. The net value of all mineral output for 1920 was \$27,883,565; in 1921, \$13,227,268.

Manufactures.—The manufacturing in New Mexico is still in its infancy. There is a gradual increase from year to year. The last figures furnished by the government show that the capital invested in 1919 was \$15,226,253; cost of material was \$7,727,483; value of the product manufactured was \$17,856,402; value added by manufacturing was \$10,129,119; salaries and wages paid amounted to \$7,685,803.

A comparative summary for the State for 1909 and 1919 follows:

	Census —	
	1919	1909
Number of establishments....	387	313
Persons engaged in manufactures.	6,646	4,766
Proprietors and firm members.	336	288
Salaried employees.....	574	335
Wage earners (average number)	5,736	4,143
Primary horse power.....	17,260	15,465
Capital.....	\$15,226,253	\$7,743,000
Services.....	7,685,803	2,974,000
Salaries.....	1,027,341	383,000
Wages.....	6,658,462	2,591,000
Materials.....	7,727,483	3,261,000
Value of products.....	17,856,602	7,898,000
Value added by manufacture (value of products less cost of materials).....	10,129,119	4,637,000

Transportation.—The Atchison, Topeka and Santa Fé Railway and the El Paso and Southwestern Railway are the most important roads in the State. The total mileage of all roads is 3,709.8 miles. Passengers and freight are extensively handled by automobiles and trucks.

Finances.—New Mexico had a total assessed valuation in 1921 of \$363,721,981, a bonded debt of \$4,712,000 in the year 1922, and a tax rate which does not exceed \$4 per \$1,000. In 1922 there were 45 National banks with capital stock amounting to \$3,210,000; total assets, \$41,536,000; 59 State banks with capital stock amounting to \$2,150,000; resources, \$17,352,000. Adding \$7,500,000 to assessed valuation gives real value of all property on tax rolls. The bonded

indebtedness is as follows: State, \$4,712,000; county, about \$3,000,000; cities, towns and villages, about \$5,000,000; and school districts, about \$2,250,000.

Population.—(1870) 91,874; (1880) 119,565; (1890) 153,593; (1900) 195,310; (1910) 327,301 (native, white, 255,609; foreign, white, 26,331; Indians, 20,573; negroes, 1,628; males, 175,245; females, 152,056); (1920) 360,350. (native white, 273,317; foreign white, 29,077; Indians, 19,512; negroes, 5,733; males, 190,456; females, 169,894). The foreign-born population is made up as follows: Austrians, 423; Canadians, 732; Czechoslovakians, 113; Danes, 115; English, 888; French, 377; Germans, 1,178; Greeks, 288; Hungarians, 130; Irish, 434; Italians, 1,678; Yugoslavians, 535; Mexicans, 19,906; Norwegians, 128; Poles, 153; Russians, 254; Scots, 440; Spaniards, 198; Swedes, 311; Swiss, 148; Syrians, 198; all other, 451. Illiterates formed 15.6 per cent of total population in 1920, a reduction of 44.6 per cent from 1900. New census shows decided decrease as result of special efforts to reduce illiteracy in several counties.

Religion.—The population consists largely of Roman Catholics, who have an archbishop, a vicar-general, about 50 churches and more than 300 mission churches; several academies for young women, a college, eight parochial schools, Indian boarding schools, day schools for Indians, and academies for boys. The Baptists have 150 churches; the Methodists comprise 17 English-speaking and a number of Spanish-speaking congregations, together with a number of mission schools; the Presbyterians 45 congregations, 30 preaching stations, 25 mission schools with 45 teachers and 1,562 pupils; the Mormons two churches with 277 members. Other Protestant denominations have about 20 congregations, and the Hebrews five organizations and two synagogues.

Education.—The education system of New Mexico was not created until 1891. Prior to this time education had been taken care of by various churches. Those of outstanding importance were the Catholic, Methodist, Congregationalist and Presbyterian. While they and other churches have continued their interest in education, the State has developed a most complete and effective system. There are 1,430 schoolhouses, 2,752 school teachers, 81,399 pupils enrolled; annual expenditures \$3,301,712. The State maintains the University of New Mexico at Albuquerque, the College of Agriculture and Mechanic Arts at Las Cruces, the New Mexico Normal University at Las Vegas, the Normal School at Silver City, School of Mines at Socorro, Military Institute at Roswell, Spanish-American School at El Rito, Institute for the Deaf and Dumb and Institute for the Blind at Alamogordo. The expenditures for maintenance of these institutions is about \$1,000,000 per year. The outstanding movement in education to-day is consolidation of districts and the creation of county high schools.

Penal Institution.—The penitentiary at Santa Fé, the Reform School at Springer, are not only penal in their character but are considered reformatory and educational as well.

Charitable Institutions.—The Miners' Hospital at Raton and the Insane Asylum at Las Vegas are State institutions. In addition thereto, the State contributes to the following

NEW MEXICO



Capitol at Santa Fe

NEW MEXICO



1 Pueblo de Taos, New Mexico

2 Pueblo Indian Dance at Taos, New Mexico

private institutions: Saint Vincent's Hospital at Santa Fé, Grant County Hospital at Silver City, Sisters of Mercy at Silver City, Ladies' Hospital at Deming, Eddy County Hospital at Carlsbad, Sisters' Hospital at Albuquerque, Relief Society at Las Vegas, Gallup Hospital at Gallup, Saint Mary's Hospital at Roswell, Sisters of Loretta at Mora, Sisters of Loretta at Las Cruces, the New Mexico Orphan School at Santa Fé. The constitution permits appropriations to be made to the above institutions. Government sanatoria are at Fort Bayard and Fort Stanton, where soldiers and sailors from all parts of the country are treated for pulmonary tuberculosis. There are many private sanatoria in the State.

History.—For untold generations before the discovery of America, New Mexico was the home of sedentary tribes of Indians—the ancestors of the present Pueblos—as well as of nomadic predatory tribes. The former constructed villages, principally of stone, on the mesas, in the shelves of rocky cliffs (see CLIFF-DWELLERS), and in the valleys. Their numbers considerably exceeded that of their descendants of to-day, but there is no reasonable ground for the generally popular belief that New Mexico ever contained a teeming sedentary aboriginal population, notwithstanding the hundreds of ruins scattered throughout its area, particularly west of the Rio Grande. There is definite historical as well as traditionary evidence that many of the pueblos occupied at the time of the discovery of the Southwest were later abandoned on account of Apache and Navaho raids, or by reason of epidemics, the failure of water supply, through superstition, or the efforts of early Spanish missionaries to concentrate the natives. Many ruined pueblos in the State may thus be accounted for; for although Coronado in 1540–2 recorded 64 inhabited villages, some of them extensive, only two (Acoma and Isleta) of the 17 which remain still occupy their 16th century sites. The recorded history of New Mexico dates from 1539, in which year Marcos de Niza, a Franciscan friar, accompanied by a Barbary negro named Estevan, or Estevanico, traversed the country from Mexico to the Zuni Indian villages, then known as the "Seven Cities of Cibola," in the western part of the State. Estevan, preceding Fray Marcos during the latter days of the journey, was killed by the natives at their village of Hawikuh, one of the seven towns; Niza followed, viewed the pueblo from an adjacent height, and fled back to Mexico. In February of the following year Francisco Vasquez Coronado, guided by Niza and accompanied by a large force, marched from Compostela, Mexico, to Cibola, storming and capturing Hawikuh (which he named Granada), in July. Expeditions sent out from here by Coronado resulted in the discovery of the Hopi or Moqui villages (called Tusayan) in northeastern Arizona, and the Grand Cañon of the Colorado. In the autumn the army moved to the province of Tiguex, in the vicinity of the present Bernalillo, on the Rio Grande, where winter quarters were established and whence parties were sent to visit the neighboring pueblos.

In the spring of 1541 Coronado crossed the Pecos River into the present Texas and northward through the buffalo plains to the Wichita settlements of Kansas—the "Province of

Quivira"—where several months were spent in exploration; but gold, which formed the object of the dreary march, was not found. The expedition returned to the Rio Grande and thence to Mexico in the spring of 1542, having spent nearly two years in the country. Two friars remained in New Mexico and one in Kansas, but these were killed by the Indians. New Mexico was visited in 1581 by Francisco Sanchez Chamuscado, with a small escort and three Franciscans, the latter being left among the Rio Grande Pueblos. These were killed after Chamuscado's departure. Late in 1582 Antonio de Espejo, with a bodyguard, was authorized to explore the new province and to learn the fate of the missionaries. Following the route of Chamuscado up the Rio Grande, he reached Puala, or Puaray, near the present Bernalillo (the principal town of Coronado's province of Tiguex), where the friars had been slain, the Indians fleeing on his approach. From this point Espejo extended his travels to the pueblos of Sia, Jemez, Acoma and Zuñi, and to the Hopi towns of Arizona, thence eastward to the Rio Pecos and back to Mexico. The next important event was the colonization of New Mexico by Juan de Oñate, the first governor of the province, who reached the new country via the Rio Grande in 1598 with about 400 colonists, and established the town of San Francisco de los Españoles, later known as San Gabriel, where Chamita, at the mouth of the Rio Chama, now stands. All the sedentary tribes were visited and their vows of obedience and vassalage taken, and the country from eastern Kansas to the head of the Gulf of California explored between 1598 and 1605. In the latter year San Gabriel was abandoned and the seat of government moved to Santa Fé, which dates from this time. During the following few years the new colony barely existed; in 1617 it had only 48 soldiers and colonists, although the missionaries had been so zealous that 11 churches had been built and 14,000 natives baptized. In 1680 the Pueblos rebelled against Spanish authority, killed many missionaries and colonists, and laid siege to Santa Fé, where the panic-stricken survivors had taken refuge in the adobe palace, which still stands. Governor Otermin finally succeeded in driving the Indians off with considerable loss, and in retreating down the Rio Grande to El Paso, Texas, with a thousand followers, leaving the natives in almost uninterrupted possession of New Mexico until 1692. In that year Diego de Vargas reconquered the province, with great loss to the Indians, enabling its resettlement toward the close of the year by 800 colonists. In 1696 the Indians again revolted, killing five friars and 21 other Spaniards, and it was not until the close of the century that the Pueblos were entirely overcome.

Henceforward New Mexico grew in importance; new towns were established in the Rio Grande Valley, which slowly increased in population despite the constant depredations of the Apaches and Navahos. Early in the 19th century a considerable trade sprang up between the province and the settlements along the American frontier, notably Kaskaskia in Illinois, and later Franklin and Independence in Missouri, which increased from \$22,000 in 1822 to \$750,000 in 1844. This was the beginning of the overland commerce via the famous Santa Fé trail, which came to a close when the Atchison,

Topeka and Santa Fé Railroad entered the Territorial capital in 1880. Mexico having thrown off the yoke of Spain in 1821, New Mexico became a Mexican province; in 1824 it was made a Territory and in 1836 a department, remaining such until 1846, when it was taken possession of by General Stephen W. Kearny in the name of the United States. In 1848, by the Treaty of Guadalupe Hidalgo (q.v.), New Mexico, the boundaries of which were very indefinite, but which comprised Arizona north of the Gila (see GADSDEN PURCHASE) and a part of Colorado, was ceded to the United States, and on 25 Nov. 1850 the Territory was organized through the agreement by Texas to the New Mexico boundary, under the act of Congress approved 9 September. In 1863 western New Mexico became the Territory of Arizona, and in 1865 a northern strip was annexed to Colorado.

New Mexico was the scene of several conflicts during the Civil War, notably the defeat of the Federals under Canby by the Texans under Sibley at Valverde in February 1862. Santa Fé was occupied by the Union forces in March; Sibley took possession of it a week later, was forced to evacuate in April, after the defeat of the Confederates in Apache Cañon. Unsuccessful efforts for the admission of New Mexico as a State were made for many years, notably in 1906 when Arizona voted adversely on the Statehood bill. On 16 June 1910 the Senate passed the bill granting statehood to New Mexico, among the last of the remaining territories. This bill specifically provided, however, that the proposed State hold no legislative sessions prior to the first of January 1912. It also stipulated that the State set aside 100,000 acres for a State penitentiary.

Statehood.—New Mexico made many efforts to attain statehood. The final effort began with the passing of an Enabling Act, approved 20 June 1910, which provided for a constitutional convention which met at Santa Fé 3 Oct. 1910 and finished its labors 21 November. The constitution was ratified by a vote of 31,742 to 13,399, 21 Jan. 1911. On 21 Aug. 1911 the President signed the bill providing for the admission of New Mexico on the condition that it amend the article providing a method for the amendment of its constitution. This amendment was approved by the people, and on 5 Jan. 1912 President Taft issued a proclamation admitting New Mexico as a State.

Governors Since Statehood: Wm. C. McDonald, 15 Jan. 1912 to 1 Jan. 1917; E. C. De Baca, 1 Jan. to 18 Feb. 1917; W. E. Lindsey, 18 Feb. 1917 to 1 Jan. 1919; O. A. Larrazolo, 1 Jan. 1919 to 1 Jan. 1921; M. C. Mechem, 1 Jan. 1921 to 1 Jan. 1923; J. F. Hinkle, 1 Jan. 1923 to 1 Jan. 1925.

FRANK H. H. ROBERTS,
President, New Mexico Normal University.

NEW MEXICO, University of, situated at Albuquerque, New Mexico, an institution of learning established 28 Feb. 1889, in an act passed by the territorial legislative assembly of New Mexico. The normal school of the University was the first department organized and was opened 15 June 1892 for a summer term. In September 1892 the preparatory school was opened and in November 1893 the commercial

school was added. In 1896 the gymnasium was erected and equipped. In 1899 the Hadley Laboratory, largely the gift of Mrs. Walter C. Hadley was erected. In 1906 two dormitories in the Pueblo Indian style of architecture were built. In 1910-11 a school of music was initiated. During the year of 1911-12, co-ordinate with the change in State government the institution became the State University of New Mexico. The seven buildings of the University of New Mexico are picturesquely situated on the mesa, or elevated plateau about a mile east of the city of Albuquerque overlooking the wide valley of the Rio Grande. They consist of the administration building, Rodney hall, science hall, the women's dormitory, the men's dormitory, the gymnasium, the dining hall and the powerhouse. During 1914-15 a psychological laboratory was established. In 1913-14 there was organized an extension division. The school of Latin American Affairs established (1915-16) is designed to aid in strengthening and developing the relations between the United States and Latin-America. The University has received an appropriation from the State legislature for expenses and repairs and an appropriation of \$40,000 for the construction of a science hall. The library contains about 13,000 volumes exclusive of pamphlets. Two Cecil Rhodes scholarships have been won by students. The annual income for general support is about \$220,000.

NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, co-educational State institution, founded by legislative act dated 28 Feb. 1889, which accepted the provisions of the Morrill Act of 2 July 1862. It is located near Las Cruces in the Mesilla Valley in the heart of the great region irrigated by the Elephant Butte Dam. It confers the degree Bachelor of Science upon graduates in agriculture, home economics, civil engineering, electrical engineering, irrigation engineering, mechanical engineering, general science, vocational teaching. It has a large extension service, a faculty of 35, and a student body of about 392. It has done great service to the country in the training of "fighting mechanics."

NEW MEXICO NORMAL UNIVERSITY, the largest educational institution in New Mexico, was created by act of the legislature 3 Oct. 1893. On 3 Oct. 1898, the institution was opened at Las Vegas with 92 students. In 1899 the legislature reorganized the institution, creating it the State Teachers College. It comprises four schools: Training school, high school, normal school and a State Teachers College. Three degrees are conferred: Bachelor of pedagogy, master of pedagogy, bachelor of arts in education. Twenty-two regular professors, with a number of assistants, are employed. The attendance in 1917-18 was 1,283. The university property is valued at \$200,000. It controls nearly 400,000 acres and has an annual income of about \$50,000. The faculty numbers 20 and the student enrollment is about 140. There are 12,000 volumes in the library.

NEW MILFORD, Conn., town, county-seat of Litchfield County, on the Housatonic River, and on the Berkshire division of the New York, New Haven and Hartford Railroad.

It was settled in 1707 by John Noble from Westfield, Mass., and later a colony from (Old) Milford, Conn., located at New Milford. It is situated in a hilly country which has considerable good farm land; tobacco is the great specialty. The extensive water power of the Housatonic is being utilized by means of a canal two miles long, which extends from Bulls Bridge to New Milford. The New Milford Power Company which owns the plant furnishes electricity to towns at a considerable distance. The tobacco warehouses have over 500 employees; the wood finishing factory, 90; the hat factory, 285; upholstery works, 40; lime works, about 60. There are several other smaller manufacturing establishments. A library and Memorial Hall for the free use of the Grand Army veterans, the town hall, the churches, and schools are all fine buildings. The educational institutions are good public schools, Ingleside School for young women and Weanington School for boys. The government is administered by three selectmen chosen annually by the people. Pop. (1920) 4,781.

NEW NETHERLANDS, *neth'ér-landz*, the name given by the Dutch to the colony they established in America in 1626. A British fleet, under command of Richard Nicolls, captured the place in 1664; and by order of Nicolls, the Duke of York was made ruler and the name changed to New York. See NEW YORK.

NEW ORANGE, a name applied to New York in 1673, when the colony of New Netherlands was retaken from England by the States-General of Holland. The name was used in honor of the Prince of Orange.

NEW ORLEANS, La., the seventeenth city of the United States in population and the largest in the Southern States, is located on the east bank of the Mississippi River in the delta region, 107 miles above the mouth. It lies along the river front for about 12 miles and extends back toward Lakes Borgne and Pontchartrain. Its total area, including the suburb of Algiers on the west bank of the Mississippi, is 196 square miles, of which about 65 square miles are improved. Other suburbs—Westwego, Gretna, Amesville and Gouldsboro—do not belong to New Orleans. The boundaries of the city are coterminous with those of the parish of Orleans. Built originally along a great bend of the Mississippi River, it was called the "Crescent City," but long ago it outgrew this shape, though the principal streets running north and south still curve to follow the bend of the river. The site is flat with a slight slope away from the river to the swamps behind the city. The highest elevation above the sea is about 10 feet and in flood time nearly all of the city is from 4 to 12 feet below the level of the river, which is kept out by levees or dikes built along the entire front and graded down to the flat city site. On the river front silt is constantly deposited by the current and the land thus formed, called the *batture*, is from time to time taken into the city and surrounded by the levee. The climate is mild and damp, and the rainfall averages nearly 60 inches a year. The winters are short and the summers long. It is cooler in New Orleans than might be expected from its location, the temperature averaging 65° for 47 years. For

only 211 days in the last 43 years has it fallen below 32° and in only 11 days was it below 20°. On seven days in 43 years the temperature has reached 100°. About once in 10 years there is a light snowfall; frost comes for about 30 days in December and January, but seldom enough to injure the plants and flowers.

Population.—The population of the city has increased from 17,242 in 1810 to 339,075 in 1910 (1920, 387,219). The most rapid growth was from 29,737 in 1830 to 102,193 in 1840, an increase in 10 years of 243 per cent. The foreign element in the population has always been large but in recent decades the proportion has been decreasing. In order of numbers the foreign-born population is composed of Germans, Italians, Irish, French and English. The negro population is about 27 per cent of the total. The large native population of French or Spanish descent, called "creoles," has strongly influenced the social life, the manners and customs and the amusements of New Orleans. The original French inhabitants came from North France, from Acadia, from Haiti and San Domingo; the Spanish from Spain and Cuba and the Canary Islands during the Spanish control of the colony of Louisiana.

Streets and Buildings.—The streets in the old French city—the *Vieux Carré*—are narrow; in the newer American city they are wider, frequently with the centre or "neutral ground" planted in palms or trees. The great names of France and Spain still live in the street names of the old city—Chartres, Royal, Bourbon, Dauphiné, Iberville, Bienville, Conti, Orleans, Toulouse, Dumaine, Carondelet, Galvez, Unzaga and Miro. Canal street, the business and shopping centre, divides the *Vieux Carré* from the modern city. The French influence is seen in the architecture of the creole houses with their tiled roofs, courtyards, iron-railed balconies and in the galleries of the more spacious districts. So much of the French town was destroyed in the fire of 1794 that the public buildings have since shown a predominating Spanish influence. The old archbishop's palace dates from 1737 and was formerly the first Ursuline Convent; Saint Louis Cathedral and presbytery were begun in 1795, and the Cabildo, the *Casa Capitular*, or government house, with adjoining buildings, was erected in the same year. Here in 1803 Louisiana was transferred to the United States. The Pontalba buildings on the Place d'Armes (now Jackson Square) are of later date, as is also the famous French Market (*Halle des Boucheries*). Of the newer structures the following are the most noted: the Custom House, built under the supervision of Major (later General) P. G. T. Beauregard, on a floating foundation of cypress logs; the United States Mint; the New Court House; the City Hall and Criminal Court buildings; the new Post Office, the Cotton Exchange and the buildings of Tulane and Loyola universities. The great business houses are on Canal or adjoining streets. Noted hotels are the Saint Charles, the Grunewald, the De Soto, the Lafayette and the Monteleone.

Parks.—New Orleans has only two large parks though it has smaller breathing places in the numerous "squares," and some of the streets are almost parks in themselves. Audubon Park, named for the great naturalist,

reaches from the river to Saint Charles avenue and contains 249 acres. It was purchased by the city in 1871, in 1884-85 it was the site of the Cotton Centennial Exposition, and has been considerably improved only in recent years. In the 18th century it was a part of the plantation of Étienne de Boré, who in 1795 succeeded in making granulated sugar from sugar cane. It is fitting that the Sugar Experiment Station of the State University is now located in the park, which also contains a large horticultural hall, one of the Cotton Exposition buildings. The park is shaded by immense live oaks and the grounds are well laid out and planted with tropical plants and flowers. City Park, of 216 acres, on the Metairie Road, was formerly a part of the plantation of Louis Allard, and under the great "Duelling Oaks" many encounters took place in ante-bellum days. In Heinemann Park, or the "baseball park," the intercollegiate and other athletic contests take place. Near City Park are the Fair Grounds and the Jockey Club. The "squares," "places" and "circles" are small, parklike places, with walks and seats, and adorned with fountains, shrubbery and statues. Among them may be mentioned Jackson Square, formerly the Place d'Armes, and the centre of the old city, in which stands an equestrian statue of Andrew Jackson, by Clark Mills; Lafayette Square, with the statues of Henry Clay, by Joel T. Hart, and of John McDonough, who left his fortune to establish public schools; Lee Circle, formerly Tivoli Circle, with the monument surmounted by a statue of Robert E. Lee, by Boyle; Margaret Place, with Margaret Haughery's statue, commemorates the "patron saint" of New Orleans orphans; in Beauregard Square, formerly called Congo Square, the slaves once met to dance African dances and here bull-fights took place under Spanish rule. Other squares are: Annunciation, Clay, Fillmore, Douglas, McCarthy, Lawrence and Coliseum Place.

Cemeteries.—The cemeteries number about 40, some of the older ones being in the centre of the city. On account of the marshy nature of the soil the dead are usually buried in vaults or tombs above ground. In all the cemeteries are noted commemorative monuments and statues. Old Saint Louis Cemetery dates from the founding of the city and its curious vaults, one above the other, are called "ovens." Saint Louis No. 2 (1824), New Saint Louis and Saint Louis for colored people are, with Old Saint Louis, under Catholic control, as also is the Campo Santo of Saint Roch, with its wonder-working shrine, which is frequented by young girls on Good Friday. Three old Protestant cemeteries are Girod (named for a French Protestant mayor), Lafayette and Washington. On Metairie ridge are most of the modern cemeteries, the largest of which is Metairie. Here are the vaults of fraternal societies and the Confederate monuments and statues. Greenwood and the Firemen's Cemetery are nearby. At Chalmette is a national cemetery where nearly 30,000 Union soldiers lie buried.

Libraries and Museums.—The principal libraries of the city contain about 500,000 volumes. The largest collections are in the Public Library, with five branches; the State Library, consisting principally of law books, in

the new Court House; the Howard Memorial Library, a private foundation, which has a very complete collection of publications relating to Louisiana and the Southern States; and the libraries of H. Sophie Newcomb College and of Tulane and Loyola universities. The State Museum, occupying the old Cabildo, has valuable historical, archæological and documentary collections relating to Louisiana, and a large exhibit of the agricultural and mineral resources of the State.

Educational Institutions.—In New Orleans there are 95 public schools, including three high schools, with an enrolment of 55,000, while the 125 parochial and private schools have 30,000 students. In the public schools are 1,500 teachers, and the public school property is valued at \$5,000,000. Notable among the private and church schools are the Ursuline Convent, the oldest school in the Mississippi Valley; the Dominican Convent, the Newman Manual Training School, the Metal Trades School and the College of the Immaculate Conception. A city normal school trains teachers for the public schools. The Delgado Vocational School, made possible by a bequest of a million dollars, is now being organized by the city school board. Among the private schools of higher grade for negroes are Leland University (Baptist), Straight University (Congregational) and New Orleans University (Methodist). The Baptists have recently established a college for white girls called the Baptist Bible Institute. Loyola University (Roman Catholic) is a new institution of university grade, with academic and law departments. H. Sophie Newcomb Memorial College is one of the leading colleges for women in the Southern States and is affiliated with Tulane University. The latter is the oldest institution of college grade in the State. It is based on an old State foundation and was developed through the aid of a bequest of \$1,000,000 by Paul Tulane. It now has academic, engineering, law, pharmacy and medical departments, with an enrolment of 2,000 students. The Medical College of Tulane University and the hospitals have made New Orleans one of the chief medical centres of the United States.

Charitable Institutions.—Chief among the charitable institutions is the Charity Hospital, an old Spanish foundation, now supported by the State and by private donations and staffed with nurses by the Catholic Sisters of Charity. It has accommodations for more than a thousand patients, and gives treatment to more than 30,000 patients each year. Other well-known hospitals are the Hotel Dieu (Catholic), Touro Infirmary (Jewish), Presbyterian Hospital, Eye, Ear, Nose and Throat Hospital, Flint-Goodrich Hospital for negroes, the United States Marine Hospital and 10 smaller institutions. There are 21 orphan homes, 10 homes for the aged and destitute, a private insane asylum, three homes for wayward women, the State Confederate Soldiers' Home and the Kingsley House settlement modeled after Hull House of Chicago. About 50 of the more than 100 charitable and beneficent institutions receive slight financial aid from the city.

Churches.—There are more than 300 churches in New Orleans, of which two-thirds are for the whites and the others for negroes.

The principal denominations in orders of numbers are Roman Catholic, Baptist, Methodist, Presbyterian, Episcopalian, Lutheran, Jewish and Christian Science.

Amusements and Social Life.—The festivals of Mardi Gras are of French origin, but have been adopted by all nationalities, and are now so widely famed that thousands of visitors are attracted each year to the city. The first celebration was in 1827 when young creoles who had been at school in France organized a masked street procession. The first of the present carnival clubs—the “Mystic Krewe of Comus”—was formed in 1857; in 1870 the “Twelfth Night Revellers”; in 1872 “Rex” and the “Knights of Momus”; the “Krewe of Proteus” in 1882; the “Krewe of Nereus” in 1895. Later-formed organizations are the “Atlanteans,” “Elves of Oberon,” and the “High Priests of Mystras.” The events of the Mardi Gras season begin on Thursday and end on Shrove Tuesday (Mardi Gras). There are balls, dinners, street and river parades, and many unorganized carnival activities in which nearly the whole population takes part, while business is almost suspended. There is much agreeable club life in the numerous organizations of New Orleans. The most noted clubs are the Boston, Pickwick, Chess, Checkers and Whist, Harmony (Jewish), Round Table, Stratford and the Era Club for women. There are numerous rowing, yachting, hunting, fishing and athletic clubs as well as Catholic and Protestant social and religious organizations. The cuisine of New Orleans has been made famous by many good cooks. Noted French restaurants are La Louisiane, Galatoire’s, Antoine’s and Madame Begné’s.

French opera was introduced into America through New Orleans and until recently the city had each season a troupe from France. But the war in Europe prevented the coming of the troupes and now the famous French Opera House has been given to Tulane University.

Health Conditions, Drainage, Sewerage.—For nearly a century New Orleans was known as one of the most unhealthy spots in North America. Before the Civil War there were almost annual epidemics of yellow fever, several severe visitations of cholera, and always malaria. But since 1860 health conditions have gradually improved and the death rate has steadily declined. Before 1860 the death rate per thousand averaged 60; in 1900 it was 29; in 1905 it was 24; and in 1914 it was 17. The death rate for whites is always lower than for blacks; in 1914 it was 14 per thousand. This lessening death rate is due to the betterment of sanitary conditions during the last 50 years and in particular to the improvements made since 1900 in the water supply, the drainage and sewerage and in the inspection of food supplies. The water supply, formerly taken unfiltered from the river and from rainwater cisterns, now comes from immense municipal filtration plants which purify 63,000,000 gallons a day. Mosquito breeding cisterns have been abolished. Drainage and sewerage has been likewise improved. Owing to the flat and low situation of the city and the heavy rainstorms it was long considered almost impossible to dispose of sewerage properly. Before 1900 open gutters were used, the streets were frequently flooded and standing water everywhere offered breeding

places for the yellow fever and malaria-bearing mosquitoes. But in 1903 the sewerage and water board put into operation a system which has completely transformed conditions. Instead of one system of sewerage as in most cities there are three systems in New Orleans, all aided by immense pumping stations to give sufficient fall. The first is for sewerage which is carried in 310 miles of pipes to the lower edge of the city and pumped over the levee into the Mississippi River; ordinary drainage, which is only slightly polluted, is carried by pipes and large canals into Bayou Bienvenue and thence into Lake Borgne and the Gulf. The unpolluted rainwater is carried by a third system into Lake Pontchartrain. Twenty years ago water could be found at one to two feet from the surface; now it is from 5 to 15 feet. The mosquito has been almost driven away and fevers have greatly decreased. A visitation of the bubonic plague in 1914 caused the tearing down or the reconstruction of every building in New Orleans which was not rat-proof. Both the State and the city health authorities maintain the strictest inspection over food supplies, hotels and eating places. The picturesque French market and its several replicas still stand but are closely screened and rigidly inspected. Cholera comes no more, yellow fever epidemics gradually became lighter and last appeared in 1905. New Orleans is now one of the most healthful of the large cities.

Railway and Harbor Facilities.—New Orleans was established by Bienville as a gateway to the Mississippi Valley, and until railways began to compete with water transportation it was without a serious rival as the port of that region. There are two ways to the Gulf—by the Mississippi River and by Lake Pontchartrain, and 13,500 miles of navigable rivers lead to its wharves. The rapid growth of the city before the Civil War was due mainly to the development of river and ocean transportation. Railway competition at that time was not important. But the Civil War closed the port for five years and much of its trade was then lost to Eastern ports. Railways were already, before 1860, connecting the Mississippi Valley with the Atlantic Coast, the bars at the mouth of the river hindered ocean-going commerce and river transportation was never again, after 1861, on a thriving basis, declining in fact to practically nothing where it now remains. Not until 1880 did the port of New Orleans do as much business as in 1860. Since then there has been a regular increase due to the development of ocean-going commerce and the building of railroads from the interior to New Orleans. During the last 15 years the city has reached its former place of primacy as the greatest port of the South and one of the greatest in the United States. Much of this is due to recent permanent harbor improvements made at public expense. The Eads jetties and later government dredging assure 35 feet of water at the passes to the Gulf. The harbor with unlimited anchorage space is the river itself, 40 feet deep at the edge of the wharves and 200 feet in mid-stream which is here one-third to two-thirds of a mile wide. Wharf space owned by the public extends for 12 miles on each side of the river and is under control of the Dock Board, a State institution which has control over all harbor improvements. The Dock Board has

constructed eight miles of wharves and on them are six miles of steel sheds to protect cargoes from the weather. There is a public owned cotton warehouse with a capacity of 500,000 bales, a public owned grain elevator with a capacity of 2,000,000 bushels, and privately owned elevators with a total capacity of 5,000,000 bushels. The United States government has just completed on the wharves three huge warehouses for general commodities, two of which will be turned over to the Dock Board. Ships load and unload anywhere along the eight miles of wharf, using the best mechanical devices. A belt railway, 50 miles long, publicly owned and operated, connects all railways, wharfs and about 80 industries, so that in transshipping the shortest distance separates the car and the ship. The coaling facilities are excellent. Under private control are the Stuyvesant Docks of the Illinois Central Railway, the Chalmette Railway and steam terminals of the Southern Railway, and the Algiers terminals of the Southern Pacific Railway. The Inner Harbor or Industrial Canal connects the Mississippi River with Lake Pontchartrain and gives a fixed water level needed by certain industries, another approach to New Orleans and the opportunity to industrial concerns to lease harbor frontage which cannot now be done on the river front which is owned by the State. The canal is six miles long, 300 feet wide and has a depth of 30 feet. The Dock Board has by State law 41 miles of river front under its control, and can indefinitely extend the harbor facilities. At Algiers, across the river, is the United States Naval Station with complete repair facilities and a dry dock which can raise vessels up to 18,000 tons. Three privately owned dry docks can accommodate vessels up to 2,000, 5,000 and 15,000 tons. Forty-five steamship lines sail from the port, a Japanese line being the latest established. Inland water transportation is almost negligible, the inland waterways now serving principally to keep down railway freight rates. Twelve railways, 10 of them trunk lines, enter the city, among them the Illinois Central, the Louisville and Nashville, the Southern and the Southern Pacific. The railways represent a mileage of 145,288 with 215 miles of terminal track. They reach New Orleans by easy grades and freight rates are nearly all on the basis of water competition. The railways coming in from the West have their terminals across the river. Railways and industries which do not own terminal facilities can enter on the public belt railway.

Commerce and Manufactures.—New Orleans has long been the chief commercial city of the South and in normal times ranks next to New York in exports and imports. Before 1860 its prosperity was due largely to the fact that it was the best outlet for the products of the Mississippi Basin and to the development of water transportation. At one time it even looked forward to being a rival of London, but the bars at the mouth of the Mississippi River, the frequent epidemics of disease, the conservatism of the people, the losses due to the Civil War, the development of east and west railways in the upper Mississippi Valley, and the fact that the city was off the main lines of world trade, all combined to check its progress. Since 1870 many of the hindering conditions have been done away with, river

navigation and port facilities have been much improved, the city has become a great railway centre with low freight rates, and it is again one of the leaders in foreign and domestic commerce. It is favorably situated for the distribution of foreign commerce into the region west of the Appalachians and for exports from the same region, especially to Mexico, Central America, the West Indies and South America. The opening of the Panama Canal has stimulated commerce with western South America and the Orient. In 1911 and again in 1915 the volume of foreign trade through New Orleans was exceeded only by New York. The war in Europe (1914-18) cut off temporarily much of its former trade, and in 1918 it ranked as the sixth port of the United States. In 1914 the exports through the port of New Orleans were valued at \$193,839,961, and the imports at \$89,382,621—a total of \$283,222,582; in 1918 the total was \$418,536,295. New Orleans is the largest market in the United States for cotton and cotton-seed products, rice, sugar, bananas, oysters and shrimp; the second coffee market; and the largest lumber market of the South. As an export market for Western grain it is developing rapidly. The total distribution of commodities in 1918 was estimated in value at \$1,130,000,000. The public grain elevators, and cotton warehouses which issue negotiable receipts for cotton, and the low port and transshipment charges, are responsible for much of the city's commercial progress. Leading commercial organizations are the Cotton Exchange, whose statistics are the standard for the United States, the Board of Trade, Contractors and Dealers' Exchange, Stock Exchange, Sugar and Rice Exchange and the Association of Commerce with its 12 bureaus. As a manufacturing centre New Orleans is of less importance. In 1914 its manufactured products were valued at \$70,000,000; in 1918 at \$140,000,000. The leading manufactured products are sugar and molasses, rice, cotton-seed products, bags, tobacco, cotton goods, clothing, foundry and machine-shop products, canned goods and steel and wooden ships. There are nearly 1,000 manufacturing plants with an invested capital of about \$60,000,000.

Bank Resources.—Resources of the 15 most important banks amounted in 1918 to \$235,126,824; deposits were \$167,142,600. Clearings were, in 1900, \$556,000,000; in 1910, \$987,000,000; in 1918, \$2,660,460,000. The 1918 clearings show the influence of the war as well as indicate increased wealth. Practically all the huge public improvements recently undertaken by the city and State have been financed by local banks.

Government.—Under the French and Spanish régimes New Orleans was not a municipality but was governed as a part of the colony of Louisiana. In 1805 it was organized as an American city under a charter which recognized the fact that the city was merely a collection of villages and to each it gave almost independent government. In 1836 on account of the conflicting racial elements in the population a new charter provided for three almost separate governments over the three districts or "faubourgs" which had been combined into the city. A mayor and council exercised general supervision over the whole, but the plan

NEW ORLEANS, LA.



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Jackson Square and Cathedral

was not satisfactory and 16 years later it gave way to the usual consolidated American city government with mayor and district councilmen. In 1870 under the "reconstruction" régime a new charter provided for what is now known as "commission" government—a mayor and seven "administrators" being elected on a general ticket. This government, on account of its origin, was unpopular and in 1882 the city was again put under a mayor and district councilmen but with numerous appointive boards to attend to most municipal functions. There were boards for police, education, fire prevention, public debt, sewerage and drainage, parks and streets, water, etc. The city was divided into 17 wards and seven civil districts, thus recognizing the seven towns or "faubourgs" which by this time had been united into the city of New Orleans. This form of municipal government lasted for 30 years and was superseded in 1912 by a "commission" government of a mayor and four other commissioners elected on a general ticket. The administration was divided into five departments each of which was headed by a commissioner: (1) Public affairs under the mayor; (2) public finance; (3) public safety; (4) public utilities; (5) public property. Numerous appointive administrative boards still exist and the division of the city into seven districts and 17 wards continues.

Public Finance.—The city still suffers from indebtedness placed upon it during the "carpet bag" days, which, however, has been considerably lessened. In 1910 the bonded debt was \$32,500,000 and the floating debt about \$1,000,000. Since then the bonded debt has been considerably increased on account of public improvements. Much of the improvement, however, more than pays the interest on the cost. The assessed value (75 per cent of property) was \$221,000,000 in 1910 and in 1918 it was \$442,874,412. The combined State and city tax rate on the true value of property amounts to 21 mills. The income from taxes is about \$9,200,000, which is distributed as follows: For city administration, \$3,000,000; for schools, \$1,162,000; for water and sewerage, \$1,500,000; for interest on the bonded debt, \$3,321,000; and any balance is divided between the city administration and the sewerage and water board.

History.—The present site of New Orleans was occupied by a village of the Houma Indians in 1699 when Bienville's expedition first explored the lower Mississippi River. Bienville was impressed by the fact that the land here was the highest for many miles around and seemed to be above overflow. Moreover it was accessible not only from the river but also by way of the lakes lying to the rear. So in 1718 he established a French post here for the purpose of guarding the gateway to the lower Mississippi Valley, whence access to the interior for trade and for military expeditions was easier than from Biloxi or Mobile, the older French settlements. The new town was named Nouvelle Orléans in honor of the regent of France, the Duke of Orleans, and in 1722 it became the capital of the colony. The French town was laid out in the form of a rectangle—whence the name of the old part of the city—*Vieux Carré*. The sending over from France of the "cassette" girls (girls with dowry) in 1727 as wives for the colonists and the establish-

ment of schools was an assurance of permanence to the colony. But neglected by the home government, the town and colony grew slowly. Settlers came from France and Canada, and some Germans were sent out by John Law of the Mississippi Company, but they were few in number, and at the end of the French régime in 1763 the city had less than 4,000 inhabitants. However, the Catholic Church was organized, teaching and missionary orders were established and trade with the Indians and some commerce with the home country developed. By a secret treaty in 1762 Louisiana was ceded to Spain, but the latter made no effort to take possession until 1768. Meanwhile the colonists, dissatisfied with the proposed transfer, planned to ask for British protection, and in 1768 when Antonio de Ulloa, the first Spanish governor, came, he was driven out by a rebellion which was, however, ruthlessly suppressed the next year by Capt.-Gen. Alexandro O'Reilly. Spanish rule was firmer and more intelligent than the French, and the population was increased by immigrants from Spain, Acadia and the West Indies. But the colony remained distinctly French, the Spanish authorities making no serious efforts to change its institutions. Great fires in 1788 and 1798 destroyed much of the *Vieux Carré* and resulted in the erection of better buildings. A considerable trade developed, the stringent commercial regulations of Spain were seldom enforced in Louisiana, and in 1794 New Orleans was made a free port of deposit for the trade of the United States west of the Appalachians. The western Americans considered an open port at New Orleans of the utmost importance to them and when in 1801 Spain ceded the colony back to France a demand arose for the possession of the port by the United States. So in 1803 with the purchase of Louisiana, New Orleans, then a town of 10,000 inhabitants, became American, and in 1805 it was given the usual American city charter. The growth under American rule was rapid in spite of controversy among rival races and nationalities. For half a century it was the centre of activity of adventurers and soldiers of fortune who had designs in the West, and in Mexico and other Latin-American countries. In 1812 the first steamboat from the Ohio region reached New Orleans, inaugurating a long period of transportation activity on the inland waterways. In 1830 the second railroad in the United States was opened from New Orleans to Milneburg on Lake Pontchartrain, and between 1850 and 1854 the city gained railway connections both to the east and west. In 1852 New Orleans was the third city in size in the United States. Its location has made it, in war time, a position of great military importance, and in 1815 the British under General Pakenham planned to seize it and thus to hold the gate to the Mississippi Valley. But on 8 Jan. 1815 the British army was defeated by the Americans under Gen. Andrew Jackson at Chalmette, just below the city. (See NEW ORLEANS, BATTLE OF). In 1861 with the formation of the Confederacy, New Orleans became a centre of military and naval operations but the mouth of the river was soon blockaded by the Union fleet and in 1862 the city was captured by military and naval forces under the command of Admiral Farragut and Gen. Benjamin Butler. (See NEW ORLEANS, CAPTURE OF, IN

1862). During the remainder of the war it was under Union control. General Butler's rule was notoriously bad, but that of his successors was less objectionable. Although the city declined in population and wealth for a time after 1862, a slow recovery followed. New Orleans remained the capital of the colony and State until 1852 and was again the capital from 1865 to 1880. From 1867 to 1877 New Orleans was the stronghold of the "radical" or "carpet-bag" government of Louisiana, and the old Saint Louis Hotel was used as a state-house. The city was bankrupted by the corrupt ruling class and to this day it carries a heavy debt incurred by the Reconstructionists. Canal street was the scene on 14 Sept. 1874 of a battle between the conservative whites and the radical forces, in which the latter were defeated and the state government overturned for a few days. In 1884-85 the Cotton Centennial Exposition was held in New Orleans. David C. Hennessy, chief of police, was murdered in 1891 by members of the Mafia, an Italian secret society; nine men arrested for the murder and acquitted in court were seized by a mob and lynched. Considerable diplomatic negotiations ensued between the governments of Italy and the United States. (See ITALY, DIPLOMATIC RELATIONS OF THE UNITED STATES WITH). During the last 20 years New Orleans has made its soundest and most rapid progress.

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NEW ORLEANS, Campaign and Battle of, in the War of 1812. On 15 Aug. 1814, after signing a treaty with the Creeks (see HORSESHOE BEND), Jackson went to Mobile, having been appointed commander of the Seventh military district. There he learned that on 25 July 1814, Maj. Edward Nicholls, with 110 British troops and three cannon, had appeared before Pensacola, Fla., accompanied by a British fleet under Capt. W. H. Percy. Though the Territory belonged to Spain, Nicholls seized Fort Barrancas at the entrance to the harbor, armed and clothed the Indians, and unsuccessfully endeavored to enlist the services of Jean Lafitte (q.v.) and his band of pirates

infesting Barataria Bay (q.v.), about 60 miles south of New Orleans. Nicholls also sent Percy with the *Hermes*, 22 guns, the *Carron*, 20, the *Sophie* and the *Childers*, 18 each, and a force of 60 marines and 120 Indians to capture Fort Bowyer, a battery at the entrance to Mobile Bay. At the fort, which was armed with 20 guns (of which only eight were serviceable), were 130 troops under Maj. William Lawrence. On 12 Sept. 1814 the ships opened fire on the fort while the troops attacked from the rear, but so superior was the American gunnery that the *Hermes* was soon cut to pieces, and was set afire by Percy; the other ships and the troops withdrew, going to Pensacola. The total British loss was 232, of whom 162 were killed, while the Americans lost only four killed and five wounded. Jackson was intent on taking Pensacola and on 3 November, despite warnings that a large British force had left Ireland to take Mobile, New Orleans and the surrounding country, started for Pensacola with 4,100 men. On his arrival he demanded that the Spanish governor surrender but the latter refused, whereupon, on the seventh, Jackson divided his troops into three columns, stormed the defenses of the town and quickly forced the Spanish to surrender unconditionally. The British then abandoned Fort Barrancas, whereupon Jackson returned to Mobile, then proceeded to New Orleans, where he arrived 2 December, and found that, despite the proximity of the British expedition, the city was utterly unprepared to defend itself. Accordingly he caused fortifications and batteries to be erected at advantageous points; stationed a few gunboats at the bay of Saint Louis, 60 miles to the northeast of New Orleans; and sent messengers in every direction urging troops to hasten to his aid.

Meanwhile the British fleet arrived with the troops under Maj.-Gen. Sir Edward Pakenham (q.v.). On 10 Dec. 1814 the troops were landed at Chandeleur Island at the entrance of Lake Borgne, but on entering the lake beheld six American gunboats under Lieut. Thomas A. C. Jones (q.v.) prepared to oppose them. Accordingly, on 14 December, 980 seamen and marines in 45 launches and barges attacked Jones' little flotilla and after a sanguinary contest destroyed them with a loss to themselves of 17 killed and 77 wounded, while the American loss was six killed and 35 wounded. This left only two vessels, the *Louisiana* and the *Carolina*, to dispute the British passage up the river. Hence, during the next week, 7,000 British troops were disembarked at Isle aux Poix in Lake Borgne and a force of about 1,700 troops under Col. William Thornton was sent in advance by Maj.-Gen. John Keene, bivouacking in the open about six miles from the city. Learning of this, Jackson, on the night of 23 December, took 2,131 troops and attacked from two different points on land while the *Carolina* slipped down the river and poured grape into the British ranks. The British were being slowly driven back when a fog arose, causing confusion in the American ranks, and as British reinforcements were arriving Jackson retired. In this battle the British lost 46 killed, 167 wounded and 64 missing, while Jackson's loss was 24 killed, 115 wounded and 74 missing. The British then pushed forward so that by 25 December, 8,000

troops under Pakenham and Sir Samuel Gibbs were ready for battle, to oppose whom Jackson had altogether about 5,000 infantry.

Jackson took position about five miles below New Orleans. The Rodriguez Canal about 10 feet wide stretched across the plain from the river to the swamps and Jackson caused this to be deepened and a parapet thrown up behind it. The *Louisiana* lay about two miles below Jackson's line and the *Carolina* a mile further down the river. When the British advanced they first had to drive away these two ships; on 27 December the *Carolina* was bombarded with hot shot, set afire and destroyed, while the *Louisiana*, after sustaining a severe fire, escaped up the river. The British then continued their march expecting little opposition, but soon, to their surprise, came upon Jackson's half-finished breastworks. On 1 Jan. 1815 the British turned their batteries on these works, but the Americans replied with such precision that the British soon deserted their guns with a loss of 76 killed and wounded and two missing, while Jackson lost only 11 killed and 23 wounded. Failing in these attacks Pakenham waited until 6 January for the arrival of two fresh regiments under Maj.-Gen. John Lambert, thus bringing his force nearly up to 10,000. On the night of the seventh Pakenham sent 1,200 troops under Thornton to attack the American works on the west bank, which were defended by 800 men under Col. David Morgan and Daniel T. Patterson's battery; while he himself was to assault Jackson's lines, General Gibbs attacking on the right, and Keane on the left, Lambert being in reserve. A motley array of sailors, regulars, creoles, pirates, negroes, Frenchmen, Kentuckians and Tennesseans held Jackson's left, while the centre was defended by Carroll's brigade of 1,414 men, and the right by 1,327 men, Adair's Kentucky brigade of 325 men being held in reserve, the total on both banks and in reserve being a few over 5,000. Early on the morning of 8 January the British advanced, Gibbs' troops coming first under the American fire, which was so terrific that they broke and fled. On receiving reinforcements they renewed the attack but were again repulsed, whereupon Pakenham reformed them and himself led the third attack only to fall in front of his men, Gibbs, too, falling soon afterward. Meanwhile Keane's division attacked Jackson's right near the river but was repulsed with great slaughter and Keane was severely wounded, the command then devolving on Lambert who instantly withdrew the troops. On the west bank Thornton had routed Morgan's troops, compelled Patterson to spike his guns, and advanced up the river a mile behind Jackson's lines, thus placing him in a precarious position, but fortunately Lambert withdrew his troops and recalled Thornton, thereby saving Jackson. After the battle a truce of two days was arranged to bury the dead and until 18 January artillery fire was indulged in, but then the whole British army withdrew to a fortified position at the mouth of a bayou and on the 27th reembarked in the ships off Chandeleur Island. Though variously stated, the most trustworthy authorities place the total British loss at 2,036 and the American loss at 71.

Meanwhile a few of the British vessels entered the river with the intention of reducing

the works at Fort Saint Philip and then co-operating in the attack on the city. They bombarded the fort from 11-18 Jan. 1815, but as their shells had little effect they abandoned the attack. Still the British seemed loath to depart without striking a blow. Reinforced by 1,000 fresh troops, Lambert bombarded Fort Bowyer 8 February and sent troops to attack from the rear. Lieut.-Col. William Lawrence had only 360 men in the fort and, therefore, capitulated on the 11th. This ended the land fighting in the War of 1812, peace having already been declared. Consult Adams, Henry, 'United States,' Vol. VIII, pp. 311-385; Armstrong, John, 'Notices of the War of 1812,' Vol. II, pp. 157-170; Burgoyne, R. H., 'Historical Records of the 93d Sutherland Highlanders'; Cooper, J. F., 'Naval History,' Vol. II, pp. 142-146; Cullum, G. W., 'Campaigns of The War,' Chap. 8; Davis, P. M., 'Official and Full Detail of the Great Battle of New Orleans'; Fay, H. A., 'Official Accounts,' pp. 279-295; Gleig, G. R., 'Campaigns of the British Army at Washington and New Orleans'; Hamilton, P. J., 'Colonial Mobile,' pp. 378-383; James, William, 'Military Occurrences,' Vol. II, pp. 341-533; King, Grace, 'New Orleans,' pp. 219-248; Maclay, E. S., 'History of the Navy,' Vol. II, pp. 40-45; Latour, A. L., 'Historical Memoir of the War in West Florida and Louisiana'; Lossing, 'War of 1812,' pp. 1017-1054; Phelps, A., 'Louisiana,' pp. 267-283; Roosevelt, 'Naval War of 1812,' pp. 343-348, 459-488; Trimien, Richard, 'Regiments of the British Army'; Walker, Alexander, 'Jackson and New Orleans'; Wiley and Rines, 'The United States,' Vol. VI, pp. 62-84; and biographies of Jackson by Buell, Parton, Frost and Eaton.

NEW ORLEANS, Capture of, in 1862.

The Civil War engagement which resulted (24 April) in the taking of New Orleans, was actually fought 70 miles down the Mississippi. The great bend next below the city was commanded by Fort Jackson on the west (north) bank and Fort Saint Philip on the east. Supposed to mount 150 guns each, they had in fact 109 together, over half of them only 24's; and the garrison was largely Northerners and foreigners. The river was blocked by a chain buoyed by 11 steamer-hulks, and there were fire-raft and boats above. Farragut's fleet comprised 17 wooden vessels with 162 guns; besides six gunboats with 30 guns and 20 mortar-schooners with one gun each, under command of David D. Porter (q.v.). Bombardment on the forts was opened 18 April; and on the night of the 20th a Union vessel hugging the bank got above the boom, and coming down with a full head and current, snapped the chain and left the channel free. After three days' more bombardment it was determined to pass the forts instead, in the dark, and on the morning of the 24th, about 2:30, the vessels steamed forward in two columns, Farragut leading one in the *Hartford*, Capt. Theodorus Bailey the other, while the mortar-boats shelled the water-battery commanding the approach to Fort Jackson. All but the last three of Farragut's column succeeded in passing the boats before daylight made it impossible, the vessels' guns in turn driving the fort gunners from their posts. Above, the Confederate

flotilla of 17 vessels inflicted great damage, one Union gunboat being sunk, one badly crushed by a ram and the *Hartford* fired by a fire-boat. Nine Confederate vessels were sunk or captured, however, and the Union fleet proceeded to New Orleans and compelled it to surrender. On the 28th the forts also capitulated. It is due to history to add that of the 17 Confederate vessels, 9 of which were rams and 2 ironclads, only 4 vessels and 12 guns were in such condition as to be capable of making a fight. If the materials of the force of John K. Mitchell, the Confederate commander, had been completed, his little fleet could have made a very creditable defense; but J. R. Soley, of the United States navy, truly says that no commander, taking hold of his vessels in their incomplete condition four days before the fight, could have made much out of them. This victory of Farragut's prevented Louis Napoleon from recognizing the Confederacy and raising the blockade, and hence was one of the most important of the war.

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NEW ORLEANS UNIVERSITY, in New Orleans, La.; a coeducational institution for the education of young negroes, founded in 1873 under the auspices of the Methodist Episcopal Church. It has preparatory and collegiate departments, and its courses lead to the degrees of A.B., B.S. and Ph.D. In 1913 there were connected with the school 40 teachers and 605 students. The library contains over 6,000 volumes, the grounds and buildings are valued at \$250,000.

NEW PHILADELPHIA, Ohio, city, county-seat of Tuscarawas County, on the Tuscarawas River and the Ohio Canal, and on the Pennsylvania and the Baltimore and Ohio railroads, about 100 miles northeast of Columbus and 90 miles south of Cleveland. It was settled in 1805 and incorporated in 1808. It is in an agricultural region, but its good water power and facilities for transportation have contributed toward making it a manufacturing city. Clay and coal are found in the neighborhood. Some of the manufactures are pressed, stamped and enameled goods, steel products, flour, woolen goods, brooms, canned goods, vacuum cleaners, tile, and wagons and carriages. Shorenbraun Springs and Tuscora Park, the public library, hospital, high school and orphans' home are of interest. The mayor is elected biennially and the council appoint or elect the administrative officials. Pop. 10,713.

NEW PHILIPPINES, fil'i-pīnz or -pēnz, a name sometimes given to the Caroline Islands (q.v.).

NEW PLATONISTS. See NEO-PLATONISM.

NEW PLYMOUTH, New Zealand, the capital and seaport of Taranaki, North Island, 120 miles southwest of Auckland. The harbor is noted and from this port a great deal of the dairy produce of the neighborhood is shipped. New Plymouth is also a terminal of railway lines to Wellington and Napier. The town contains flourishing flour mills, for it is in the centre of a rich cereal district. There are 'so leather factories. Pop. 5,141. Consult *australasian Year Book*' (Melbourne 1906).

NEW POMERANIA, or **NEU POMMERN**, noi pōm'ern, formerly **NEW BRITAIN**, the largest island of the Bismarck Archipelago (q.v.), 50 miles distant from Kaiser Wilhelm's Land, New Guinea, Rock Island and the Dampier, and the Vitiaz straits, intervening. It is crescent shaped, 300 miles long, with a maximum breadth of 90 miles and an estimated area of 9,500 square miles. It is of volcanic formation, the mountains culminate in Mount Hurstein in the extreme west (6,000 feet) and they are mostly forested to the tops. The coastal belt is fertile. There is a German mission and trading station on the northeast coast. The inhabitants are savage Papuans.

NEW PROVIDENCE, one of the Bahama Islands (q.v.), northeast of Andros Islands and about 300 miles east by north of Key West. In 1629 the first English settlement on the Bahamas was made on New Providence. This island has the best harbor of any of the group. Nassau (q.v.), the capital of the islands, is on New Providence. Although this island, as all of the group, belongs to Great Britain, it is included in the Roman Catholic archdiocese of New York. Pop. 13,554.

NEW RED SANDSTONE, in geology, a term formerly used, in contradistinction to Old Red Sandstone (q.v.), of red shale, loam and sandstone lying above the coal measures. The nomenclature is faulty, being based only on a color distinction, and it is now recognized that the rocks formerly grouped under this name are at two very different eras, the Permian and Triassic (qq.v.).

NEW RIVER. See GREAT KANAWHA.

NEW ROCHELLE, rō-shēl', N. Y., city, in Westchester County, on Long Island Sound and on the New York, New Haven and Hartford Railroad, 16½ miles from the Grand Central Station in New York City. It has connection by New York, Westchester County and Bronx electric railroad, and trolleys with New York City and several of the villages and cities in the vicinity. It was settled in 1687 by Huguenots and was named after La Rochelle, France. It has a beautiful location and is considered a desirable residential city by a large number of the business men of New York. It has a well-kept park, over 60 miles of paved streets and Glen Island, Echo and Neptune bays are nearby. The prominent buildings are a number of old colonial edifices, several of the churches, especially Saint Gabriel's (R. C.), with its parish school building, both gifts of Adrian Iselin, the Masonic Temple, a hospital, Knights of Columbus and the city buildings. The water supply is exceptionally pure; and the vital statistics show a low death rate. It is the seat of the Ursuline Seminary of Saint Teresa, founded in 1898, and it has several private schools, good public and parish schools and a public library which contains about 9,000 volumes. Thomas Paine resided here for some years, and it is the home of a number of well-known authors, editors and artists. Pop. 36,213.

NEW ROOF, The, a term used in early American history for the Federal Constitution.

NEW SALLEE, sā-lā', Morocco. See RABAT.

NEW SARUM, sā'rūm. See SALISBURY.

NEW SHETLAND. See SOUTH SHETLAND ISLANDS.

NEW SIBERIA, or **LIAKHOF** (lĕ-āh'ōf), **ISLANDS**, a group of islands in the Arctic Ocean, off the north coast of Siberia, between the mouths of the Lena and Indigirka, and administratively attached to the government of Yakutsk. The group includes Liakhof, Maloi, New Siberia, Thaddeus, Kotelnoi and Bennett Islands; the area is estimated at 20,480 square miles; they are rocky, treeless, icebound all the year round, and uninhabited. Reindeer, foxes and white bears are found, and there is immense wealth in fossil ivory, the remains of mammoth, rhinoceros and buffalo. The first discovery was made by the Cossack Vaghin in 1712.

NEW SOMERSETSHIRE, in American history, a name given the territory extended to William Gorges in 1636, and comprising those settlements along the coast of Maine, which had not been included in the Ferdinando Gorges patent of 1631. William Gorges, a nephew of Ferdinando, was appointed first deputy-governor of the district.

NEW SOUTH SHETLAND ISLANDS. See SOUTH SHETLAND ISLANDS.

NEW SOUTH WALES, Australia, the oldest Australasian colony of Great Britain and since 1901 one of the six original and the most populous, though not the largest state of the commonwealth, in the southeastern portion of the continent. It is separated from Queensland on the north by an irregular line running southwest from Port Danger in lat. 28° 8' S., till it meets the 29th parallel of latitude which forms the rest of the north boundary; on the east the Pacific Ocean is the boundary; on the south the Murray River, and a line running northwest from Cape Howe, lat. 37° 31' S., separates it from Victoria; while on the west the 141st meridian forms the boundary between the state and South Australia.

The state has an area of 310,700 square miles divided into 141 counties. It is more than twice the size of the State of California and five times the size of England and Wales. A federal district of 900 square miles was set aside in 1911 for the new capital of the commonwealth. See CANBERRA.

Topography.—The surface, more especially in the eastern and most populous portion, is much diversified, and presents, in its general features, a succession of hills and valleys, mountains and plains. The great dividing chain, forming the great watershed of the state, with many summits varying in height from 3,000 to 6,000 feet, extends from north to south nearly parallel to the coast, at a distance of from 30 to 50 miles inland or sometimes more, and takes in the north the name of Liverpool Range, in the centre that of the Blue Mountains, and in the south that of the Australian Alps. The highest summit is Mount Kosciusko, in the southeast 7,328 feet. The space between the mountains and the sea is partly broken by spurs and ramifications, but descends from the west with more or less rapidity, and has a generally undulating surface, intersected by water-courses; in some places well wooded, and in others covered with dense

brush-wood. The coast line presents in general bold perpendicular cliffs of sandstone, in horizontal strata. Occasionally the cliffs are interrupted by low sandy beaches, some of which stretch to a considerable distance inland, and appear to have been covered by the sea at no very remote period. The indentations of the coast are remarkable for their number, and the excellent harbors which they form. Among them are Port Stephens, Port Hunter, Broken Bay, Port Jackson (on which lies Sydney), Botany Bay, Jervis Bay, Sussex Haven and Two-fold Bay.

Hydrography.—The most important rivers are the Murray, which is navigable as far as Albury (long. 147° E.); the Murrumbidgee and Lachlan, farther north, which after uniting fall into the Murray; and the Darling, which flows from northeast to southwest through the whole extent of the state, and also falls into the Murray. The Darling, in its upper course known as the Barwon, has among its more considerable affluents the Bogan, the Macquarie, the Castlereagh, the Naomi, the Gwydir, the Macintyre and the Warrego. The Murrumbidgee is 1,350 miles long, the Darling 1,160, the Macquarie 750, the Lachlan 700. Notwithstanding the existence of those large rivers the western plains are but sparsely watered. The comparatively narrow space between the mountains and the Pacific leaves little room for the development of large rivers. Many of them are for a great part of the year either altogether dry, or form a succession of deep ponds or water-holes instead of continuous streams. The chief are the Hunter, 300 miles, which falls into the fine port of that name at Newcastle, and is navigable for 50 miles above its mouth by small craft of 30 to 40 tons; and the Hawkesbury, 330 miles, which falls into Broken Bay, and is navigable by vessels of 100 tons as far as Windsor, a distance of 140 miles. Others are the Shoalhaven, 260 miles; the Clarence, 240 miles, of which 70 are navigable; the Macleay, 190 miles; and the Richmond, 120. Some of these rivers in the winter season cause disastrous floods.

Geology and Mineral Resources.—In the southeast, east and middle the prevailing rocks are Palæozoic (Silurian and other), with granite and other igneous rocks forcing their way to the surface, and in this region are chiefly situated the metalliferous deposits in which New South Wales is so rich. In the east Carboniferous and Permo-Carboniferous rocks also occur extensively, and to these belong the large and valuable coal fields of the country. Valuable sandstones also exist here in abundance. Cretaceous rocks extend over a wide area in the north and west, and the plains are mostly of Pleistocene origin. In connection with the granite, limestone, both granular and foliated, occurs in abundance, and besides being often hollowed out into stalactitic caverns, sometimes passes into a beautiful close-grained marble, as white as that of Carrara.

The coal fields extend over an area of 10,000 acres, with more than 91 mines. The state exports considerable quantities of coal to the west coast of North and South America. Copper ore of the richest quality and tin exist in large quantities, and iron is very generally distributed. Gold is found in all parts of the

state; the value of the output in 1915 was \$3,314,095, showing a considerable diminution; the total value of the output of gold since its discovery in 1851 until 1915 is \$305,951,850. Most of the gold is sent to the mint for coinage. The combined value of the silver and lead output in the same year was over \$11,547,090. Copper valued at \$1,172,185 was obtained in 1915. Several varieties of precious stones have been found, notably opals.

Climate.—As the area of the state extends over 110 degrees of latitude and contains a good deal of elevated ground, nearly every variety of climate is to be found. In the north the climate is tropical, while on the table-lands severe frost is not uncommon. The interior plains are very dry, and severe droughts occasionally kill millions of sheep, but the coast districts have abundant rains. Though the hot winds of the warm season are annoying, they are not unhealthful, while storms and electrical disturbances are comparatively rare.

Forestry, etc.—About one-fourth of the area of the state consists of forest lands, which in 1887 were taken under the care of the government by the creation of a Forest Conservation Department. The timber reserves, including state forests, cover an area of about 7,250,000 acres. For the Flora and the Fauna of the state, see AUSTRALIA.

Agriculture and Stockraising.—The absence of water renders much of the land useless for agricultural purposes, but a large proportion is devoted to pasturage and grazing. In some places artesian wells have been introduced with good results. There is no great breadth of highly fertile land away from the river bank; but the fertility of the land on the margins of rivers is exceptional. Where liable to inundation, however, the year's harvest may be swept away in a few hours. Great reservoirs built along the river courses have greatly lessened the dangers of drought and inundation. The area under cultivation in 1915 was 4,808,627 acres, and the crops included wheat, maize, barley, oats, rye, millet, potatoes, lucerne and artificial grasses, vines, orange-trees, sugarcane, some tobacco, etc. Dairy husbandry is becoming important, and butter is exported. Native fruits are neither numerous nor valuable, but the best of those of Europe are acclimatized. So well does the peach thrive, for instance, that farmers sometimes feed their pigs with the windfalls of their orchards. Other fruits include oranges, apples, pears, apricots, nectarines, cherries, plums, figs, grapes, melons, mulberries, gooseberries, currants, etc., and in the more northern parts the banana is abundant. The rearing of silkworms on the mulberry, which might be carried to an almost indefinite extent, has attracted attention. The grapevine is successfully cultivated, as well as the sugarcane; considerable quantities of wine, brandy and sugar being made. The rearing of sheep (of which there are 32,583,000 in the state) and cattle are the chief employments of the people, 146,295 persons being engaged in agricultural and pastoral pursuits during the year ended 30 June 1915.

Commerce and Industries.—Wool is the most important article of export. The annual value of this export is not without fluctuation, but is again increasing. Wool exports in 1915 reached a total of \$61,000,000. Other important

exports comprise coal, silver ore, silver lead, gold and coin, frozen and preserved meat, butter, tallow, leather, wheat and flour. The principal imports are wearing apparel, sugar, tea and hardware. The value of the total exports in 1916 was \$204,791,580, of imports \$166,898,485.

The manufacturing industries are naturally not of much importance as yet, but they are already very varied, and help to supply a considerable share of the home demand. In 1915 there were 4,188 miles of railway open, nearly all constructed by government, which has spent over \$350,000,000 upon the railways.

Government.—The constitution of New Wales vests the legislative power in a parliament of two houses, namely the Legislative Council and the Legislative Assembly. The former consists of not less than 21 members nominated by the Crown (52 in 1916), originally for the term of five years, but, subject to certain conditions, for life at the expiration of that period; and the latter of 90 members chosen by the same number of constituencies. Members of the Assembly receive \$1,500 per annum, and they are entitled to travel free by rail or tram in the state. As electors require no property qualification there is virtually universal suffrage. The executive consists of a governor nominated by the Imperial Parliament, assisted by a Cabinet composed of Premier and Colonial Treasurer, the ministers for lands, public works, mines, labor and industry, agriculture, education and justice, and the attorney-general. The parliaments last for three years. Unless local acts supersede them the imperial laws are enforced. No enactment of the state legislature becomes law till sanctioned by the governor, and in some cases by the sovereign. The state sends six representatives to the federal senate, and 27 to the federal house of representatives. For defense see AUSTRALIA.

Population.—The population is 2,101,968, of whom 1,072,424 are males and 1,029,544 females, chiefly British-born subjects. The aborigines number about 2,012 and the Chinese 6,105. Sydney (population, including suburbs, 955,900) is the capital, and other urban centres are Broken Hill, Newcastle, Parramatta, Goulburn, Maitland, Auburn and Bathurst.

Religion and Education.—There is no established religion. Among the religious sects the Church of England, Roman Catholics, Presbyterians, Wesleyan and also Methodists, hold the chief places. The Church of England has 734,000 adherents, the Roman Catholics, 412,013; the Presbyterians, 182,911; and the Methodists, 151,274. Education has been since 1880 controlled by a minister of public instruction. The public schools are classified as public primary schools, superior public schools in the chief centres of population, evening schools, high schools for boys, and high schools for girls. Primary education is compulsory, and in state primary and superior public schools is free. Among the higher educational institutions are the Sydney Grammar School, and Saint Paul's, Saint John's and Saint Andrew's colleges, and the Women's College, the colleges being all connected with the University of Sydney—an important institution, attended by 1,798 students and granting degrees in arts, medicine, science and law. Technical education is ad-

ministered by a special branch of the department of public instruction. In 1915 there were 17 high schools, 1,992 public primary schools and 520 provisional schools with 265,446 pupils. In addition there were 718 private schools, with 78,619 pupils and 3,682 teachers.

History.—New South Wales was discovered by Captain Cook in 1770, and founded as a penal settlement (at Botany Bay) in 1788, the convicts being employed in road-making and preparing the soil for agriculture. One of its early governors was the notorious Captain Bligh, who was deposed by the colonists in 1808. The most important events in its history since convict immigration ceased in 1840 are the establishment of representative institutions in 1843; the erection of Victoria into a separate colony in 1850; the discovery in May 1851 of extensive gold tracts; the rush to the diggings, with consequent great increase in population and prosperity; and the incorporation of the colony in the Australian commonwealth in 1901. The first railway, from Sydney to Parramatta, was opened in 1855. Among more recent events are the Sydney Exhibition held in 1879, and the Intercolonial Conference held at Sydney in 1883. The colony celebrated its centenary in January 1888, and a special series of stamps of elaborate design was issued in commemoration of the event. On 1 Jan. 1901 Sydney was the scene of the inauguration of the first governor-general of the new commonwealth, Lord Hopetoun. (See AUSTRALIA; AUSTRALIAN FEDERATION). Consult Griffin, 'New South Wales, Her Commerce and Resources' (1888); Hutchinson, 'New South Wales; the Mother Colony of the Australias' (1896); 'Official Year Book of New South Wales'; David, T. W. E., 'New South Wales' (London 1912).

CHARLES LEONARD-STUART.

Editorial Staff, 'Encyclopedia Americana.'

NEW SWEDEN, or NEW SWEDELAND, a name given in the 17th century to land lying between the Dutch colony of New Netherlands and the English colony of Virginia. It included territory in what is now Delaware and New Jersey. It was settled in 1638 by a colony from Sweden; and in 1655 it was taken possession of by the Dutch.

NEW TESTAMENT. See BIBLE.

NEW TESTAMENT CHRONOLOGY, the approximate dates of the events recorded in the gospels and other books of the New Testament summarized according to the findings of the best scholarship of recent years. The unity in diversity of the different texts of the evangelists is synchronized by chapter and verse references to related incidents. Allowing for the preparatory incidents which led early chroniclers to approximate the beginnings of the Christian Era at 9-8 B.C., the principal events may be outlined as follows:

- B.C. 9-8.—Zacharias, priest at Jerusalem, husband of Elisabeth received a prophecy that he would be the father of John the Baptist, Luke i, 5-25. At Nazareth, Mary espoused to Joseph of the house of David, received a prophecy that she would be the mother of the Messiah, Luke i, 26-29.
- B.C. 7.—Elisabeth, Zacharias' wife, made a similar prophecy to Mary, when the latter visited her for a stay of three months in a hill town of Judea, Luke i, 39-56.
- B.C. 6.—John the Baptist was born, Luke i, 57-80.
- B.C. 5-4.—The census at Jerusalem; the birth of Jesus at Bethlehem, Matthew i, 18-25, Luke ii, 1-7. The vision

and visit of the shepherds to the manger, Luke ii, 8-20. The circumcision of Jesus at Bethlehem, and his presentation in the temple at Jerusalem, Luke ii, 21-24. Simeon and Anna's prophecies, Luke ii, 25-38. The visit of the Magi to Jerusalem and Bethlehem, Matthew ii, 1-12. The warning and flight of the Holy Family into Egypt; Herod's slaughter of the innocents; Matthew ii, 13-18; Luke ii, 39-40.

- B.C. 3-2.—Sojourn of Joseph, Mary and Jesus in Egypt and return to Nazareth, Matthew ii, 19-23.
- A.D. 1-7.—Jesus accompanied his parents when they "went to Jerusalem every year at the feast of the Passover," Luke ii, 41.
- A.D. 8.—"Jesus tarried behind in Jerusalem" without his parents' knowledge, and they returning "after three days found him in the temple, sitting in the midst of the doctors, both hearing them, and asking them questions," Luke ii, 41-50.
- A.D. 9-26.—Jesus lived with his parents in Nazareth "and was subject to them . . . and Jesus increased in wisdom and stature, and in favor with God and man," Luke ii, 51-52.
- A.D. 26.—John the Baptist son of Zacharias, received the word of God in the wilderness and went "into all the country about the Jordan preaching the baptism of repentance for the remission of sins," Luke iii, 3; Matthew iii, 1-12; Mark i, 1-8; John i, 1-28; Acts i, 5.
- A.D. 27.—The baptism of Jesus by John in the Jordan, Matthew iii, 13-17; Mark i, 9-11; Luke iii, 21-22; John i, 29-34. The temptation of Jesus in the desert of Judea, Matthew iv, 1-11; Mark i, 12-13; Luke iv, 1-13; Jesus gains disciples at the Jordan and in Galilee, John i, 35-51. The marriage at Cana in Galilee, John ii, 1-12.
- A.D. 28.—Jesus drives the traders out of the temple at the Passover, John ii, 13-25. Nicodemus a ruler of the Jews, confers with Jesus, John iii, 1-21. Jesus leaves Jerusalem but remains in Judea and baptizes: Further testimony to Christ by John the Baptist, John iii, 22-36. John is imprisoned, and Jesus departs into Galilee and "from that time began to preach," Matthew iv, 12; xiv, 3-5; Mark i, 14; vi, 17-20; Luke iii, 19-20; iv, 14; John iv, 1-3. Jesus goes to Samaria, discourses with the Samaritan woman; and many Samaritans acknowledge "that this is indeed Christ, the Saviour of the world," John iv, 1-42. Jesus teaches publicly in Galilee, Matthew iv, 17; Mark i, 14-15; Luke iv, 14-15; John iv, 43-45. Jesus again visits Cana, where he heals the son of a nobleman lying ill at Capernaum, John iv, 46-54. Jesus returns to Nazareth "where he had been brought up; and, as his custom was he went into the synagogue on the Sabbath day and stood up for to read," then he began to preach and all "wondered at the gracious words;" but as he proceeded "they were filled with wrath" and would have killed him "but he passing through the midst of them went his way and fixed his abode in Capernaum," Luke iv, 16-31; Matthew iv, 13-16. The call of Simon Peter and Andrew, of James and John the sons of Zebedee, and the miraculous draught of fishes on the Sea of Galilee near Capernaum, Matthew iv, 18-22; Mark i, 16-20; Luke v, 1-11. The healing of a demoniac in the synagogue at Capernaum, Mark i, 21-28; Luke iv, 31-37. The healing of Peter's mother-in-law and others, Matthew viii, 14-17; Mark i, 29-34; Luke iv, 38-41. Jesus goes with his disciples from Capernaum throughout Galilee, Matthew iv, 23-25; Mark i, 35-39; Luke iv, 42-44. The healing of a leper, Matthew viii, 2-4; Mark i, 40-45; Luke v, 12-16. The healing of a paralytic at Capernaum, Matthew ix, 2-8; Mark ii, 1-12; Luke v, 17-26. The call of Matthew, Matthew ix, 9; Mark ii, 13-14; Luke v, 27-28.
- A.D. 29.—Jesus goes to Jerusalem and at the pool of Bethesda, heals the infirm man. Jesus subsequent discourse, John v, 1-47. The Pharisees censure the disciples for plucking ears of wheat on the Sabbath day, Matthew xii, 1-8; Mark ii, 23-28; Luke vi, 1-5. Jesus heals the withered hand on the Sabbath day in the synagogue of Capernaum, Matthew xii, 9-14; Mark iii, 1-6; Luke vi, 6-11. Jesus arrives at the sea of Tiberias, followed by multitudes, Matthew xii, 15-21; Mark iii, 7-12. Jesus retires to the mountain near Capernaum and chooses the 12 disciples; multitudes follow him, Matthew x, 2-4; Mark iii, 13-19; Luke vi, 12-19. The Sermon on the Mount, Matthew v, 1-13; Luke vi, 20-49. The centurion's servant at Capernaum is healed, Matthew viii, 5-13; Luke vii, 1-10. The raising of the widow's son at Nain, Luke vii, 11-17. John the Baptist in prison sends disciples to Jesus, Matthew xi, 2-19; Luke vii, 18-35. The testimony of Jesus concerning John and the marvelous works of the day, Matthew xi, 20-30. Jesus eating by invitation with a Pharisee is anointed by a repentant sinful woman. The parable of the two debtors, Luke vii, 36-50. Jesus and the 12 disciples make a second journey around Galilee, Luke vii, 1-3. The healing of a demoniac; The Scribes and Pharisees blaspheme; Matthew xii, 22-37; Mark iii, 19-30; Luke xi, 14-15; 17-23. The Scribes and Pharisees seek a sign Jesus' comments, Matthew xii, 38-45; Luke xi, 16; 24-36. Jesus declares that the true disciples of Christ are his nearest relatives, Matthew xii, 46-50; Mark iii, 31-35; Luke viii, 19-21. Jesus prophesies woes against the

Pharisees and others at a Pharisee's table, Luke xi, 37-54. Jesus discourses to his disciples and the multitude, Luke xii, 1-59. The slaughter of certain Galileans; parable of the barren fig tree; Luke xii, 1-9. Parable of the sower, Matthew xiii, 1-23; Luke vi, 1-25; Luke viii, 4-18. Parable of the tares and other parables, Matthew xiii, 21-53; Mark iv, 26-34. Jesus crosses the Lake of Galilee; incidents; the tempest stilled; Matthew viii, 18-27; Mark iv, 35-41; Luke viii, 22-25. The two demons of Gadara, Matthew xiii, 28-34; ix, 1; Mark v, 1-21; Luke viii, 26-40. Levi's feast; Discourse on fasting; Matthew ix, 10-17; Mark ii, 15-22; Luke v, 29-39. The raising of Jairus' daughter; the woman with an issue of blood; Matthew ix, 18-26; Mark v, 22-43; Luke viii, 41-56. Two blind men healed, and a dumb spirit cast out, Matthew ix, 27-34. Jesus visits Nazareth and is again rejected, Matthew xiii, 54-58; Mark vi, 1-6. The third journey around Galilee; the 12 disciples instructed and sent forth; Matthew ix, 35-38; x, 1, 5-42; xi, 1; Mark vi, 6-13; Luke ix, 1-6. Herod perplexed, believes Jesus to be John the Baptist who had been beheaded at his command "for Herodias' sake," Matthew xiv, 1-12; Mark vi, 14-29; Luke ix, 7-9. The 12 disciples return, and Jesus retires with them across the lake; 5,000 people are fed; Matthew ix, 13-21; Mark vi, 30-44; Luke ix, 10-17; John vi, 1-14. Jesus walks at night on the Sea of Galilee-Genesareth, Matthew xiv, 22-26; Mark vi, 45-56; Luke vi, 15-21. Jesus' discourse to the multitude in the synagogue at Capernaum; many disciples turn back; Peter's profession of faith, John vi, 22-71. Jesus' discourse relating to eating with unwashed hands; Pharisaic traditions; Matthew xv, 1-20; Mark vii, 1-23. The daughter of a Syrophenician woman is healed, Matthew xv, 21-28; Mark vii, 24-30. A deaf and dumb man healed and several others; 4,000 people fed; Matthew xv, 29-38; Mark vii, 31-37; viii, 1-9. The Pharisees and Sadducees near Magdala again require a sign; Matthew xv, 39; xvi, 1-4; Mark viii, 10-12. The disciples on the northeast coast of the Sea of Galilee warned against the Pharisees and Sadducees; Matthew xvi, 4-12; Mark viii, 13-21. A blind man healed at Bethsaida, Mark viii, 22-26. Near Caesarea Philippi, Peter and the other disciples again profess their faith in Christ, Matthew xvi, 13-20; Mark viii, 27-30; Luke ix, 18-21. Jesus foretells his death and resurrection, and the trials of his followers, Matthew xvi, 21-28; Mark viii, 31-38; ix, 1; Luke ix, 22-27. The transfiguration and the vision of Moses and Elias; Jesus' discourse with Peter, John and James; Matthew xvii, 1-13; Mark ix, 2-13; Luke ix, 28-36. The healing of a demoniac, whom the disciples could not heal, Matthew xvii, 14-21; Mark ix, 14-29; Luke ix, 37-43. Jesus again foretells his death and resurrection, Matthew xvii, 22-23; Mark ix, 30-32; Luke ix, 43-45. The provision of the tribute money at Capernaum, Matthew xvii, 24-27. The disciples contend who should be the greatest; Jesus counsels humility, forbearance and brotherly love, Matthew xviii, 1-35; Mark ix, 33-50; Luke ix, 46-50. Jesus goes to the festival of tabernacles; his final departure from Galilee; incidents in Samaria; Luke ix, 51-62; John vii, 2-10. The 70 instructed and sent out from Samaria, Luke x, 1-16. Ten lepers cleansed in Samaria, Luke xxi, 11-19. Jesus at the festival of tabernacles; his public teaching at Jerusalem; Luke vii, 11-53; viii, 1. The woman taken in adultery, Luke viii, 2-11. Further public teaching of Jesus; he reproves the Jews and escapes from their hands; Luke viii, 12-59. A lawyer instructed; Love to a neighbor defined; Parable of the Good Samaritan, Luke x, 25-37. Jesus in the house of Mary and Martha at Bethany, Luke x, 38-42. The disciples again taught how to pray, Luke xi, 1-13. The 70 disciples return to Jerusalem, Luke x, 17-24. A man born blind is healed on the Sabbath; Jesus' subsequent discourses; John ix, 1-41; x, 1-21. Jesus at the Festival of Dedication in Jerusalem; he retires beyond the Jordan, John x, 22-42. The raising of Lazarus at Bethany, John xi, 1-46.

A.D. 30.—The counsel of Caiaphas against Jesus; he retires from Jerusalem to Ephraim, John xi, 47-54. Jesus is followed by multitudes beyond Jordan; he heals the infirm woman on the Sabbath; Matthew xix, 1-2; Mark x, 1; Luke xxi, 10-21. Jesus goes teaching and journeying toward Jerusalem; Pharisees warn him against Herod; Luke xiii, 22-35. Jesus dines with a chief Pharisee on the Sabbath; incidents; Luke xiv, 1-24. What is required of true disciples, Luke xiv, 25-35. Parables of the lost sheep; the prodigal son; etc.; Luke xv, 1-32. Parable of the unjust steward, Luke xvi, 1-13. The Pharisees reproved; parable of the rich man and Lazarus; Luke xvi, 14-31. Jesus inculcates forbearance, faith, humility, Luke xvii, 1-10. The coming of Christ will be as sudden as the lightning, Luke xvii, 20-37. The parable of the importunate widow; the Pharisee and the publican; Luke xviii, 1-14. Jesus' teachings regarding divorce, Matthew xix, 3-12; Mark x, 2-12. Jesus receives and blesses little children, Matthew xix, 13-15; Mark x, 13-16; Luke xviii, 15-17. The rich young man; parable of the laborers in the vineyard; Matthew xix, 16-30; xx, 1-16; Mark x, 17-31; Luke xviii, 18-30. Jesus for the third time foretells his death and resurrection, Matthew xx, 17-19; Mark x, 32-34; Luke xviii, 31-34. James and John make their ambitious

request, Matthew xx, 20-28; Mark x, 35-45. The healing of two blind men near Jericho, Matthew xx, 29-34; Mark x, 46-52; Luke xviii, 35-43; xix, 1. The visit to Zaccheus the wealthy chief of the publicans at Jericho; the parable of the 10 pieces of money; Luke xix, 2-28. Jesus arrives in Bethany six days before the Passover, John xi, 55-57; xii, 1, 9-11. Jesus' entry into Jerusalem amid public rejoicings, Matthew xxi, 1-11, 14-17; Mark xi, 1-11; Luke xix, 29-44; John xii, 12-19. The barren fig tree; the cleansing of the temple; Matthew xxi, 12-13, 18-19, Mark xi, 12-19; Luke xix, 45-48; xxi, 37-38. The barren fig tree withers away, Matthew xxi, 20-22; Mark xi, 20-26. Christ's mission questioned; parable of the two sons; Matthew xxi, 23-32; Mark xi, 27-33; Luke xx, 1-8. Parable of the wicked husbandman, Matthew xxi, 33-46; Mark xii, 1-12; Luke xx, 9-19. Parable of the marriage of the King's son, Matthew xxi, 1-14. Insidious questions of the Pharisees and Herodians; tribute to Caesar; Matthew xxi, 15-22; Mark xii, 13-17; Luke xx, 20-26. Insidious question of the Sadducees; the resurrection; Matthew xxi, 23-33; Mark xii, 18-27; Luke xx, 27-40. A lawyer questions Jesus; the two great commandments; Matthew xxi, 34-40; Mark xii, 28-34. Christ is the son of David by the Holy Ghost; Matthew xxi, 41-46; Mark xii, 35-37; Luke xx, 41-44. Warnings against the evil example of the Scribes and Pharisees, Matthew xxiii, 1-12; Mark xii, 38-39; Luke xx, 45-46. Woes prophesied on the Scribes and Pharisees; Lamentations over Jerusalem; Matthew xxiii, 13-39; Mark xii, 40; Luke xx, 47. The widow's mite, Mark xii, 41-44; Luke xxi, 1-4. Greek visitors at the feast request through Philip of Bethsaida to see Jesus, John xii, 20-36. Comments upon the unbelief of the Jews, John xii, 37-50. Jesus on taking leave of the temple foretells its destruction and the persecution of his disciples, Matthew xxiv, 1-14; Mark xiii, 1-13; Luke xxi, 5-19. Christ's advent to be signalized by the destruction of Jerusalem and the overthrow of the Jewish state, Matthew xxiv, 15-42; Mark xiii, 14-37; Luke xxi, 20-36. The final hour of the coming of Christ; Exhortations to watchfulness; The parables of the 10 virgins; and of the 10 talents; Matthew xxiv, 43-51; xxv, 1-30. Scenes of the judgment day described, Matthew xxv, 31-46. The rulers conspire against Christ; the supper at Bethany; the treachery of Judas; Matthew xxvi, 1-16; Mark xiv, 1-11; Luke xxii, 1-6; John xii, 2-8. Preparation for the Passover at Bethany and Jerusalem, Matthew xxvi, 17-19; Mark xiv, 12-16; Luke xxii, 7-13. The Passover meal; contention among the 12 disciples; Matthew xxvi, 20; Mark xiv, 17; Luke xxii, 14-18, 24-30. Jesus washes the feet of his disciples; John xiii, 1-20. Jesus indicates the traitor; Judas retires; Matthew xxvi, 21-25; Mark xiv, 18-21; Luke xxi, 21-23; John xiii, 21-35. Jesus foretells the denial of Peter and the dispersion of the 12 disciples, Matthew xxvi, 31-35; Mark xiv, 27-31; Luke xxii, 31-38; John xiii, 36-38. The Last Supper, Matthew xxvi, 26-29; Mark xiv, 22-25; Luke xxii, 19-20; 1 Corinthians xi, 23-25. Jesus' last discourse with his disciples, comforting them, promising the Holy Spirit, foretelling persecution, and assuring them of joy and peace, John xiv, 1-31; xv, 1-27; xvi, 1-33. Jesus' prayer with his disciples, John xvii, 1-26. The agony in the Garden of Gethsemane, Matthew xxvi, 30, 36-46; Mark xiv, 26, 32-42; Luke xxii, 39-46; John xviii, 1. Jesus betrayed and made prisoner, Matthew xxvi, 47-56; ix, 43-52; Luke xxi, 47-53; John xviii, 2-12. Jesus taken before Caiaphas; Peter denies him thrice; Matthew xxvi, 57-68, 69-75; Mark xiv, 53, 54, 66-72; Luke xxii, 54-62; John xviii, 13-18, 25-27. Jesus before Caiaphas and the Sanhedrim, is condemned and mocked, Matthew xxvi, 59-68; Mark xiv, 55-65; Luke xxii, 63-71; John xviii, 19-24. The Sanhedrim lead Jesus away to Pilate, Matthew xxvii, 1, 2, 11-14; Mark xv, 1-5; Luke xxiii, 1-5; John xviii, 28-38. Jesus before Herod, Luke xxii, 6-12. Pilate seeks to release Jesus; the Jewish rabble demand the release of Barabbas the thief; Matthew xxvii, 15-26; Mark xv, 6-15; Luke xxiii, 13-25; John xviii, 39, 40. Pilate yields Jesus to be scourged and mocked, Matthew xxvii, 26-30; Mark xv, 15-19; John xix, 1-3. Pilate, after again seeking to release Jesus, delivers him to be crucified, John xix, 4-16. Judas in remorse hangs himself, Matthew xxvii, 3-10; Acts i, 18-19.

Friday 7 April, 30 A.D.—The Crucifixion, Death and Burial of Jesus Christ, Matthew xxvii; Mark xv; Luke xxvii; John xix. The Resurrection of Jesus Christ, Matthew xxviii; Mark xvi; Luke xxiv; John xx. Christ's subsequent appearances. He is seen by Peter; then by two disciples on the way to Emmaus, 1 Corinthians xv, 5; Mark xvi, 12-13; Luke xxiv, 13-35. Jesus appears in the midst of the apostles at Jerusalem, Thomas being absent, 1 Corinthians xv, 5; Mark xvi, 14-18; Luke xxiv, 36-49; John xx, 19-23. Christ again appears, Thomas being present, John xx, 26-29. The apostles go to Galilee, Jesus appears to nine of them at the Sea of Tiberias, Matthew xxviii, 16; John xxi, 1-24. Jesus appears to the apostles and a gathering of about 500 brethren on a mountain in Galilee, Matthew xxviii, 16-20; 1 Corinthians xv, 6. Christ is seen of James, then of all the apostles, Acts i, 3-8; John xv, 7. The Ascension at Bethany, Mark xvi, 19-20; Luke xxiv, 50-53; Acts i, 9-12.

For the extension of New Testament Chronology, see CHRISTIAN DOCTRINE, DEVELOPMENT OF, and other special articles in this work on BIBLE; BIBLICAL CRITICISM; CHRISTIANITY; CHRISTOLOGY; JESUS CHRIST; MARY; on the books of the New Testament, and related references.

CHARLES LEONARD-STUART,
Editorial Staff of *The Americana*.

NEW TESTAMENT PROBLEMS. If the importance of a writing be estimated by the influence it exerts and has exerted on the mind of men and on the history of the human (more particularly the Caucasian) race, *Homo Europæus*, and there seems to be no other standard nearly so just, then it must be admitted that the New Testament writings so far transcend all others as to form a class of their own. This affirmation need not be argued; it is undisputed. Hence it becomes a matter of supreme interest to understand these writings, from which modern no less than mediæval history takes its start, its form, its color, and, in great measure, its inspiration. But no understanding is final or satisfactory that is not historical. The question of Zoölogy is not, "What use have cattle for their horns?" but rather, "How did cattle get their horns?" So, too, the primary query with the critic is not, "What does the New Testament teach?" (this question is left to the divine and the theologian), but, How did these Scriptures come into being? Who wrote them? When? Where? Under what circumstances? And for what ends? The whole body of knowledge thus far attained, and, still more, the whole body of investigation touching these inquiries are comprehended under the title of New Testament Criticism. This latter has therefore, in first line, nothing to do with questions as to the truth or falsity of any teaching of the Scriptures, nor with any matters of doctrinal or dogmatic interpretation, except in so far as these latter may be bound up with the conclusions concerning the genesis of the Scriptures themselves. This criticism, then, is essentially a discussion of origins, and not of values. However, it need not be disguised that doctrinal values, or at least estimates, may often be seriously affected by our determination of origins. In case of some scientific verity or method, as of the Pythagorean theorem or the use of zero in numerical notation, it may be quite indifferent whether the source be found in Greece or in Egypt, in Babylon or in Japan; but in case of some article of faith, some doctrine regulative of life but beyond the reach of proof or disproof by experiment or by argument, it is by no means indifferent whether it be the dictum of some supramundane personality or some theosopheme of a sect of mystics, the utterance of an inspired Apostle or the refinement of some ancient Babylonian myth. The interest of New Testament Criticism is not, then, merely academic; it does not appeal solely to the cognitive faculties, to the civilization-making instinct for knowledge as knowledge: its secondary and derivative but hardly less important interests concern our active natures as well and bear upon the whole front of our practical and institutional life.

The first inquiry that meets the student of any document concerns the text itself. Is this latter an original, or is it a copy? Or per-

haps the copy of a copy? In either case, has it suffered any corruption, or is it a faithful transcript? In case there be many discrepant copies — the case actually presented — there will arise many questions as to the comparative age and authenticity of these copies, as to their relations to each other, and it will perhaps be necessary to reconstruct the supposed original from the contradictory attestations of these witnesses. Such is, in general, the text problem of New Testament Criticism, one of the most highly complex that ever challenged the efforts of the human understanding.

The testimony, which is enormous in amount, exists in the form of manuscripts, both uncials and cursives in the supposedly original tongue (the Greek), of translations, as Latin, Syriac, Æthiopic, Armenian, Gothic, of citations by the early Christian writers, of lectionaries arranged for liturgical use, of capitulations and versifications or divisions into chapters and verses, and so on. The problem of sifting and evaluating such a mass of evidence and striking the golden mean of truth would seem too difficult for human intellect, especially as there is no secure foothold at any point, nor any sure way of testing our results as we proceed. In the end there is no court of final appeal, and the whole case must be left undecided. Under such circumstances the marvel would seem to be that there should be any agreement at all, that there should not be as many minds as critics.¹ However, extremely numerous as are the points of diverse judgment, where adjudication seems hopeless, the number of agreements is still far greater, where critical opinions rest harmonious and undisturbed. Now it might be thought that this harmony would be extended and perfected by the discovery of new testimony, which of late years has proceeded apace, and by the deeper and minuter study of the long familiar evidence. But the fact is exactly the reverse. Accumulation of depositions and profounder investigations have confirmed some critical judgments, but have shaken many others and completely overthrown not a few. The problem is indeed becoming not less but more complicated with advancing knowledge, and the textual uncertainty was never before so great as it is now.

True it is that the last generation has witnessed the most brilliant attempts² yet made to construct the most highly probable text. Those masterly scholars, Bishop Westcott and Dr. Hort, thought they might, by a careful study of the genealogy of the various witnesses, attach a coefficient of value to each one singly and in combination, and thereby determine the original text in the overwhelming majority of cases with a close approach to certainty. Plausible and seductive as was their argumentation, and thoroughly accepted even now in many high quarters, it was yet fatally defective at many points and for several reasons, and can no longer command scientific assent. The "neutral" text which they posited as best represented by the great Vatican MS. B, is a figment of the imagination. The deference paid to certain great

¹ So Jerome's aphorism: *tot enim sunt exemplaria pene quot codices*, in his Preface to the Gospels, addressed to Pope Damasus.

² As by Tischendorf, Westcott and Hort, Weiss, von Soden.

uncials was unwarranted. The testimony of the Fathers and the versions was undervalued. The depreciation of the so-called Western text was undeserved. The rash assumption that F was a copy of G was unfortunate.¹ Closer study has shown decisively that at crucial points the witnesses upon which Westcott and Hort relied most confidently might all be misleading, and the MSS. most lightly esteemed might present the older reading. Even as the shepherd boy of old laid low the giant, so at any time may some neglected cursive or version or citation by the Fathers overthrow the most venerated uncial. Thus, the all-important word *Ρουμ*, in Rom. i, 7, 15, is attested by nearly all the best authorities; none the less it is an interpolation (Smith, J B L, 1901, Part I, p. 3 ff, Harnack, 'Preuschen's Zeitschrift,' 1902, I, p. 83 f). So, too, the position of the Doxology at the end of Rom. xvi is witnessed by N B C D and the best versions; nevertheless the position at the end of xiv is certainly the older. The Epilogue (xv and xvi) is given by nearly every authority, but, in spite of all, it is proved to be a later addendum; the Amiatinian and Fuldensian capitulations clearly point to its earlier absence.²

These examples also correct very usefully a prevalent notion that textual variations are after all merely trifles, like the fading line between Imperfect and Aorist or the impalpable refinements of Greek syntax. On the contrary, they are sometimes blinding in their illumination, in their revelation of the primitive structure of our Scriptures.

Thus, the textual facts just stated involve a complete reconstruction of our notions about *Romans*, which now seems to be no Epistle and not addressed originally to Romans, but to be a compilation of moral and theological essays, first addressed to "all those in love of God," afterward fitted out with Prologue and Epilogue as it now stands.

So, too, the extremely important F and G variant in Rom. ix, 22, unnoticed even by the best commentators (as Godet, Sanday, Weiss, Lipsius, Hofmann), indicates clearly the pure Judaic original of this famous chapter; the Christian hand has been laid on lightly and deftly but transfigures into a cosmic theory what was at first only a Jewish patriot's explanation of the delay of divine vengeance upon "vessels of wrath," the Pagan oppressors of his people—an observation more fatal to theological libraries than the torch of Omar. Consult 'The Hibbert Journal,' 1, 2, pp. 328, 329.

Still another notion must be corrected. Let no one imagine that all or nearly all the variants are mistakes or due to mistakes; very many are visibly intentional. It was the ancient habit, particularly of the Oriental, to compile and recompile, to edit and re-edit and re-edit again, and with sacred books this habit became almost an inviolable rule. No one disputes this fact in case of the Old Testament and the Apocrypha and the extra-canonical early Christian writings. It would be well-nigh miraculous if the New Testament Scriptures should offer exceptions. Before the establishment of the Canon no sacred awe in-

vested the canonics, there was no apparent reason why the favorite Scriptures should not be systematically modified to keep pace with the developing Christian consciousness, very much as our creeds are altered nowadays.³

It is notorious that the Old Catholic heresy-hunters charged upon their opponents, Marcion, Valentinus and the rest, that these latter had corrupted the Scriptures to suit their own heresies. The charge may often have been well-founded in the sense above defined, but it might undoubtedly have been retorted and was retorted with equal justice by the heretics upon the Orthodox. The great master, Hort, has himself said, in speaking of the "Doxology": "Indeed, 'copies corrupted by Marcion' need mean to us no more than 'copies agreeing in a certain reading with Marcion's copy.' . . . On the whole, it is reasonably certain that the omission is his only as having been transmitted by him, in other words, that it is a genuine ancient reading." Wetstein's great word holds good: "Various readings, almost all, are due to the zeal, ingenuity and guesswork of transcribers." Tischendorf admits: "It can not be doubted that in the very earliest days of Christianity there were multifarious departures from the pure Scripture of the Apostles, wherein to be sure there entered naught of dishonesty or guile." Under the deeper probing of Von Soden and others the original "neutral" B-text of W.-H. turns out to be only a very learned revision; the fault of the great Vatican is that it has considered "too curiously."⁴ It is impossible to blink the fact that all manuscripts of all parts of the New Testament abound in readings that are plainly second thoughts. Our most ancient and revered codices reproduce only deformed, transformed and highly elaborated originals. It is extremely noteworthy that the heretical readings are slowly coming to their rights, to be recognized as often more primitive, less subtly reflective forms. Thus in John i, 3 the Gnostics read: "And without him was made not one (thing). What was made in him was life," putting the full stop after *ἐν*, instead of after *ὑγιονεν* (was made); and their punctuation is at last adopted by W.-H. and Von Soden. In a word, it can no longer be doubted that Scripture was made from Dogma, not Dogma from Scripture.⁵

There is little reason then to hope for the establishment of a Received Text—the *ignis fatuus* of textual criticism, though not to despair of it be the last infirmity of noble minds. If such did not exist in the beginning, neither will it exist in the end. The discovery of new manuscripts, the collation of a few hundred more, will not bring the chaos to order but will make confusion worse confounded. Witness the publication of the Sinaitic Palimpsest in Syriac and the turning of attention to the famous Bezae Codex, called D: they have merely raised

³ In the same spirit King James' Translators, in their 'Address to the Reader,' wrote wisely and well.

⁴ As Holsten was led to observe—Holsten, the *Doctor subtilissimus* of Protestantism, the matchless master of exegesis, whose imposing reconstructions of Paulinism, by their very perfection, constitute the *reductio ad absurdum* of the premises and methods he employs.

⁵ It is indeed plain on its face that a doctrine must in general antedate its literary expression, and when we find this expression in a highly composite, apophthegmatic form, we may be sure it has been forged on the common anvil beneath the alternate strokes of more than one hammer.

¹ Smith, 'The Pauline MSS. F and G,' *Am. Jour. of Theo.*, July and October 1903.

² Smith, 'Unto Romans,' J B L, Vol. XXI, 1902, Part II, pp. 117-169.

new problems, not settled the old. It is perfectly just, then, and highly significant when Blass no longer quotes critical editions of the New Testament, but quotes the manuscripts themselves, never presuming to say what is the "true text." Such in theory at least is the position to which criticism must finally come. The critic's text, no matter how ingeniously or plausibly "berichtigt," is only the critic's text, not the "true text," after all.

And is such a mouse-like conclusion the only issue of the mountainous labors of centuries? Shall we know from year to year less and less what was the original autographic legacy, "the pure Scripture of the Apostles"? True. But this "less" is yet in a higher sense infinitely more. For we now come to recognize clearly the prime error of our assumptions thus far, and immeasurable is the progress involved in this recognition. It has, in fact, been everywhere and in every age tacitly assumed that there *was* in each case a unique autographic original, and that the problem of textual criticism was to discover that autograph, restore that original, and explain the manifold deviations therefrom. It is no reproach to criticism to have made this assumption and upheld it for centuries. No other was so natural or so plausible; none the less, it has proved unsatisfactory. In the face of the widening and multiplying diversities of the text-tradition, we can no longer range the Gospels and Epistles side by side with the Greek histories and the Letters of Cicero and ask how did Luke or Paul write it, just as we ask how did Thucydides or Plutarch or Pliny phrase it? In the Greek and Latin classics we recognize the works of the individual consciousness, here and there marred or corrupted, but each, in the main, single, solitary, self-consistent. Not so in the New Testament Scriptures. There we are confronted less with an individual than with a collective and communal consciousness. This consciousness is not always the same. By no means. It varies widely from the Synoptics to the Johannines, from the Paulines through the Catholics, to the Apocalypse. But it is nowhere individual, nowhere unital, nowhere self-consistent¹; it is everywhere communal, everywhere complicate, everywhere harmonistic. Indeed, Syncretism is by all odds the most conspicuous and impressive phenomenon it presents, a syncretism without a parallel in literature, unless in the Old Testament. In the latter the attempt has been made bravely and instructively, even if prematurely, to separate the components, to disentangle the "manifold wisdom" and distinguish the threads by colors. The time is not yet ripe for such an essay in the New Testament, but we may be sure that more than the seven primaries will be needed. The widely varying testimony of the manuscripts greatly complicates the problem, while lending some aid in its solution. Perhaps it may be well to illustrate the state of the case by a few examples. Let us pass by such long familiar facts as the omission or varying position of the paragraph anent the Adulteress (John vii, 53—viii, 11), or the absence of the conclusion of Mark (xvi, 9-20), and many others, and fasten our eyes on the more massive fact that the variations in Acts are so extraordinary and

omnipresent that the great master, Friedrich Blass, has been driven to the assumption of two originals, an α -text and β -text. The remarkable peculiarities of the Bezae Codex (D) had been noted by F. A. Borneman as early as 1848, but critics did not follow him in regarding it as presenting the older text; its eccentricities were ascribed to the copyist, who, like the villain in the play, was thought capable of anything. Tischendorf, Westcott-Hort, and Weiss base their texts of Acts essentially on B N A C. It remained for Blass to show that this D was only one of many witnesses to a distinct Occidental text very widely ramified. It was as when one tugs mightily at some exposed root of a tree: the earth begins to stir everywhere on that side of the tree. Blass was led to think that two manuscripts proceeded originally from Luke, one a memorandum (or draft) which he himself filled out into a book (the α -text or Antiochian form) for Theophilus. The draft, he thinks, remained as the β -text, at Rome, where it was elaborated into the Occidental text (*forma romana*). This theory of Blass has not maintained itself; it is naive at many points, and it wrecks on many textual and other facts; but it has proved extremely valuable as bringing clearly to light the systematic differences of the manuscripts and showing how a critic with ultraconservative leanings (Blass dates Acts from 57-59 A.D.) is yet forced to the assumption of two primitive texts. Let one citation indicate the interval between them.

Acts xxvii, 1 (α -text): "And as it was determined for us to sail unto Italy, they were delivering both Paul and some other prisoners to a centurion by name Julius, of the Cohort Augustan."

(β -text):

"So therefore the governor decided for him to be sent to Caesar, and on the morrow, having summoned a certain centurion of the Cohort Augustan, by name Julius, he delivered to him Paul with the remaining prisoners."

It remains to add that Blass has found it necessary to distinguish two texts, α and β , in Luke's Gospel as well as in Acts.

The criticism of this eminent philologist, though not quite attaining the goal proposed, may be said to mark the beginning of the end of well-meant efforts to reconstruct the unital autographic originals of the New Testament Scriptures. The notably complex character of these latter comes out daily more and more clearly. The Baurian criticism had left the Apocalypse and the four chief Paulines as the primary and irresolvable literary records of the Apostolic Age, by which all others were to be measured and appraised. Of this sacred pentagram it was the analysis of Völter and Vischer that dissolved the first corner. These critics, especially the latter, have exhibited the Apocalypse as primarily a Judaic composition, itself highly composite, which has been interpolated and Christianized by one or more Christian hands. The still deeper digging of Gunkel, Bousset, Zimmern and Jeremias has brought to light a considerable amount of exceedingly primitive, even Babylonian, mythical material which had been cast into the alembic of the Apocalyptic. On the other hand, the extremely complex character of 'Romans' has come clearly into evidence. Spitta has found it

¹ Unless, perhaps, in the unicapitulars, as Philemon, Jude, 3 John.

necessary to break it up into two Epistles; the great Lightfoot, while rejecting the crude attempt of Renan, found himself constrained to propound a theory of a Shorter Recension. Völter surrendered the unity unconditionally, and Van Manen the Paulinity in his elaborate work on *Paulus*, though he had defended it against Loman. Steck also in his widely read and very readable *Galaterbrief*. More piercing was the analysis of Pierson and Naber in their remarkable *Verisimilia*, which in spirit and principle is the most advanced of European critical productions. Independently of the foregoing, and following other methods, the present writer has exposed the concretionary structure of Romans in a series of monographs, with sufficient clearness. It can hardly be doubted that similar results await the application of similar methods to Corinthians and Galatians. Indeed, it was said years ago in the *Theol. Jahresb.*, "The 2 Cor. Letter will no longer hold together."

In Romans the presence of a large body of ancient Judaic originals seems now made out. The conservative, J. Rendel Harris, perceives that the list of sins (Rom. i, 29-31) is based upon an ancient Jewish Vidui (Confession for the day of Atonement).¹ The same must, of course, be said of the similar list in 2 Tim. iii, 2-5. The searching analysis of Spitta and Massebieu shows clearly that the Epistle of James is almost wholly Judaic, Christianized by a few insignificant interpolations.

The problem of discovering the original elements, often Jewish, of the New Testament compositions, has been propounded only recently and has not yet advanced far toward solution. But the progress already made is most encouraging. That way lies truth — of this the day for doubt seems gone forever.

Closely connected with this quest is another, for the sources of the Scripture quotations attributed to the Gnostics by the Fathers. Thus far it has been held unsuspectingly that the Gnostics quoted from our Canonics or from parallel, still later sources. Inasmuch as the matter is of fundamental importance, it has appeared well to the writer to subject it to a minute and exhaustive investigation, which should include primarily Hippolytus, Irenæus, Tertullian, and Clement of Alexandria. As a result of this investigation, though not yet completed, it may be declared that no evidence has yet come to light that the Gnostics ever used our Canonics; on the contrary, it appears certain that the Gnostics derived largely from sources now lost but certainly presenting much of our present 'canonic' matter in a cruder, more primitive, less elaborate form. By every token these sources contained this matter in far more natural connection than it appears in at present. The new light that is thus thrown upon the anharmonies and asyndeta of the New Testament is often surprising. The transformations are often complete and effected in queerly ingenious manner. We now begin to feel the force of the oracle in Matt. xiii, 52: "Every scribe disciplined for the kingdom of the heavens is like unto a householder that brings forth from his treasure things new and things old." A few examples must here suffice. In Matt. xiii, 3-9, Mark iv, 3-9, Luke viii, 5-8, we read the Parable of the Sower. In Matt. xiii,

19-23, Mk. iv, 14-20, Luke viii, 11-15, it is carefully expounded. The seed is declared to be "the Logos of God," the Sower is not interpreted, but is left to be understood of the Jesus or indeed of any preacher of the Gospel. Critics, even the keenest, as Koetsveld, Jülicher, Bugge, have never yet been able to satisfy even themselves concerning the interpretation, still less concerning the expressed design of the parables, to blind the hearers. Jülicher declares this latter to be impossible, especially for Jesus, and puts the dilemma sharply: "Either the Evangelists or Jesus." No solution is found in the New Testament, but on turning to Hippolytus (*Philosophumena*, v. 8) we find given as a "saying" of the oldest pre-Christian Gnostics, the Naassenes, the following *Allegory of Creation*: "Forth went the Sower for to sow: And some fell by the wayside and were trodden down; and some upon the stony places and sprang up (he says), and through not having depth were withered and died; and some fell (he says) upon the earth the fair and good and made fruit; some a hundred and some sixty and some thirty. Who hath ears to hear, let him hear." . . . Here the Sower is none other than God himself; the seed is the Logos, the *spermatic Logos*, the seminal Reason of the Stoics; the three classes are the elsewhere familiar Choics, Psychics, Pneumatics (all known to the New Testament), otherwise named the Captives, the Called, the Chosen. (A paper read by the writer before the Society of Biblical Literature and Exegesis, New York, 28 Dec. 1904; "Der vorchristliche Jesus," 107-135).

In the Gospels the phraseology has been expanded and enlivened, the Hebraism "in his sowing" (*ἐν τῷ σπέρσειν αὐτοῦ*) has intruded itself from the Lucan source, a 4th class has been inserted in the 3d (by Justin in the 2d) place, and the application made is entirely new.

In Matt. vii, 13, 14, we read the famous exhortation as to the gates: "Enter ye in by the narrow gate: for wide (is the gate), and broad is the way, that leadeth to destruction, and many be they that enter in thereby. For [how] narrow is the gate, and straitened the way, that leadeth unto life, and few be they that find it." The passage is quite unconnected with its context; there is never any hint as to interpretation; it is a mystery even to Zahn; it is impossible in its present setting. But in Hippolytus (op. cit., v, 8) we find the Eleusinian doctrine of the two gates: the one into the lower common life of flesh and soul, through which all enter at birth, the other into the higher life of spirit, through which only the initiates may fare; then is given as a saying of "the Saviour" the following: "Concerning these (he says) expressly hath spoken the Saviour, that narrow and straitened is the way that leadeth into life, and few are they that fare in into it; broad though and wide the way that leads unto destruction, and many are they that thorofare through it." The doctrine of the "Two Ways" was a favorite of antiquity but no nobler interpretation than this has yet been found. It must not be supposed that the use of the term "The Saviour" (*ὁ Σωτῆρ*) presupposes the Gospel or Christianity. The word is not a New Testament favorite, occurring (save in Luke i, 47, ii, 11, Acts v, 31, xiii, 23) only in the so-called later Scriptures (19 times, 6

¹ *The Teaching of the Apostles*, pp. 83-87.

times in Titus); it has been shut out, then, from the Gospel tradition, perhaps as a current heathen designation of gods or even kings. With the Gnostics it was greatly preferred, while the Fathers substitute for it the name Lord (*Kύριος*, *Dominus*). Its Greek use goes back at least to Æschylus and Pindar, and in its technical sense it was pre-Christian. The battle-cry of the Greeks at Cunaxa was "*Zeus Σωτήρ καὶ Νίκη*" (Xen. Anab. I, 8, 16).

Again, the doctrine of judging the tree by its fruits finds large space in the Gospels. Thus Matt. vii, 16, "Do they gather grapes from thorns or figs from thistles?" and Luke vi, 44, "For of thorns they gather not figs, nor of bramble harvest grapes." Here is an excellent answer to the oft-recurring question, which of two or more forms is the original? Plainly, both—and neither. They are variants upon an aphorism repeatedly met with in the classics. Says Plutarch, "We do not expect the vine to bear figs nor the olive clusters," *οὐκ ἐκ τῆς ἀμπελὸς σκα φέρειν οὐκ ἄξιον μὲν οὐδὲ τὴν ἐλαίαν βότρυς* ("De Tranquillitate Animi," XIII (472, F). Ovid, too, 'Aro Amatoria,' I, 747.

*Siquis idem sperat, jacturas poma myricas
Speret: et in medio flumine mella petat.*

"If any hopes this, let him hope tamarisks will bear apples, and let him search for honey in the river's mid."

These classic parallels suggest the important question: How much of the New Testament exists under other form in profane literature? The question has not yet received complete answer, which could hardly fail to prove very illuminative.

From all of the foregoing it appears that we must not judge the New Testament by the same standards we apply to the products of individual genius. It is the life of ages and of whole peoples that is concentrated in that volume. It is the gradual precipitate of the moral, religious and philosophic consciousness of three and a half centuries—a time and two times and the dividing of a time—that is stratified in that wonderful book. To this slow deposit nearly the whole circum-mediterranean region would seem to have made contribution. Certain it is that Rome and Athens and Ephesus and Antioch and Alexandria will bear honorable mention by the side of Palestine and Jerusalem, not yet to include Persia and India.¹ It is the mighty Mother, it is Universal Humanity, that has brought forth this prodigious birth through the long travail of a third of a millennium.

The new aspect under which the critical problem now appears effects a remarkable transvaluation of values. The great critical movement may be said to have begun, ineffectually to be sure, in the great year 1792 with *The Dissonance of the four generally received Evangelists, and the evidence of their respective authenticity examined*. By Edward Evanson, A.M.—Ipswich. Evanson was bold enough to reject Matthew, Mark and John, along with

many of the Epistles, for reasons never sound but not always unworthy of serious attention. Of course, he held the spurious Scriptures to be later in origin. In 1820 'Probabilia de Evangelii et Epistolarum Joannis, Apostoli, indole et origine eruditorum judiciis modeste subiecti Carolus Theoph. Bretschneider.' The author concludes at the end of 224 well-reasoned pages that the fourth Evangelist was "certainly neither John the Apostle, nor a companion of Jesus, nor a Christian sprung from Palestine and living there, nor a born Jew, but some other Christian skilled in Alexandrine doctrine, a presbyter (as he himself professes in later epistles), who in writing it (exarando) made use of both tradition and a written book. Most probably he lived in Egypt." The author, who so modestly submitted this book to the judgments of the learned, afterward still more timidly recanted; nevertheless it brought "eternal honor to his name." His arguments were repeatedly answered in detail, hardly in their entirety. But before and beside these two negative judgments as to the sources, there had spread itself an all-embracing skepticism as to the miraculous contents of the New Testament story. In the hands of the English Deists it took the form of mere mockery, of contemptuous denial or disproof, with little or no attempt to understand them genetically, and beyond this stage it has in many cases not advanced even to this day. But the tenderer, more sympathetic, German spirit sought earnestly to interpret the miraculous narratives, to show how they arose, to make clear what forms of religious consciousness had produced them. In this striving there was a possible basis for a steadily progressive intelligent critique and ultimate understanding of the New Testament, while in the brutal English negation there was none.

This German Rationalism had not gone to such alarming lengths without deadly violence no less to the spirit than to the letter of the sacred narratives, but it had been so insidious as to have remained almost unconscious of itself. It was Strauss who in his 'Leben Jesu kritisch untersucht' (1835) rather roughly tore away the mask and showed the "very Age and Bodie of the Time, his forme and pressure." But the criticism of Strauss touched almost solely the contents of the Gospels, the profounder question of the sources it did hardly moot. Hence there was not only place but imperative call for Baur and the Tübingen School, with whom New Testament criticism in the more modern sense may be said to have begun.

The influence of their penetrating researches was clearly seen a generation later in Strauss' second 'Life of Jesus for the German People' (1864), less so in the brilliant romance of Renan, 'La Vie de Jésus,' in which keen sympathy, lively fancy and perfect style vainly strove to supply the place of exact scientific criticism. Meantime another great voice in theology, Albrecht Ritschl's, had in his 'Entstehung der altkatholischen Kirche' (1857) openly renounced the Baurian two-term formula, Paulinism versus Petrinism, as unequal to the expression of the facts of early Christianity, and had founded the Ritschlian School, whose leaf even in the fifth decade is still green.

Practically all of this high argument, stretching through 70 years, has turned upon questions

¹ For Persia the monumental work of Cumont is fundamental and exhaustive. Leaving aside the surmises and parallels of Seydel and Hopkins ("Christ in India," in his 'India Old and New,' 1901), compare the circumspect dissertation of Van den Bergh van Eysinga, 'Indische invloeden op oude Christelijke verhalen' (1901), and articles by Oldenberg in the *Theologische Literaturzeitung* and the *Deutsche Rundschau*. Consult Edmunds' "Buddhist and Christian Gospels" (1905).

of date and authorship. The gravamen of the Tübingen contention consisted in referring the bulk of the New Testament to the 2d century and construing it as pseudepigraphic and in some sense born of the Paulo-Petrine controversy, reflecting it, or solving it, or smoothing it away. On the other hand, the Conservatives, largely aided by Ritschlians, held more or less firmly to the traditionary first century dates and authorship and minimized the antagonism between Jewish and Gentile Christianity.

All this has now been greatly changed. Dates and authors are not indeed unimportant, but they are no longer of prime significance. This follows at once from the principles already enunciated. If these much-debated compositions be really so highly compounded, then their dates and authors are not precisely determinable. Even if it were possible to discover the ultimate or the penultimate reviser, the question would remain as to the extent of his own contribution to the final whole; the fact that he wrote 150 A.D. might very well consist with the fact that some or most of his material appeared even in written form 150 B.C. Thus the units of the New Testament compound seem dissolving under our hands like an atom of radium, but without apparent loss of energy. With this regard the large enterprises of such as Volkmar and Zahn and Hilgenfeld are alike turned awry. At the same time, from this higher viewpoint we can see the partial justification of opposing theories, the half-truth in each term of the contradiction. Radicalism has been right in detecting indications of late origin in many or all of these canonic Scriptures; Conservatism has been equally right in emphasizing the presence of more far older elements. But neither the one nor the other has been justified in any inference from one part to its neighboring part, much less to the whole. Side by side in the faulted and folded strata of a mountain range we may find fossils separated by many thousands of years. Though the apocalyptic prophecies of Mark xiii be written before the catastrophe of Jerusalem, nothing follows as to the rest of the Gospel, which may have been written much later. Why may they not have been written at least in part, a hundred years earlier? They are not foretelling a second coming, but only *The Coming* of the Son of Man. Again, even if part of the parallels in Matthew and Luke do presuppose that catastrophe, which quivers still here and there in Matthew (Harnack, Chron., p. 654), it remains none the less true that these vivid pencillings may be only later touches of a revising hand. The body of the picture may still be generations older. In studying these Scriptures we are exploring the tossed ruins of a world, and each fragment must stand on its own merits. Questions then of age and authorship must still present themselves continually, but not under the old familiar forms.

There are two elements in the New Testament that are especially subject to considerations like the preceding: the philosophic, or rather theosophic,¹ and the gnostic. These are present in large measure, even in portions mainly personal and narrative. With respect to

both it seems reasonably certain that the age is often very great. The theosophic doctrines repeat themselves under endlessly varying forms in Gnosticism. This latter phenomenon is now referred with increasing positiveness and definiteness to the first Christian and even pre-Christian century. Its wide-reaching roots stretch themselves away back into the alluvium of the Tigris and the Euphrates (see Anz, 'Ursprung des Gnostizismus'). As an offshoot or outgrowth or "acute secularization" (Harnack, D. G., I, 232) of Christianity, it is wholly inconceivable. The great historian of dogma himself annuls his own contention by recognizing a boundless extent of *Vorstufen* (op. cit., p. 226, 231 f.) for his secularization. These prestiges were confessedly pre-Christian, or at the very latest syn-Christian, and since they contained demonstrably and indisputably in this form or in that nearly the whole body of New Testament theosophism and much more, it follows irresistibly that the derivation of Gnosticism from Christianity is in every sense impossible. The two historical products were practically synchronous; since many of the Gnostic central thoughts were certainly centuries pre-Christian, it may be possible to regard Christianity as emerging from Gnosticism, but it is surely impossible any longer to regard Gnosticism as diverging from Christianity. To this general state of case there is explicit testimony in the book of Acts in chapter viii, 9-24, where Simon Magus is represented as an elder contemporary of Peter and Philip. The first preaching of the Gospel in Samaria found him already preoccupying the ground, for many years he had been amazing the Samaritans, proclaiming some doctrine about the "Power of God, that called Mighty," which we know to be a Gnostic slogan. Now this Simon figures in the Fathers as the well-head of Gnostic heresy; and it was both the habit and the dogmatic necessity of the Fathers to post-date, never to predate, the Heresies. Harnack admits the historicity and antiquity as well as the epic grandeur of Simon's attempt at universal religion. Strangely he regards this heresiarch, who had at the first preaching of the Cross for a "long time" been so omnipotent among the Samaritans as to be considered by them a god — this precursor of Peter he regards as a "counterpart to Jesus" (Gegenbild zu Jesus). That Simonism was the elder is clearly indicated in Acts viii, 13, where Simon accepts the preaching of the Gospel, believes, is baptized and attaches himself devotedly to Philip *προσκαρτεροῦν* (τῷ Φίλιππῳ). The close affinity of Simon's preaching with Peter's is unmistakably hinted in the disclaimer of Peter (viii, 21), "There is not for thee part or lot in this Word." Moreover, we know from Origen (C. Cels. V, 62) that *Simonians* was, at least with the Gentiles, one of many names for Christians. This is not nearly all, however. We learn from Hippolytus that Simon was far from being the fountain-source of Gnostic heresy, at least of Gnosticism. He appears as only fifth in the chronological list. The first, antedating Gnosticism itself, and only later called Gnostics, are the all-important Naassenes, whence all the rest (Hip. Phil. v, 6). Compared with Naassenism, Simonism is visibly and palpably a much later development. Hence Naassenism is thrown back beyond the begin-

¹ But we speak divine wisdom (θεοῦ σοφίαν) in mystery, 1 Cor. ii, 7.

ning of our era. There is no evading this argument *a fortiori*; witness the utter bewilderment of Bunsen in his *Tabulation* ('Hippolytus and his Age,' I, p. 236), where he says the Gnostics (Hip's, I-IV) originated 70-99 A.D., but the later Simon belonged to the first age (27 to 65)!! With this early dating, and only therewith, do all the phenomena correspond. Now in this archaic pregnosticism we find already present, however inchoate, a goodly company of the most important and characteristic New Testament ideas: the Son of Man (Humanity=*bar-nasha*), the Man from Heaven, Citizen of Heaven, the Father, the new Jerusalem, the Choics, the Psychics, the Pneumatics, the Captives (Luke iv, 18; Rom. vii, 23), the Called, the Chosen, the Perfect, the Spirit, the new Birth, the Christ, he Jesus—all of these and more march in proud procession through the pages of Naassenism. The name *Jesus* for the Son of God is used in one of their hymns, which we have no reason for supposing post-Christian, being Harnack and Preuschen declare to be "ein naassenischer jedenfalls alter Psalm" ('Die Ueberlieferung und der Bestand der alchristlichen Literatur,' p. 168).

The momentous fact confirmatory is that all these notions are used in the New Testament as perfectly familiar, needing no explanation. This presupposes that these notions already had a history lying behind them. We may be perfectly sure that they had been formed and defined and bandied about in frequent discussion long before they became encysted in apophthegms of the earliest Christian literature.

With respect to the gnomic element the case is quite as strong. The starry words of the New Testament are evidently stones that have been polished to perfection by the attrition of ages. That this literary peculiarity is due to the personality of Jesus cannot be maintained. For since he must have spoken in Aramæan, not in Greek, the forms we have could be only translations. As reproducing words actually used by him, the renderings of Dalman and others have little value. Jesus and the Baptist are thought of as strongly contrasted, almost antipodal; but the style of the one is hardly distinguishable from the style of the other. Both denounce the Pharisees as "generations of vipers" (Matt. iii, 7, xxiii, 33), both use precisely the same words about the Tree and the Fire (Matt. iii, 10, vii, 19). The variations found in the synoptic reports are precisely what might be expected in such anthologies. Let any one compare corresponding proverbs in sister languages or even different forms in the same language, for example, as given in Bartlett's 'Dictionary of Quotations,' and he will find almost exactly the same phenomena presented.

At this point the recent papyrus finds, with their new 'Sayings of (the) Jesus,' are of striking interest.¹ Clearly they are but *dissecta membra* of a once imposing organism. Such Logoi (not Logia) undoubtedly existed in that elder day in countless number. Oblivion has swallowed them up, as it has swallowed up so much of ancient literature. Here and there some few have escaped and are seen *rari nantes in gurgite vasto*. The salvage of our canonic

is like the Seven Tragedies of Sophocles—7 out of 80! We may rejoice, however, in the belief that what has survived is the best—not all of it the best, nor all of the best,—but on the whole the most worth saving. The Christian consciousness has sifted and resifted, has tested the spirits whether they be of God; it has polished and refined, has set and reset the precious stones, until the great citadel of its faith gleams and flashes like the bejeweled gates of the New Jerusalem.

Examples of the long-continued process of perfectionment lie open to behold in our Gospels. Thus, in Luke vi, 17 the Jesus descends into a plain and teaches a great multitude eagerly pressing upon him. But in Matt. v, 1 he withdraws from the multitude into "the mountain" (of new legislation) and teaches "the disciples" only. In Luke vi, 20 he declares, "Blessed the poor, for *yours* is the kingdom of God"; but in Matt., "Blessed the poor *in spirit*, for theirs is the kingdom of the heavens." In Luke, "Blessed they that hunger now, for *ye* shall be filled"; but in Matt., "Blessed they that hunger and thirst for *righteousness*, for they shall be filled." In Luke, "Blessed they that weep now, for *ye* shall laugh"; but Matt., "Blessed they that mourn, for they shall be comforted." So, too, Matthew omits the "Woes" in Luke, supplying other beautiful beatitudes. That the Lucan form is older and has been immensely spiritualized in Matthew is too plain for argument, though it is not affirmed and not probable that Matthew has derived directly from Luke. Notice, too, that "they that mourn," "the meek shall inherit the earth," "they that thirst," "the pure in heart" are all Old Testament gems (Is. lxi, 2, Ps. xxxvii, 11, Is. lv, 1, Jer. xxxi, 24, Ps. xxiv, 3, 4) gathered into a new brilliant. Compare also Ps. cix, 28, cxxvi, 5, 6 for the Lucan contrasts of weeping and laughing, cursing and blessing.

The primary form of the angelic song (L. ii, 14), it is now admitted, was "Glory on high to God, and on earth peace among men of (His) good will," that is, His people Israel. Surely it is not hard to forgive the scribe who, by the omission of a single letter, *ε*, of the last word, transformed it into "Glory on high to God, and on earth peace, among men good will."

Once more, the zenith of moral sublimity, before which Rousseau justly exclaimed, "Socrates died like a philosopher but Jesus like a God," is attained in the prayer on the cross: "Father, forgive them, for they know not what they do." Nevertheless, it is now bracketed by Lachmann and Westcott and Hort as a "Western" interpolation. Finally, mark how the Lord's Prayer as given in Luke (xi, 2-4) has been expanded and ennobled in Matthew (vi, 9-13).

Such examples, which may be multiplied indefinitely, may teach us how erroneous it is to suppose that the extra-canonic "Sayings" are less primitive, because less perfect in form and substance; on the contrary, their comparative crudity far more reasonably argues their comparative originality; "first blade, then ear, then full corn in the ear" (Mark iv, 28).

We come now still nearer the heart of the matter. In most of the foregoing we may hope for the general concurrence of critics, save such as Nösgen of Rostock. Few of the enlightened

¹ The formula "(The) Jesus says" seems to stand on precisely the same footing as the Old Testament parallels, "Thus saith Jehovah," and the like. Against Soltau.

would now deny that the general mind of "the Church" has been largely formative of our present Scriptures. The more advanced would concede that it has even taken an active part in shaping the canonical "Biographies" of Jesus. The recent powerful and convincing work of Wrede admits no doubt on this point. Hear some of his emphasized conclusions: "To write a Life of Jesus meant for Mark not to report something about Jesus, it meant rather quite simply to narrate a life full of Messianic manifestations" ('Das Messiasgeheimnis in den Evangelien,' 1901, p. 125). Again, p. 129: "The evangelic research of to-day proceeds throughout on the supposition that Mark in his historical narrative has the actual circumstances of the life of Jesus before his eyes, approximately distinctly, if not uninterruptedly. It presumes that he thinks outward from the Life of Jesus, that he motivates the individual features of his history according to the real circumstances of this life, according to the real thoughts and feelings of Jesus, that he concatenates in historic-psychologic sense the events that he sketches. In accord herewith it interprets, and in accord herewith it criticises the Gospel in detail. It assumes, to be sure, chronologic displacements, inaccuracies as to fact, alterations in the verbiage of utterances ascribed to Jesus, also an addendum of later dogmatic conception. But yet it operates everywhere with the psychologic necessities and probabilities that held for the personal actors in the given situations, it motivates in accordance therewith, it supplements the accounts with the consequences that flow therefrom naturally, and so covers with flesh the skeleton of dry dates. *This view and this procedure must be recognized as false in principle.* It must be said openly: *Mark has no longer any conception (Anschauung) of the historical Life of Jesus.*"

This is certainly one of the most important deliverances of recent criticism. The characterization of the prevailing investigation of the Gospels is perfect, but it is unfortunate that Wrede has contented himself with a bare negation, however unshakably established. "Herewith I will by no means prejudge the historic character of the materials, which I have not investigated. These materials may here be disregarded entirely" (p. 129). The same prevalent attitude has been clearly stated by Pfleiderer, though in much broader outline, when he declares with Strauss (against Ullmann) "the Christ of the Gospels is a creation of the faith of the church, but this faith is an effect of the person of the historical Jesus." Again, "Historical science, which is concerned to understand Jesus as the originating source of Christianity," Harnack, while strenuously maximizing the trustworthiness of the Gospels in *der Hauptsache*, admits that, "however, here and there are mirrored even in them the conditions of the original community and the experiences through which it passed in later times" (p. 15). In other words, the later apostolic Christian consciousness transfigured more or less the primitive "Life of Jesus." Harnack would perhaps use still stronger language after reading Wrede. So we might go on quoting Feine, Bousset, Weiss, Keim, Jülicher, Holtzmann, Weizsäcker, Gunkel, Meinhold and the rest. Enough. The transforming activity of the

early Christian consciousness they do not deny; how high it is to be rated is yet unsettled; but after Wrede's work it will never again be rated so low as before.

Nevertheless, all these critics up to this time are harmonious on one point, however discordant as to others; they will all agree with their great spokesman, Pfleiderer, that the end and aim of the historical science of the New Testament "is to understand Jesus as the originating source of Christianity." How seriously historical science has taken this problem is above all evident in the great number of works, by men of first-class ability and intensely in earnest, bearing the title *Life of Jesus* or *Life of Christ*. 'Das Leben Jesu' was the title of the great apocalypse of David Friedrich Strauss. Since then we have had Renan's, and Keim's, and Weiss's, and Hase's, and Holtzmann's and Réville's, and the like, not to mention Farrar's, and Geikie's, and Edersheim's. Even Volkmar, who, in his 'Marcus,' had, along with Hoekstra and Loman, broken the path since trodden by Wrede, resolving so much of the biography into symbolism, *Lehrgedichte*, and the like, even Volkmar must yet write his, *Jesus Nazarenus*, sounding often like a recantation.¹ More than one of these works was of signal ability. Keim's was pre-eminently able. But even where no formal 'Life' was written, if the writer attempted any construction or interpretation of primitive Christianity, it was uniformly in terms of the Personality of Jesus. The consciousness of the Christ — that was the oldest Christianity, and, barring the acknowledged imperfection of the means and agents of transmission, that was the content of the Gospel as to us transmitted.

Here at least there is nothing in debate. Surely the problem has been clearly and definitely conceived; it has been firmly and resolutely grasped; the materials for solution are not lacking in abundance; the expenditure of the widest, deepest, exactest learning, of zeal and abilities of the highest order, has been prodigal, and the methods employed have been infinitely varied; — what then, we may and we must ask, has been the net result? The answer can not be doubtful: absolutely *nil*! There is no exaggeration in this statement. Thus far it has been found utterly impossible to rationalize the Life of Jesus. Certain negative critical results have obtained more or less general recognition in critical circles, but they do not, however, apparently, help us in the least "to understand Jesus as the originating source of Christianity." On the contrary, they tend rather to make such understanding less and less possible. The theories developed in such capital works as Pfleiderer's 'Das Urchristentum,' or Harnack's 'Das Wesen des Christentums,' or Heinrich's 'Das Urchristentum,' or Réville's 'Jésus de Nazareth,' or McGiffert's 'The Apostolic Age,' or the cognate treatises of Schürer, Hausrath, Weizsäcker, Votaw and others, though lasting monuments of erudition, though brimful of

¹ A like remarkable refluence of critical consciousness made itself known in Loman, the Tiresias of the North, especially in controversy with Scholten. These keen critics, beside whom must be named their unhappy master, Bruno Bauer, had strange forebodings, extraordinary glimpses of the truth — they saw visions, they dreamed dreams. But their glittering structures lacked the solid foundation of scientific fact. No wonder then that they have sunk in a heap.

ingenuity and sagacity, though widely illuminative and always pressing out further and further the bounds of our knowledge—all such are none the less disappointing as regards the capital point. In the last resort they are all equally impotent to make the Christian movement comprehensible or credible as an emanation from a personal focus, as a reaction from the Life and Death of the Man Christ Jesus. We might illustrate this fact by abundant citation, but there is no need to carry owls to Athens. Not one but must in the end beg the whole question, must abdicate the whole task, by assuming some uniqueness in this Personality, some absolute disparateness and incomparability with all other humanity. In other words, when under their inexorable analysis every trace of the miraculous¹ has vanished alike from Gospels and Acts, from Epistles and Apocalypse, there remains unshaken in tremendous majesty the one supreme Miracle of Miracles, the Heart of Heart in the New Testament, without Whom all other miracles are vain and contradictory, with Whom they acquire consistency and awful significance. The crumbling away of these outer parapets but lifts aloft into still bolder relief the impregnable strength of this inmost citadel.

The case then stands thus:

If Jesus be such a unique Personality as everywhere demanded by critical theory, in last analysis incomparable with the sons of men, then He was in some sense superhuman, it makes no difference in what sense, and neither His words nor His deeds are to be measured by the standard of men. Hence His miracles, one and all, remain miracles but cease to be wonders. We know of no reason why He should not have been born of a virgin, and walked on the waves, and raised the dead, and ascended into heaven, and endowed His disciples with any desirable spiritual gifts, and transmitted the Power of the Keys to an endless series of infallible viceregents. Nay, it becomes antecedently highly probable that He would and did do all this and much more; we should reasonably expect such a unique extra-natural being to do unique extra-natural things. We have no ground at all, then, for extruding or slurring or minimizing the non-natural element in the Scriptures, but every ground for retaining and accenting and even magnifying it. Accordingly, the strictly orthodox view appears alone consistent and rational, the liberal theology must ultimately commit suicide, however skilfully it may postpone the dénouement to the last page of the last chapter. The unescapable question, "What think ye of the Christ?" must sooner or later precipitate the catastrophe. Greatly then as we admire and applaud the most enlightened scholarship of Europe and America, we must admit that at this critical pivotal point it has no standing before the bar of logic. This yea-and-nay criticism has now for years been bankrupt.

When so many wingéd hounds of Zeus thus find that their quarry forever eludes them, the suggestion is inevitable that there is something radically wrong in their method of pursuit, that

in some way their finest sense has betrayed them. We hold that the nature of their error is now at length an open secret. They have sought to explain Christianity as an emanation from a single individual human focus, as the reaction upon history and environment of a single human personality, they have sought "to understand Jesus as the originating source of Christianity"—they have failed and they must forever fail: for no such explanation is possible, because no such origination was real. Over against all such attempts we oppose the fact that every day comes to clearer and clearer light, that now flashes continually into evidence around the whole horizon of investigation, the fact that was perceived nearly a decade ago, but whose effective proclamation called for the publication of a series of preparatory investigations, the fact that the Genesis of Christianity must be sought in the collective consciousness of the first Christian and immediately pre-Christian centuries, that in the Syncretism of that epoch of the amalgamation of faiths, when all the currents of philosophic and theosophic thought dashed together their waters in the vast basin of the Roman circum-mediterranean empire, was to be sought and found the possibility and the actuality of a new faith of Universal Humanity, that should contain something appealing to the head and the heart of all men, from slave to emperor, a faith in which there should be no longer male and female, Jew and Greek, bond and free, but all should be one by virtue of a common Humanity of the ageless, timeless, spaceless Son of Man.² It is only as the outcome of this Syncretism, as the final efflorescence of the Judæo-Greco-Roman Spirit, of the Asiatic-European Soul, that Christianity is wholly intelligible and infinitely significant; the notion that it is an individual Palestinian product is the *Carthago delenda* of New Testament criticism.

That the drift of the most advancing thought and the most penetrating research is all in the direction indicated, can not escape the notice of the reader of the most recent works of such as Pfeiderer, Gunkel, Bousset, Zimmern, Heitmüller, Dieterich, Seeberg, Wrede, Kreyenbühl, Usener, and their peers. Such is the unmistakable trend of historico-religious investigation. But this latter is very slow, and naturally very slow, to cut loose from the ancient moorings, to weigh anchor and commit itself to seas entirely unknown. Thus even Gunkel hesitated long ("nach langem Zaudern und manchen Erwägungen") before publishing his 'Zum religionsgeschichtlichen Verständnis des Neuen Testaments' (1903). He has therein spoken out bravely the great word (p. 95), "Christianity is a syncretic religion," even as Bousset had already declared: "Judaism, however, was the retort in which the different elements were assembled" (Rel. des Judentums, p. 493).³ Nevertheless, Gunkel tells us "*all this has been transferred to Jesus*," "When then Jesus appeared in his superhuman sublimity," and it avails little to add "that the christologic problem of the present is not merely historic and can not be solved in purely historical way"; so that, after all, we are advanced hardly an

¹ Even criticism in the bosom of the Church of England spares now but two or at most but four of the miracles: The Incarnation and the Resurrection, with their "incidents," the Virgin Birth and the Ascension. Consult the controversy in 'The Nineteenth Century and After.'

² *ὁ υἱὸς τοῦ ἀνθρώπου* = Bar-nasha = Human Being.

³ Most characteristically Bousset adds: "Then resolved through a creative miracle the new formation of the Gospel."

inch beyond the elder standpoint. In the same spirit Wernle declares that "Paul's utterance concerning Jesus was at bottom a myth, a drama, to which Jesus gave the name" (329). None the less, Wernle still deduces Christianity from this uniquely but merely human Jesus.

The amazing state of case, then, is this: The most piercing criticism detects nearly the whole body of Christian doctrine and practice in the mixed religions of the day, even the sacraments themselves. None of this, it feels sure, "can be derived from the teaching of Jesus; they show us how Christianity in its infancy was drawn into the chaos of Oriental religions" (Wernle). Nevertheless, it assures us that this teaching, *this* Jesus, remains the heart's core of Christianity. When now we ask, what then was this teaching, what this Personality? the answer rendered is arbitrariness itself. Since the critic feels constrained to explain 99 per cent of Christian theory and practice as derived from Judæo-pagan sources, as merely "transferred to Jesus," he is at liberty to choose the remaining 1 per cent as he will; he makes of the teaching precisely what he thinks it ought to have been, he declares Jesus did or did not teach this or that, because it conforms or does not conform to his idea of Jesus! But whence this idea? Certainly not from the Gospels, for these are saturated through and through with "transferred" elements; the only one that professes to be based on personal knowledge, the Fourth, is exactly the one that is rejected *in toto* as history, even by such a conservative critic as Harnack ("Especially the Fourth Gospel . . . can not be used as an historic source in the ordinary sense of the word"—D. W. d. C., p. 13)! No standard, then, is left but the caprice of the critic; he makes his own Jesus and conforms the Gospel thereto! If the Gospel contains contradictory or superfluous elements, they have been imported from the surrounding "chaos"! If it omits certain necessary or desirable features, it was because the religious consciousness of the writers was not free to assimilate them, but was bound fast by the historical conditions that obtained! It is plain at a glance that nothing can ever come of such criticism, where the "poverty of the ascertained historical materials" is turned into endless imaginary wealth by "the uncontrolled power of combination and divination" (Pfleiderer). The focus, the burning point of investigation, must then be this *Personality*, which is thus the irresolvable residuum of the most inexorable analysis. But we may be absolutely sure that nothing can ever come of the arbitrary methods in vogue, all of whose airy constructions of the "Nazarene"

"Are but dust that rises up
And is lightly laid again."

Against every such theory of a unique deified Man, still more against the recent crudities of Kalthoff (Jesus merely a social-ethical Ideal!), while expressly holding important collateral questions in abeyance, it seems that criticism must now explicitly postulate the *aboriginal Godhood of the Centre of Christianity*, as appears at least from these considerations:

1. The mere human Personality, which each critic postulates according to his own convenience, makes no great figure in the early propaganda. Neither in the book of Acts, nor in the

Epistles, nor in the oldest extra-canonic literature, can the keenest eye detect the after-effect of "the Carpenter," his words, his deeds, his life, his death; the Jesus, the Christ is everywhere conspicuous, towering like the Matterhorn, but everywhere supremely as an object of worship, as an over-earthly supernal Being, as a God (*The Outlook*, 66, p. 686 f., 1900). The greatest early preacher, The Apostle, apparently cared little or naught for the earthly history of Jesus and preached him solely as a Divinity. When Harnack and the rest talk of "the impression that he made upon his disciples and which they propagated," they forget the Pauline injunction not to be wise above what is written. Certainly, any such human Person as they assume must have made and left a regulative, overpowering and ineffaceable impression; the fact then that no such impression at all is anywhere discernible, but quite the contrary, must teach us to revise their assumptions.

2. The preaching of "the Jesus" was seemingly pre-Christian. We have already mentioned the occurrence of the name and the idea in "an ancient psalm of the Naassenes" (Harnack), which we have no right to regard as post-Christian. It also occurs repeatedly, at least four times, in the 'Zauberpapyri' lately brought to light, especially at line 3120 of the great Paris Papyrus edited by C. Wessely, in a long "Hebraic Logos" which shows no trace of Christian influence, which is expressly attributed to "the pure men," and which the great master, Dieterich, positively ascribes to the (pre-Christian) Essenes. At line 3119-20 we read ὁρκίζω σε κατὰ τοῦ θεοῦ τῶν ἑβραίων Ἰησοῦ . . . "I adjure thee by the God of the Hebrews, Jesus."

As the end of controversy on this point we cite Acts xviii, 25, where of the learned and eloquent and zealous Apollos of Alexandria it is said, "He was wont to speak and teach accurately the doctrine of the Jesus (ἐλάλει καὶ ἐδίδασκεν ἀκριβῶς τὰ περὶ τοῦ Ἰησοῦ), knowing only the baptism of John." The phrase italicized excludes all possibility of biographical reference to the Jesus of the Gospels, and shows incontestably that the cult of the Jesus was fervently propagated far and wide in ignorance of any earthly Life of Jesus.

3. The Epithet "Nazorean" (Ναζαρηαίος, Ναζωραῖος, Ναζαρηνός) is not derived from Nazareth, a seeming topographic fancy, but is a divine appellative derived from the Old-Semitic stem NaSaR, meaning to keep, guard, preserve, frequent in the cuneiform inscriptions (na-ša-ru) as far back as 2250 B.C., constant in the Old Testament, where Nōšrim means *watchers*, precisely the term by which the Talmud designated the Christians (NaZoReans). The epithet Nazorean would mean then *Servator*, almost the same as *Salvator* (Jesus), which are both used to render the Greek Σωτήρ. The Syriac form Našaryā suggests, but does not prove decisively, that the termination refers to the divine name Yah. So that Našaryā would mean *Servator*—Yah. Consult *The Monist*, January 1905, pp. 25-45, "Der vorchristliche Jesus," 42-70.

4. The "Našaraioi" were certainly "before Christ" and "knew not Christ," to quote Epiphanius (Pan. Haer. xxix, 6). The name is the same as Našaryā (Syriac for Nazarene) and indicates that they worshipped God (Yah) un-

der a particular aspect or *Person*, namely, as Protector, Preserver (N—S—R). The notions of Servator (*Nasap*—*αὐός*) and Salvator (*Ἰσῶς*), being hardly distinguishable, we naturally get the double title Jesus Nazarean. The fusion of this notion of *Saviour* with the more orthodox notion of *Messiah* (Chrestos)¹ gave rise to the slogan of Paulinism, *the Jesus—the Christ*; this fusion was perhaps distinctively the work of Paul.

5. *Primitive Christianity seems not unifocal but multifocal in origin and development.* It does not emerge full-fledged at Jerusalem and encompass the Mediterranean with the flight of an eagle. The "astoundingly swift" (Heinrici) spread of the Gospel seems only apparent. In reality it seems everywhere in the air, a divine contagion. It springs up almost simultaneously in Jerusalem, in Antioch, in Damascus, in Alexandria, in Rome, in Crete, in Libya, in Ephesus, in Corinth—wherever in the Dispersion the seed was sown. The book of Acts makes two attempts to explain this multifocal fact in accord with its own unifocal theory. It assembles at Pentecost "in Jerusalem, dwellers, Jews, devout men from every nation that is under heaven," who, "each one in his own dialect, heard them (the Apostles) speaking." The other is found in the mighty persecution that arose against the Church in Jerusalem after Stephanos was crowned with martyrdom. "All were dispersed except the Apostles." But these were really the only or at least the principal offenders, the very ones that would have been dispersed first of all. Immediately after, the Church had peace, was builded up and multiplied (Acts ix, 31), and, not many years after, the believers in Jerusalem number many myriads, all zealous for the law (Acts xxi, 20). The fact of multiplicity is clearly implied in these abortive attempts to trace it back to a higher unity. The other evidences are strewn through the book of Acts; they are scattered and broken lights, but gathered up and focused by the lens of criticism they glow with surprising brightness.

These results, set forth and grounded in 'Der vorchristliche Jesus' (1906-11), were reinforced and greatly extended in 'Ecce Deus' (1911-12), in which it was maintained ('Zweifellos mit Recht'—M. Dibelius in Harnack's 'Theologische Literaturzeitung') that:

6. Proto-christianity was a protest against idolatry, a crusade for Monotheism, the "Eternal Gospel," "Fear God and give Him glory" (Rev. xiv, 6, 7), and as such swept round the Mediterranean in triumph. It was also held that:

7. Primitive Christianity was esoteric, heard in the ear, and only later proclaimed on the housetop.

8. Its language was largely parable and allegory and expressive symbols, representing the pagan world as a leper or blind or lame or deaf or even dead, or still more as possessed by demons (which symbolize heathen gods), and most pathetically as a sinful (adulterous) but repentant woman.

9. In the Gospel, sin is pre-eminently idolatry with its attendant vices; repentance is return "from the polytheistic error," and faith is the belief in and the worship of the one true God.

Around these positions there has raged (since 1911 at least, till the outbreak of the World War) a very lively strife and there has grown up an extensive literature mainly in continental Europe, without, however, making any large addition to our knowledge. By odds the most notable volumes are the 'Kyrios Christos' of Prof. W. Bousset, reviewed in the *Monist* under the title 'Polyxena Christiana,' and the 'Agnostos Theos' of Prof. E. Norden, both of which, under disguise of "controversy," go far toward confirming the positions enumerated.

This later conception of Proto-christianity lifts it entirely out of the domain of mere morality into which the well-meant liberalism of the 19th century had sunk it, and restores it, under wholly new auspices, to its elder rank as the greatest, and in its central aspect, the final religious revolution of the ages.

So far the investigation has been carefully made, and so much appears "very probable." Still other kindred inquiries are in progress, but of these the results must be awaited. Enough, however, seems established to show that the "hopeless confusion" of Rationalism, in its century-old essay to interpret Christianity from the *Man Christ Jesus* as the assumed sole human personal animating centre, must remain forever confused and hopeless, for no such interpretation can ever be correct. On the contrary, this most interesting and most important of all historic phenomena is comprehensible and must be comprehended as a total product of the totality of historic-religious-philosophic-ethic conditions prevailing around the Mediterranean, as a phenomenon which itself came not with observation, so that no man could say "Lo here!" or "Lo there!" but which emerged to view from the fermentation of three centuries and lightened like the dawn of a polar day round the whole horizon from the East even unto the West. This prodigy, this heir of all the ages, appeared at first under many forms, with many slogans and battle-cries, of very varying degrees of worth. It was the work especially of the second century to rally the straggling and sometimes contending arrays under one banner, to select and unify and communicate what was best in each, and to reject and excommunicate what was bad or irreconcilable. The organic result was the Old Catholic Church—as its name implies, the *totalization* of a host of originally more or less independent elements. Here, however, we are brought to the borderland of theology, and here we must pause, for that border we dare not cross. Many important consequences seem to present themselves naturally, but these must be left for the reader to recognize. If the deep-eddying stream of criticism, whose swift descent we have followed through the century, has now at last surmounted and surpassed every bulwark of tradition, we need only reflect that it is a cleansing and a fertilizing flood, the river of the waters of life, which has been poured abroad over exhausted fields, and that

¹The earlier form, see Blass *Gram. & nt. Gr.* § 27, 4. Compare also Ps. xxiv, 8, quoted by Clem. Alex., *Adm. in Genl.* 56 C. Syll., "taste and see that Christos is God," where the Septuagint has *Chrestos* (good) is the Lord.

²As is proved by microscopic scrutiny of Acts.

the inundated plains will blossom and brighten anew with abundant blessing.

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NEW TESTAMENT CRITICISM.

Triple Evidence.—Logicians distinguish between metaphysical, physical and moral evidence for the things we know. Metaphysical evidence is based on the unchangeable essences of objects or on the analysis of our concepts; for example, the whole is greater than its parts. Physical evidence is based on the conditional stability of the laws of nature; for example, the sun rises in the east and sets in the west. Moral evidence is based on the testimony of a witness; it implies that we have the genuine words of the witness, and that the witness is endowed with the necessary knowledge and veracity. The New Testament does not furnish us either metaphysical or physical evidence; we have to be content with moral evidence. And even this is not of the highest order. We do not listen to the words of eye-witnesses, but we have only a number of historical and doctrinal writings to consult. Again, we do not possess a single autograph of these writings; our New Testament text has been copied and copied again, edited and edited again, so that at present not a single verse reads exactly alike in all copies and editions. The very words of our witnesses seem to have become uncertain. Moreover, doubt has been raised as to the knowledge and the veracity of our New Testament writers; their evidence has been pronounced unreliable even in those passages in which their words are practically certain.

Criticism.—For these reasons the principles of criticism must be applied to the books of the New Testament. Lower or textual criticism

will inquire into the genuineness of each verse and of every word of the New Testament. Higher criticism will investigate the authenticity of the entire New Testament books, and will test their reliability. Meanwhile, let not the metaphysician and the scientist under-rate the evidence furnished by the New Testament writings. It is the evidence on which history is built; even the abstract thinker is content with this kind of evidence as soon as he leaves the region of speculation and enters into practical life.

Lower or Textual Criticism.—Lower or textual criticism strives to restore the original text of the New Testament. Its method consists generally in a reversal of the process by which false readings have penetrated into the text. The original readings are suggested partly by the ingenuity of the critic, partly by the text of early manuscripts or of patristic quotations or again of early versions.

Original Manuscripts.—The original copies of our New Testament books must have been lost very early. No early Father appeals to the original manuscript in defense of his own peculiar reading of the text. Tertullian (de præscript. 36) and Peter of Alexandria (de pasch. vii; Migne, P. G., xviii, 517, 520) are no exceptions. Tertullian's words concerning the Pauline Epistles do not necessarily imply the existence of the original copies; and Peter's testimony is based on late authority. Neither can it be said that a fragment of Mark's original Gospel is still kept in Venice (Baron., Annal. ad ann. 485), and that the copy of Matthew's Gospel written by Barnabas is still extant in Constantinople (Assem., Biblioth. orient., ii, pp. 81 ff); for both relics are spurious.

Early Variations.—Some of the early ecclesiastical writers are of opinion that the New Testament text was corrupted intentionally by the heretics. This view is expressed by Irenæus (c. hæ. i, 27; Migne, P. G., vii, 638), Dionysius of Corinth (Eus., H. E., iv, 23; Migne, P. G., xx, 388 ff.), Tertullian (c. Marc. v, passim), Eusebius (H. E., v, 28 Migne, P. G., xx, 516), and Epiphanius (hæ., xlii, 9 ff.; Migne, P. G., xli, 708). We do not deny that heretical writers may have introduced one or another variant, but they cannot be held responsible for the great bulk of different readings. Nor are we at a loss to account for the early appearance of variations. (1) Oral tradition was prized higher in the earliest time of the Church than the written word. (2) The dogma of inspiration was not sufficiently well developed to demand a special amount of accuracy on the part of the copyists. (3) Most copyists did not work as official scribes of the Church, but transcribed the text for the use of private persons. (4) It must also be kept in mind that the scientific accuracy of later days was not a characteristic feature of the first centuries. (5) Finally, the copyists were fallible men, and as such they were not exempt from the various sources of accidental error to which all scribes are subject.

Earliest Witnesses for Variations.—Among the earliest witnesses for the existence of variants in the New Testament text must be reckoned Polycarp, Hegesippus, Papias, the Elders of Irenæus, Justin, Theodotus, the churches of Vienne and of Lyons, Marcion,

Ptolemæus, Heracleon and Tatian. Nor can the variants, for the existence of which they testify, be regarded as mere accidental slips of memory. Polycarp's quotation of Acts ii, 24 (ad Philipp. 1, 2) disagrees with nearly all Greek codices and early visions, but it agrees with cod. D, the Vulgate, and several other versions. The double reading of this passage must then have existed even in his day. Irenæus (adv. hæ. 30, 1; Migne, P. G., vii, 1203) appeals to ancient and accurate manuscripts in defense of a certain reading. Clement of Alexandria, too (Strom. iv, 6; Migne, P. G., vii, 1252), cites variants of certain passages. Various readings must therefore have been quite common in the 2d century. In the 3d century Origen complains of the great diversity in the codices (in Matt. xv, 14; Migne, P. G., xiii, 1293), and during the course of the 3d century Jerome attests that the evil grew rather than diminished (ad Dam., præf. in evang.). After the 4th century the occurrence of variants is attested by existing manuscripts, patristic quotations and faithful translations.

Incipient Stability.—It has been believed that Origen was the author of a revised text of the New Testament. But this opinion can hardly be reconciled with Origen's own words (in Matt. xv, 14; Migne, P. G., xiii, 1293). On the other hand, many learned men did not consider it below their dignity to aid in the transcription of the sacred text. Eusebius and Jerome (H. E. VI xxxii, 3; de vir. ill. 75) testify that Pamphilus had transcribed certain texts. Jerome again (ep. 34; al. 141) tells us that the priests Acacius and Euzoius had been engaged in transcribing the sacred text in the library of Cæsarea. In other passages Jerome shows his esteem for the manuscripts written by Adamantius and Pierius (in Matt. xxiv, 26; in Gal. iii, 1; Migne, P. G., xxvi, 181, 348), the latter of whom was one of Origen's successors in the presidency of the Alexandrian school; but neither Jerome nor Eusebius can be cited as a witness for a text revision by either of Jerome's favorites (cf. Eus. H. E., vii, 32; Migne, P. G., xx, 732). True text revisions appear to have been edited by the Egyptian bishop Hesychius and the Antiochian priest Lucian. It is true that Jerome's words (ad Dam., præf. in evang.; de vir. ill. 77) are not as clear and definite as one might desire. Still they show that Hesychius and Lucian had paid considerable attention to the problem of the New Testament text. Hug, Eichhorn and W. Bousset have ventured to suggest that the work of Hesychius has been preserved in the so-called Alexandrian group of New Testament variants, while that of Lucian is variously connected with the Byzantine or the neutral group. But no proof for either view has thus far been advanced. It cannot be denied, however, that from the 4th or 5th century onward the variants in the New Testament crystallize into several types or forms, differing according to the country in which the respective manuscripts were written, the versions were made and the citations were employed.

Causes Which Effectuated the Stable Text Groups.—We have said that the different groups of variants were more or less attached to their place of origin. But loyalty to the customs of particular places was not the only cause of the incipient text stability. The following considerations will suggest additional reasons:

(1) The local ecclesiastical authorities naturally insisted on having the transcriber copy the text current in each particular Church. (2) After the Church began to enjoy the blessings of peace under the reign of Constantine, the bishops had better opportunities to regulate the interior affairs of their respective dioceses (cf. Sozom., H. E. i. 11; Migne, P. G. lxxvii, 889). (3) Owing to Diocletian's decree concerning the destruction of sacred books, many copies of the New Testament had been destroyed during the late persecution, so that the number of the model texts was greatly reduced (Eus., H. E. viii, 2; Migne, P. G. xx, 745). (4) Finally, the Emperor Constantine charged Eusebius with the transcription of 50 new codices which were donated to the various imperial foundations and thus became the model text for innumerable other copies (cf. Eus., Vit. Constant., iv, 34, 36, 37; Migne, P. G. xx, 1181 ff.). Here we have an explanation of the fact that the so-called Syrian or Byzantine group of texts attained such an overwhelming popularity.

The Written Text from the 4th to the 16th Century.—Though from the 4th century onward the particular churches had their own peculiar groups of variants which they propagated in preference to other readings, it must not be imagined that the lines of demarcation between these text-families are mathematically accurate. Suppose we denote by 1 the text peculiar to the Church A, by 2 that current in the Church B, by 3 that peculiar to the Church C, etc., then the text peculiar to the Church Z will not be entirely new, but in all likelihood it will be a mixture of 1, 2, 3; and the text of the Church Y will be a mixture expressed by 3, 2, 1, and similarly the text of the Church X will be the mixture of 2, 1, 3. And while the codices were thus propagated, fairly faithful reproductions of parts of the text were kept for us by Eusebius, Athanasius, Epiphanius, the two Cyrils, Basil, the two Gregorys, Chrysostom, Theodoret and Ephræm. To these illustrious men must be added Andrew of Cappadocia for the 5th century, Venerable Bede, John Damascene and Alcuin for the 8th, Photius for the 9th, Suidas and Arethas for the 10th, Theophylactus, Ecumenius and Euthemius for the 11th and 12th, the Correctoria for the 13th and Laurentius Valla for the 15th. And this is by no means an exhaustive list of men and works important for textual or lower criticism.

New Testament Codices.—Greek manuscripts are divided into uncials and cursives or minuscules. In uncial writing all the letters are large and divided. The other class of manuscripts is called minuscule, because its letters are small; it is called cursive, because its letters are linked together in a running hand. Broadly speaking, the manuscripts written before the 10th century are uncials; those written between the 10th and the invention of printing (1454 A.D.) are minuscule or cursive. Not counting eight manuscript psalters containing the text of the hymns found in the third Gospel, the New Testament uncials number 114; two of these belong to the 4th century, 15 to the 5th, 24 to the 6th, 17 to the 7th, 19 to the 8th, 31 to the 9th, 6 to the 10th. But only one of all these contains the complete text of the New Testament; four others contain the greatest part of it. Besides these five, there are 81 gospel manu-

scripts (12 complete or nearly so, 14 partial ones and 55 fragmentary), 13 of the Book of Acts (five complete or nearly so, eight more or less fragmentary), five of the Catholic Epistles (four more or less complete, one fragment), 20 of the Pauline Epistles (seven more or less complete, 13 fragmentary). There are four complete manuscripts of the Apocalypse, and one defective one. Of the cursive manuscripts more than 1,200 contain the Gospels, more than 400 the Book of Acts, more than 500 the Pauline Epistles, more than 180 the Apocalypse. Besides, textual criticism knows more than 260 lectionaries with fragments of the Book of Acts and of the Epistles, and more than 950 evangelistaria, about 100 of which are uncial manuscripts. The investigation into the origin and the relationship of the various cursive manuscripts is far from being complete. To facilitate reference, the uncial manuscripts were denoted by capital letters, either Latin or Greek or even Hebrew, while the cursives were indicated by Arabic figures. H. Fr. von Soden has changed this notation considerably. On the list arranged according to this improved plan, not merely the identity of Soden's 2,328 manuscripts is indicated, but also their age and contents ('Die Schriften des Neuen Testaments in ihrer ältesten erreichbaren Textgestalt hergestellt auf Grund ihrer Textgeschichte'; Bd. i.).

The Printed Text.—It was in 1516 that Erasmus published the first printed edition of the Greek New Testament text. He based his work on six manuscripts at most; of these none was complete and only one valuable. New and improved editions of the Erasmusian text were issued in 1519, 1522, 1527 and 1535. Meanwhile, the polygot edition of Cardinal Ximenes, which had been prepared with much greater care and had left the press on 10 Jan. 1514, was published in 1522 (perhaps in 1520); but being limited to 600 copies, it never reached a large circulation. Not to mention other reissues of these two main editions, Robert Estienne or Stephanus repeated in his third and fourth editions (1550, 1551) almost the pure Erasmusian text, adding in the margin variants based on 15 manuscripts and the polygot of Ximenes. The English *Authorized Version* and the so-called *Received Text* current in England follow the third edition of Stephanus. His fourth edition is the first Greek text divided up into verses. Among its numerous re-editors, Th. Beza and the Elzevir Brothers deserve the first rank. The preface of the second Elzevir edition, which appeared in 1633, contains the words "*textum habes nunc ab omnibus receptum*." Hence the reprints of this text, and there are more than 170, are simply called the *Received Text*. In brief, then, the *Received Text* is the text of the second Elzevir edition, which appears to be a repetition of the Bezan text. This latter is the fourth edition of Stephanus corrected according to several notes of Henry Stephanus, some ancient versions and the Codex Claramontanus. In its turn, the Stephanus edition is a repetition of the fifth Erasmusian edition, and the latter is based on cod. 1 and 2 for the text of the Gospels, on code. 4 for the text of Acts, on cod. 7 for the Pauline Epistles, on cod. 1 for the text of the Apocalypse, in such a way, however, that the successive reprints of this highly composite text were slightly emended according to a few other text sources.

Critical Apparatus.—Robert Estienne (c. 1546) and Th. Beza (c. 1565) are rightly considered as the pioneer collectors of an apparatus for the textual criticism of the New Testament. Br. Walton (c. 1657) and John Fell also cooperated at the building up of such an apparatus, but they were far surpassed by Mill (c. 1707), who collected about 30,000 variants out of more than 100 sources. Bengel (1687–1752) first divided the various readings into groups. He distinguished between an African and an Asiatic or Byzantine type of variants. Semler (c. 1740) and Griesbach (1745–1812) distinguished three text groups: the former called his divisions the Alexandrian, the Occidental and the Oriental or Byzantine family; the latter named his groups the Alexandrian, the Occidental and the Constantinopolitan. Eichhorn (c. 1820) and Hug (c. 1840) agreed with Griesbach, but Scholz (c. 1850) returned to the double division into Alexandrian and Byzantine readings. Tischendorf (1815–74) acknowledged four different types of text, an Alexandrian, a Latin, an Asiatic and a Byzantine; Tregelles (1813–75) favored again a dual division of texts, naming them the Constantinopolitan and the Alexandrian group. Finally, Westcott and Hort introduced four text families: the Syrian, the Occidental, the Alexandrian and the Neutral. The Syrian text is the vulgate text in the Greek Church since the middle of the 4th century. It is supposed to be a revised edition of a pre-Syrian vulgate text. This latter exhibits three peculiarities: one group of its variants is remarkable for paraphrases, interpolations, amplifications and omissions; this text constitutes the Occidental group. Another group of variants is peculiar for its grammatical and scholastic emendations, and this is called the Alexandrian. A third set of variants, though pre-Syrian, shows neither the diffusiveness of the Occidental text, nor the nicety of the Alexandrian; it is, therefore, called the Neutral group. Now, since the Syrian text figures as the vulgate of the Greek Church after the middle of the 4th century, and since about a century must be allowed for the rise and passing away of the Occidental and the Alexandrian families, the Neutral type of variants must have been the common text during the course of the 2d century. But it cannot be maintained that these premises and conclusions are admitted by all textual critics.

Critical Editions of the New Testament.—

After the *Received Text* had become the current Greek text, it began to be regarded as quite sacred. Mill, Bengel and Wetstein collected various readings differing from the *Received Text*, but they did not dare to introduce them into the body of the New Testament. It was Griesbach who first changed the *Received Text* according to the authority of various manuscripts; but not even Griesbach had the full courage of his conviction. Besides, he was not acquainted with some of the oldest manuscripts discovered after his time (c. 1777). We need not delay over some of the less important editions published by Mace, Harwood, Matthæi, Alter, Scholz, Schott, Knapp, Tittmann, Hahn, Theile and others.

Lachmann (1793–1851) was the first who endeavored to construct a new text out of the oldest manuscripts known to him. Believing it impossible to restore the original text, he tried

to reconstruct the readings that had been current in the Church during the course of the 4th century. For this purpose he confined his study to a few of the oldest manuscripts, together with a few of the Fathers, and the best codices of the Latin Vulgate. He simply counted the authorities in favor of each reading and then followed the majority. Though the text thus prepared is far better than the *Received Text*, it is based on too small a number of witnesses, on too slight a knowledge of the few manuscripts actually used and on too mechanical a method of using them.

Tischendorf's services in the publication of manuscripts have probably done more to establish textual criticism on a sound basis than anything else. Besides, he published at least eight (according to another method of reckoning, 21) editions of the New Testament. It is to be regretted that he did not use his material more consistently and scientifically. Between 1841 and 1849 he differs considerably from the *Received Text*; between 1849 and 1869 he approaches quite closely to it; but after 1869 he again diverges from it. His last, or eighth edition (1864–72), still remains the standard collection of evidence for the Greek text. The prolegomena (1884–94) to this edition are the work of Gregory; they give an account of the manuscripts, the versions and the patristic quotations.

Tregelles (1831–75) published two manuscripts and collated many others with great accuracy, thus preparing his material for a revised Greek text. He based his edition exclusively on the most ancient authorities, but he used a larger number of them than Lachmann had done. Like his predecessors, he did not follow the principle of grouping in his new edition, so that the choice of his readings depends somewhat on personal preferences. Alford, Lightfoot, Weiss and others also have devoted a good deal of study to the New Testament text, but more with a view to its proper interpretation than its emendation.

Finally, Westcott and Hort have given us a new edition of the New Testament text based on the principle of grouping as explained under the preceding number. By adhering to the Neutral readings, they believe they reproduce the text current in the Church during the course of the 2d century. This edition has met with determined opposition, especially on the part of Scrivener and Burgon. These two scholars maintain that in the reconstruction of the Greek text all available authorities must be considered, and the most ancient must not be given the sole right of being heard. J. B. McClellan, too, based his English version of the Gospels (1875) on a revision of the Greek text, in which internal probability is taken as the most trustworthy guide in the selection between variants. Other good editions of the Greek text have been published by Weymouth, Gebhardt, Nestle, Bandscheid and Hetzenauer.

Recent Discoveries.—In recent years quite a number of discoveries have been made which have an important bearing on the textual criticism of the New Testament. The Arabic text of Tatian's 'Diatessaron' has come to light and was edited by Ciasca in 1888. The so-called second Epistle of Clement was discovered by Bryennios in 1875. In the last-named manuscript was also contained the Teaching of the

Apostles, but it was not made known till 1883. A fragment of the Gospel of Peter was discovered in 1886 by members of the French Archaeological Mission, who conducted excavations in the cemetery of Akhmim, in Upper Egypt. The Sinaitic Syriac manuscript was discovered by Mrs. Lewis and Mrs. Gibson in 1892, during their visit to the monastery of Saint Catharine, on Mount Sinai. Part of the Codex Purpureus was brought to light in 1896 in the neighborhood of Cæsarea. Finally, some Sayings of our Lord were discovered by Messrs. Grenfell and Hunt in 1896 and 1903 on the site of the ancient Oxyrhynchus, in Egypt.

Results.—Confining ourselves to general statements, we may derive the following conclusions from what has been said: (1) The material for the textual criticism of the New Testament is constantly growing. (2) In Mill's time the number of variants in the New Testament was estimated at 30,000; in 1874 Scrivener counted at least 120,000; Schaff stated in 1892 that they did not fall much short of 150,000. (3) There are more variants than words in the New Testament; in fact, there are about 20 variants to each single verse and they increase with each new discovery. (4) Lower criticism shows that we need not be alarmed at the number of these variants and that the substance of the New Testament is absolutely certain. (5) Dr. Hort, who is surely good authority in this question, tells us that "the amount of what can in any sense be called substantial variation . . . can hardly form more than a thousandth part of the entire text." (6) Kaulen enumerates only four passages in which the variants touch matters of faith: Mk. i, 1; Acts xx, 28; 1 Cor. xv, 51; and 1 Tim. iii, 16. But our faith is not affected by these variants; the revealed truth contained in these four passages is sufficiently certain from other texts of the New Testament. (7) Our classical scholars are satisfied that we possess the true text of those classical works of antiquity that have come down to us, though our knowledge of these works depends on a mere handful of manuscripts, while the manuscripts of the New Testament are counted by hundreds and even thousands. (8) The fact that our New Testament variants differ only in form, not in substance, excludes the hypothesis that it is the result of syncretism. The very defenders of this hypothesis seem to feel the difficulty; hence they declare that the New Testament presents "a syncretism without parallel in literature, unless in the Old Testament." (9) The number of manuscripts, of ancient versions, and of patristic quotations, is so great that it is practically certain that the original text of the New Testament is preserved in some one or another of these ancient authorities. This cannot be said of any other book of antiquity.

Higher Criticism.—The name Higher Criticism (q.v.) implies that it deals with problems more important than those of the textual or lower criticism. These problems are the questions concerning the integrity, the authenticity, the literary form and the trustworthiness of the various books. In the case of profane writings, these topics have been considered by a science called Literary Criticism. The higher critic ought to employ in his work not only the evidence of the literary work itself, but also external evidence that may be at his command.

The internal evidence comprises the style of the book, the views of its authors, allusions to past or contemporary events, geographical and chronological data, religious, moral and political principles, grammatical forms, lexicographical peculiarities; in fact, all the details that offer a solid basis for comparing the work under consideration with other literary products of the same period of time or by the same author. After all these elements have been considered, the actual work of comparison can safely be undertaken.

Faults of Higher Criticism.—We do not say that all higher critics are sophists, nor do we imply that sophistry occurs more frequently in higher criticism than in any other branch of human science; we wish only to point out some faults that higher critics have actually committed in their process of reasoning. (1) Many higher critics begin their work with a prejudiced or biased mind. While the orthodox inquirer cares very little whether he has to admit a supernatural fact more or less, and is therefore free to follow objective evidence, the unbeliever is pledged *a priori* not to admit any supernatural fact, seeing that a single fact of this kind would upset all his theories. If Christianity, they say, originated from Jesus, then he must have been superhuman. But nothing superhuman must be admitted at any cost. Hence Christianity must be considered as the syncretism of its age, the last efflorescence of the Judæo-Greco-Roman spirit. And all this vague terminology blinds them to the fact that this hypothesis involves a greater miracle than they have sought to avoid. (2) The higher critics often infer *a passe ad esse*; they imagine that a certain fact *can* be explained according to a given hypothesis, and forthwith that hypothesis is upheld as the only explanation. History and common sense may go against their inference, but all this cannot make them change their point of view; *stet pro ratione voluntas*. (3) The higher critics often change the degree of certainty of their contentions as they go along. First, something *may* be true; next, it is *probably* true; again, it is *certainly* true; finally, they actually refer back to their preceding statement with the words, "we have *proved* this to be so." (4) The argument of silence, too, has been highly favored by certain higher critics, though no regard was paid to the conditions under which alone this argument is of any value. (5) Again, higher critics are apt to pronounce judgment on topics outside their sphere of study. They claim to give an opinion on matters theological, philosophical, historical, scientific without the least hesitation; they even feel aggrieved if their criticism is criticised.

First Beginning of Higher Criticism.—The name higher criticism is of comparatively recent origin, but its principles are very old. In the last century before Christ, Dionysius of Halicarnassus won great renown by his critical acumen. In the early days of the Church, too, the books of Scripture were defended against the attacks of a Porphyry and a Celsus by men like Clement of Alexandria, Origen, Eusebius and Jerome by an appeal to the principles that are employed by our present-day higher critics. It is true that during the course of the succeeding ages our great Christian scholars were imbued with too great a reverence for the inspired books to subject them to

the critical process applied in the case of profane literature. Still, there were notable exceptions even to this rule. The introductory treatises to the Bible as a whole or to its several books were applications of critical principles. Richard Simon (1638-1712) applied the same in a pre-eminently masterful way in his famous work, *Histoires Critiques du Vieux Testament, du Texte et des Versions du Nouveau Testament.* The erudite works of Dom Calmet, too, give evidence of skilled critical inquiry.

The Age of Scoffers.—Though railery is no longer the equivalent of argument, it is instructive to review the attempts made to undermine the authority of the Scriptures by means of this weapon. Among the scoffers Voltaire holds a pre-eminent place. The tradition that he copied his difficulties against the credibility of the Bible out of Dom Calmet's works without either adding their solution or indicating his sources is too well known to need repetition. In his wake followed the French encyclopædists. A panegyrist calls Voltaire the king who succeeded Louis XIV, and who handed the royal sceptre over to Napoleon. Among his ministers figure such celebrated men as Diderot, D'Alembert, Buffon, Helvétius, D'Holbach, D'Argens, Lamettrie, Turgot, Condorcet, and in a way also Rousseau and Montesquieu. The king himself had learned his trade among the Deists of England, whither he was forced to withdraw in 1726, and where he remained for about two years. Cherbury, Toland, Tindal, Woolston, Collins, Bolingbroke, Chubb, Whiston, Shaftesbury, Whitey, Somers, Wharton, Shrewsbury and Buckingham figure among the principal apostles of English Deism.

Rationalism.—In Germany three forces had been at work to prepare the minds of the people for disbelief in the New Testament: First, the Wolfian philosophy had freed the mind from the strict letter of the Bible; secondly, the New Testament editions of Westein and Griesbach had shaken the readers' confidence in the inspired text; thirdly, Bengel and Crusius had modified the current notion of inspiration, insisting more on the active part of the inspired instruments than on their passive condition. The public was thus ready to appreciate Lessing's publication of the *'Fragments of Wolfenbüttel,'* the work of his deceased friend Samuel Reimarus (d. 1768). The first part of this work published in 1774 inculcated tolerance for the Deists; the second part appearing in 1777 was a general attack on revelation; the third part published in 1778 was directed against Jesus and his apostles, practically representing them as so many deceivers.

But this attack on the reliability of the New Testament was too brutal to become popular. Hence Paulus (1761-1851) proposed a hypothesis which removed the supernatural element from the New Testament as effectively as Reimarus had done, and at the same time saved the veracity of the inspired writers. In his *'Leben Jesu'* (1828) he distinguishes two kinds of supernatural elements in the Gospels; one kind is carried into the Gospels by the interpreters against the intention of the inspired writers; another kind is really intended by the sacred text. The former is removed by a proper method of interpreting the Bible; the latter must be regarded as the result of the subjective impression of the evangelists. They were rude,

uncultured fishermen and judged of the extraordinary phenomena in the life of their Master in a way that was neither scientific nor rational. In brief, according to Paulus, the writers of the New Testament are no longer deceivers, but they were incompetents.

The reliability of the New Testament fared still worse in the *'Leben Jesu'* published (1835, 1864, 1874) by Strauss (1808-71). He apparently saves both the veracity and the competency of the sacred writers, but he declares their work to be a mere collection of myths. The storm raised in Germany by this work is too well known to need further description.

Strauss had studied only the contents of the Gospels without paying due attention to the Gospels themselves. Ferdinand Christian Baur (1809-82) perceived this weak point in the work of his pupil, and endeavored to strengthen it. He believed that he had discovered the key to the history of early Christianity in the romance of the so-called Clementine Homilies. The opposition between Peter and Paul and their respective parties he traced back from these homilies into the books of the New Testament, in which the opposition between Petrinism and Paulinism was said to be either reflected or harmonized or again considered as past. Only the Apocalypse of John, the Epistles to the Galatians, to the Romans and to the Corinthians were admitted as genuine; all the rest of the New Testament was pronounced pseudonymous, and relegated into the 2d century. Here we have the tenets of the Tübingen school.

Anti-Tübingen Movement.—Baur made several vital mistakes in his assumptions: (1) His fundamental thesis concerning the great opposition between Paul and the other apostles cannot be proved (cf. Weber, *'Katholik,'* 1898, pp. 193 ff.; 1899, pp. 45 ff.). (2) Baur's preference for the four great Pauline Epistles was merely personal; subsequent negative criticism has not spared their genuineness (cf. Bruno Baur, *'Kritik der paul. Briefe,'* 1850-52; Steck, *'Der Galaterbrief nach seiner Echtheit untersucht,'* 1888; Pierson, *'Der Bergrede,'* 1878). (3) Baur was wrong in his utter neglect of early Christian tradition. The testimony of a Clement of Rome, an Ignatius, a Justin, a Marcion, an Irenæus and a Tertullian should not be set aside at the bidding of merely subjective considerations. Hilgenfeld, in his *'Historisch-kritische Einleitung in das Neue Testament'* (1875), acknowledged the genuineness of several New Testament books rejected by Baur; Reuss, in his *'Geschichte der heil. Schriften d. N. T.'* (1842), restores the origin of the whole New Testament, excepting 1 Pet. to the 1st century. Similar conclusions were reached by Ewald, B. Weiss, Hofmann, Schulze, Godet, Zahn, Harnack and other writers. On the whole, our most recent critics admit that early Christian tradition ought to be respected, and though the defenders of the general genuineness of the New Testament books encounter still strenuous opposition, as has been seen on the occasion of the publication of Zahn's *'Einleitung,'* they are no longer charged with lack of scientific method.

Syncretism.—There are critics who maintain that the striving to understand Jesus as the originating source of Christianity must prove abortive. They believe that "the most enlightened scholarship of Europe and America

has no standing before the bar of logic." The genesis of Christianity, we are told, "must be sought in the collective consciousness of the first Christian and immediately pre-Christian centuries; in the amalgamation of faiths when all the currents of philosophic and theosophic thought dashed together their waters in the vast basin of the Roman circummediterranean empire." But how can organic unity develop out of heterogeneity? How can concord develop out of discord and opposition? The material elements which compose the plant or the brute beast exist before either plant or beast begin to live; but who will imagine that a horse or a cow will be the result of the dashing together of their respective material elements? Moreover, Monsignor Batiffol (*Revue biblique*, January 1903) has shown that between 120 and 140 A.D. Marcion wrote a treatise proving that an opposition exists between the Law and the Gospel; at that early period, therefore, the Gospel was considered as possessing paramount authority. Again, Marcion appealed to Saint Paul in proof for the absolute newness and independence of Christianity. At Marcion's time, therefore, there existed a Canon of the New Testament books. And why should the faithful have esteemed the Gospels and the Pauline Epistles higher than the Epistles of an Ignatius, unless they were convinced that these canonical writings contained the exact teaching of the Master? The authority of Christ's word had preceded the authority of the canonical books.

What is Christ?—Higher critics distinguish between the Christ of history and the Christ of Christianity. Harnack, Wrede and Staerk may be said to simply rob Christianity of its Christ. Schmiedel, O. Holtzmann, Bousset and Schürer endeavor to link the Christ of history together with the Christ of Christianity, but their explanations are unsatisfactory. The Abbé Loisy, too, distinguishes a triple Christ; first, the views of Christ concerning himself; secondly, the faith of the early Christian community concerning Christ; thirdly, the Christology of the New Testament. And if you ask on what the faith of Christianity is based, if not on the facts of history, there will be as many different answers as there are writers. So that we rightly urge against our present-day higher critics the dilemma: Christ is either God, or what is He?

Bibliography.—A fairly complete list of the older literature belonging to this subject may be found in Reuss, 'History of the New Testament' (Vol. II, p. 367 f.); O. von Gebhardt adds to the preceding a fairly complete list of the pertinent literature down to about 1896 in his 'Urtext und Übersetzungen de Bibel,' which is a reprint of his articles on 'Bibel-text und Bibelübersetzungen,' contributed to the 'Realencyclopædie,' pp. 16, 54 ff. A reference to the contemporary literature may be found in the numbers of the *Ecclesiastical Review* under the heading "Recent Bible Study." Besides, the reader may consult Rose, 'Studies on the Gospels' (authorized English translation by Mgr. Robert Fraser, 1904); Lagrange, 'La Méthode Historique' (Paris 1904); Lagrange, 'Études sur les Religions Sémitiques' (Paris 1905); Chauvin, 'La Bible depuis ses Origines jusqu'à nos jours' (Paris 1903); Chauvin, 'L'Enfance du Christ d'après les Traditions Juives et Chrétiennes' (Paris 1904);

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NEW TESTAMENT THEOLOGY, that branch of theological science which has for its peculiar task to state, arrange and compare the theological doctrines and conceptions found in the New Testament. While it might be combined with Old Testament theology under the name Biblical theology, yet the differences in dates, language, style and contents between the Old Testament and the New are such that their respective theologies have usually been treated separately, although their methods are necessarily identical. It is also possible to state the doctrinal teachings and theological conceptions of any individual author and even those found in any single work of any author, and such contributions to Biblical theology have often proved exceedingly valuable; but the historic unity of the New Testament renders it practically important that the teachings and views of the various New Testament authors should be so presented and compared as to give but a single impression of the whole.

Character and Relations.—New Testament theology is strictly a historical science, neither attacking nor defending the conceptions which it finds, but merely stating, arranging and comparing them. As a historical science it is connected with Ecclesiastical History and might be considered the first volume of the History of Christian Doctrine. But it demands such a mastery of the results of the sciences of Isaagogs and Exegesis, on which it depends, that it is usually associated rather with interpretation, of which it might be reckoned the crown. It also presupposes and builds upon Old Testament history and the history of the world in New Testament times, and in its turn it provides much material for Dogmatics.

History.—The name Biblical Theology, which had earlier been employed to designate such a system of dogmatics as was based upon the Scriptures rather than upon either creeds or reason, was first used in its modern sense by Gabler in 1787, since which time the science in its application both to the Old Testament and the New has gradually developed. The first American work in the sphere of New Testament theology was published in 1870, and the first lectures in any American theological school are said to have been given in 1883. Since then it has received a steadily increasing amount of attention.

Difficulties.—The task of the New Testa-

ment theologian presents peculiar difficulties. It is impossible for him to increase the amount of the material with which he deals, however helpful for supplementing or verifying his conclusions such increase might be. All expression of thought is defective, and most of all is this true in theology, where upon words derived from the earthly and the human is laid the burden of declaring the heavenly and the divine. Further, the teachings to be considered come in a form due to ancient ages, tongues and conditions, and accordingly accurately and adequately to restate in modern form thoughts which have thus come down in ancient garb cannot be easy. Then, since with few exceptions the theological thoughts contained in the New Testament found expression solely for ends then immediately practical, it follows that the statements are often partial and incomplete, and the emphasis upon certain aspects of truth is only relative, and these statements must be read with constant reference to the thought of the age and the details of the local situation to which they belong. Hence only with difficulty can the incomplete expressions of practical religious thought be fitted together to reconstitute such systems of doctrine as may be credibly attributed to the various New Testament authors.

Grouping of the Books.—There is general agreement as to the grouping of the New Testament books according to the types of thought which they exemplify. The teaching of Jesus demands attention first, if not as a standard for the rest or as of superior authoritative-ness, as at any rate prior in time to the other New Testament teachings and as presupposed by them. The records of Christ's teaching are necessarily subdivided into the Synoptic and Johannine reports. The second group of documents represents the type of Christian thought which developed among Christians of Hebrew descent and consists of the first part of the book of Acts, the letters of James and Jude, the two letters of Peter (which, however, show that there had been a development considerably beyond the primitive conceptions current in the Church), and such traces of apostolic or other early doctrine as may be noted in the Gospels. In the Pauline section the Epistles attributed to this Apostle fall naturally into four groups, which differ in theme and matter as well as in date and style. If any of these letters should not be held to be Pauline in origin, they are yet so distinctly in harmony with Paul's views that this would not change their place in the general classification, while the Epistle to the Hebrews is a natural pendant to the writings of Paul. The fourth group of New Testament writings consists of the books attributed to the Apostle John, consisting of his letters, of so much of the Fourth Gospel as is not the teaching of Christ and of the Revelation.

Teaching of Jesus in the Synoptics.—In the Synoptic reports Jesus began his teaching by echoing the proclamation of his forerunner, John the Baptist: "The kingdom of heaven is at hand." While from the beginning of this preaching he seems to have recognized that he himself was to be the head of the promised kingdom, yet his own conception of the character and work of the Messiah was so different from the popular conception, so much loftier and purer, that he could not present

himself at once and unreservedly as the Coming King, for, had he immediately and unmistakably advanced his claim, political enthusiasm would have forestalled religious faith, and even on the part of true followers earthly ideals, expectations and plans would have obscured and neutralized heavenly, as, indeed, to some extent actually occurred in spite of caution and reserve. The name kingdom of heaven or of God, however, remained prominent throughout the teaching of Jesus, but in the latter part of it with an altered meaning. Convinced that he had nothing to hope from the leaders of the nation or the people whom they controlled for the kingdom of prophecy, which was intended to reach its spiritual ends through a local, national, political organization, Jesus necessarily substituted individual submission to the sovereignty of God, and retaining the name without the form, the kingdom which he strove to establish became in his teaching universal and spiritual.

While the state of individuals and society which he would establish thus took a new form in consequence of his rejection by his nation, the conditions of entrance, as well as the ultimate ends to be attained, remain unchanged. The first demand upon each and all is for repentance. As a morally transformed and thus fit nation should have met its King come at last, so only a soul turned from evil to good can receive the spiritual blessings which Jesus bestows. More and more clearly as antagonism gave renewed opportunity, Jesus denounced sin and demanded from all without exception penitence and reformation, although in serene consciousness of sinlessness he ever held himself apart from all confession of any evil on his own part.

With repentance as a reversal of moral tendency must come acceptance of himself as Supreme Master and absolute submission to him. His demand for self-denial is a demand for complete self-abjuration; his invitation, "Come unto Me," is not only an invitation, but no less the presentation of himself to the world as the one fountain of spiritual blessing; to receive him he says is to receive God himself, and personal service to him is regarded as proof of sins forgiven; devotion beyond all other loves is required, and so absolutely supreme is the relation of the soul to him that on confession or denial of him he makes the issues of the future life to hinge. This relation is made still more significant by the few but clear and emphatic teachings as to his death, by virtue of which as a ransom salvation would be rendered possible for men.

The fourth element in the teaching of Jesus which the Synoptists record relates to God. This teaching is almost never metaphysical, only religious and practical. The chief thought in it is God's love. This love, which exceeds that of any earthly father for his child, is shown in the rising of the sun on the evil and the good alike and the coming of the rain on both just and unjust, and in care for sparrows, ravens and lilies, and finds its crown of perfectness in kindness to the unworthy. The climax of this teaching appears in the parables about rescue of the lost, in the third of which, usually called the "Parable of the Prodigal Son," this tender love of God is so winningly presented that it has given a very common name

for the love of God, so that all Christ's teaching is said by many to be dominated by the thought of God's "Fatherhood," a view which should be so held as to include the other conceptions of Jesus as to God's special relation of fatherhood to believers and his unique fatherhood to Christ himself.

Teaching of Jesus According to John.—In the Gospel of John the teaching of Jesus is presented with a superficial dissimilarity at first sight striking, but in essential consistency with the Synoptic reports. As the place of the ministry reported is largely the city of Jerusalem instead of the open country of Galilee, as we have often hostile Pharisees for interlocutors instead of disciples for reverent auditors, so of the four chief elements of the Synoptic teaching, the Kingdom, Repentance and Faith, his own unique supremacy and the fatherly Love of God, the kingdom is scarcely mentioned, repentance is ignored and faith given a different aspect and the paternal kindness of God is much less emphasized, while Jesus insists even more upon his own pre-eminence and shows it in new lights.

The two foci of the teaching reported in the Fourth Gospel are, as might be expected from the author's own statement of his purpose as stated at the end of his writing, the deity of Christ and the duty of Faith. All the discourses in the Gospel are selected with a view to showing Christ's self-revelation to the world on the one hand and to his disciples on the other. While his Messiahship is not here emphasized, there is presented instead a conception of a sonship based on a unique unity with God, combined with hints of pre-existence, suggestions and implications of divinity and, finally, a welcome by Jesus to the assertion of his deity.

The proper relation on the part of his disciples, and, indeed, of all men, toward this personality who thus presents himself is not mere acceptance of statements about him and of truths relating to him, but further spiritual union with him by entering into relations to him, appropriation, in a word.

Judaic Teaching.—The earliest Apostolic teaching and the type of doctrine which seems long to have prevailed among the churches which were of Judaic origin and cast was only to a very slight degree dogmatic and brought on no enlarged or corrected doctrines touching the nature of God or the character of men. Indeed, no New Testament authors ever approach these themes as if intending to communicate fresh truth, but rather to confirm and apply truth already commonly apprehended. The chief thought of the primitive Church was the place and rank of Jesus, and here even the earliest teaching of the Apostles is developed in many respects beyond that of Jesus himself, a fact which is not surprising when it is remembered on the one hand that we cannot rightfully suppose that he exhausted the contents of his consciousness in even his frankest disclosures to his disciples, and on the other hand he himself promised that the guidance of the Spirit whom he would send from God would result in larger knowledge than his own instructions had brought. While the name of the kingdom is dropped at once and permanently out of use, at the same time the Messiahship of Jesus is asserted, and it is insisted

upon that by his coming forth from the tomb re-embodied, which was the resurrection to which his Apostles testified, his Messiahship and Lordship were fully confirmed. While it was constantly recognized that Jesus was no less man than other men, he was regarded as distinguished from other men, not only by his character of unique holiness, but also by his Messianic rank which gave him universal sovereignty and Lordship and, further, he was given the title Lord, which had been a familiar substitute for the most sacred of all the divine names. Theological discussions as to the nature, basis and conditions of salvation are not to be expected in such documents as represent Judaic Christianity, but it is plain that it was thought of as release alike from the consequences and the power of sin, provided, especially in the former aspect, by the death of Christ, and to be obtained by repentance.

Pauline Teaching.—The teachings of Paul are much fuller than those of the other Apostles, and in many places, owing to the doctrinal controversies which evoked them, they approach somewhat closely to dogmatic form, while such was the diversity of the occasions out of which the letters arose and of the situations of their first readers, that they cover nearly the whole field of Christian thought. Paul's conceptions of the nature and attributes of God, of his sovereignty and his love, and of the ruined condition of sinful men, while frequently brought out with great distinctness, were in no sense peculiar to himself. His special topics are, besides the rank of Christ, his saving work, the duty of man in relation to it and the activity of the Holy Spirit in completing it. While Paul implies a general knowledge of the life and teachings of Jesus, he looked to Christ as far transcending in nature and rank what might be inferred from these facts. In Paul's mind the unique fact of the resurrection of Jesus at once certified to his unique nature and relation to God and opened to him the way to supreme exaltation and universal dominion which would become fully his when he should return in glory to earth. He shared the divine essence; in his activities before his birth of a woman he created the universe and continues to uphold it, and to him worship is rightfully paid. The life and especially the death of Jesus were a part of the divine plan for the rescue of men from the state into which their sin had brought them. The death of Christ was clearly set forth by Paul as provided in the love of God as a basis indispensably prerequisite for the favorable treatment which he gives to every penitent: the blood of Christ was to Paul the ransom and propitiation by virtue of which redemption and reconciliation are secured for men. Paul was led by controversy to insist with peculiar urgency that Divine forgiveness and favor are conditioned on faith alone, that is, that salvation does not primarily depend on the behavior of a man, but on his acceptance of God's gracious gift, but while faith alone is the condition of entrance on the Christian's state, yet the Christian life in its ideal involves nothing less than the perfect performance of every duty and this ideal is practically attained only by the aid and power of the Holy Spirit, whom he regards as possessing personal, divine

attributes, who is imparted to every believer and permanently dwells in him.

Teaching of the Epistle to the Hebrews.—

The letter to the Hebrews makes no contribution of special novelty to the theology of the New Testament. While somewhat unlike the thought of Paul in that it presents the Mosaic system as helpful preparatory to Christianity which supersedes it, the views which it presents of the transcendent rank and sacrificial death of Christ are in fullest harmony with Paul's. That Christ is a "high priest," that is, a representative of men before God, and that faith is an unyielding grasp on the invisible, are thoughts which are peculiar to the author of this Epistle.

Johannine Teaching.—The teachings of John relate themselves proportionally more to God himself than those of any other New Testament teacher, but his conceptions of the deity, like theirs, are mainly dynamic and ethical, rather than metaphysical. His thought seems to sum itself up in three words, life, light and love, which suggest that God is the constant source of all power and joy; that he is spotlessly holy and tends unceasingly to manifest himself as such in and to his universe, and that his most central, essential and characteristic attribute is kindness and beneficence, unceasing and all-embracing. In the teaching of John the eternal Logos, or expression of God, became incarnate in Jesus, and thus presents God to men; and in turn by his death he became the "propitiation" in virtue of which forgiveness is promised on condition of penitence and confession. The privilege and duty of Christians is fellowship with God, that is, by refraining from all sin to share his spotless holiness.

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NEW THEOLOGY, a term which has come into general use since 1875 to designate a movement inaugurated by the faculty of Andover Theological Seminary and of which the principles were set forth in 'Progressive Orthodoxy' (1886). At present the term has acquired a wider and deeper significance, comprising that body of theological thought which seeks to embody in divinity the accepted results of modern philosophical thought and more especially seeks to co-ordinate the evolutionary theory with theological interpretation. The new theology, therefore, accepts evolution both in spiritual and material things, applies the methods of the higher criticism to the Bible, of which it rejects a verbal inspiration. Dogma cedes its place to ethics and sociological study and the miraculous is minimized or excluded altogether. The movement is general throughout Christendom, but there is much difference between its advocates and in general it might

rather be termed a tendency of theological thought rather than a school with fixed and avowed principles. Consult Campbell, R. J., 'The New Theology' (London and New York 1908).

NEW-THOUGHT, an idealistic or metaphysical movement in the United States, a direct successor of New England transcendentalism, but much more practical and democratic. The older idealisms were seclusive, but this one is preached and practised on the high-roads and carried into the minutiae of daily life, often assuming the forms of religion and philosophy. It boasts of being the greatest healer the world has yet seen and scorns the idea of being mere speculation. It is claimed that New-Thought will not create any new religion or creed and that it will not formulate any new system of metaphysics. As regards religions, it is said by the representatives of New-Thought, that they are not desirable, because they are based on will, not on thought, and because they demand obedience. As regards metaphysics, no system is wanted because life and thought cannot be confined in a system. The world needs illumination and freedom, not limitation.

The first apostles of New-Thought were P. P. Quimby of Portland, Me., Dr. W. F. Evans and their immediate disciples. The first preached it orally, the other by the pen. None of these, however, are its parents in any sense, nor are they quoted as authorities by any present-day followers or teachers. New-Thought is the modern expression of an inherent self-affirmation of the soul as old as the soul itself. New-Thought self-affirmation is intensely individualistic and has found its philosophy in Emerson's 'Self-reliance.' In the Emersonian extreme and in Tennyson's

"Self-reverence, self-knowledge, self-control,
These three alone lead life to sovereign power."

Ænone.

may be found its first principles. New-Thought people, however, identify the self with the "Oversoul" and commonly prefer to quote the Biblical "*I am* (that I am)" as their motto and foundation. The revealed secrets of the "*I am*" are to be read upon every page of their hundred and one serial publications. These "revelations" resound with mystic refrains of the Oriental *tat twam asi*, "That (namely the 'Universal Self') art Thou!" and they run into the high notes of Promethean self-deification and rebellion. "The Song of the Soul Victorious" is of freedom, of our being centres; of concentration and self-assertion, human divinity, ideal suggestion, the souls' prerogative to rule and of "vibrations" which are the redemptive forces of existence. In strong contrast and as a jarring note in this solemn and highflowing song one reads immediately afterward that the publisher does healing, "absent treatment, a specialty," at so much or so much per contract, if the reader promptly forwards the money.

New-Thought ontology teaches "oneness of life," that "all life is one," but the student searches in vain for any scholastic definition of these axiomatic teachings as also for the theological dogma "God is omniscient, omnipotent and omnipresent." This last, the omnipresence of God, is taught to the exclusion of all other attributes. The bearing of these two doctrines

leaves, however, no doubt about their being inherently pantheistic in character, and implying a pantheism in the direction of the Hegelian pan-logism. To New-Thought life, God and all other categorical terms are swallowed up by Mind or "the limitless self." New-Thought epistemology is in harmony therewith: "all knowledge is one," it declares with much force, but without argument, the popular understanding being that human knowledge is one with divine knowledge.

New-Thought is often confounded with Christian Science, but their difference can clearly be seen by their cosmology. The latter holds the Oriental doctrine that the world and its things are illusory, products of "the mortal mind," but New-Thought asserts the reality of the world and considers it an expression of God, the two being related as cause and effect. The central doctrines of New-Thought lie in psychology. They consist in asserting the supremacy of mind over all other energies and in identifying it with the perennial stream of energy which permeates existence at large. Our mind is identical with the supreme mind, it makes us what we are and creates our conditions and environment; by inherent love it overcomes all hatred, malice and sickness; by inherent law it establishes itself as the world's law and by inherent order it rules everywhere. It keeps itself alive in love, law and order by constant affirmation of itself: "I am, that I am!" In ethics, the New-Thought is of a decided optimistic tendency. Its program is the Emersonian "don't bark against the bad, but chant the beauties of the good." Evil is not real, but only an imperfection which illumination dissolves. New-Thought is not iconoclastic, but fulfils the ends of creation in "peace and good will." If others do not know Reality and only worship "an unknown God," New-Thought people do not think it right to use violence or even persuasion; growth and experience will bring truth.

New-Thought is intensely practical. It professes to heal sickness and to remove the sting of death. Sickness is error and is cured by right and wholesome thinking, and death is but a transition, a "passing out" into another condition. If we always stood fast in right thinking we should never die, but simply transform ourselves.

New-Thought "circles of healing" are very common. They are found in every State in the Union, and in most cities followers of the cult can be found. It is estimated they exist by the million. The cult and its teachings have spread to Australia, Canada, England and many places on the Continent, especially France and Germany. The circles are not churches, but "bethels" or "houses of thought" for instruction and meditations. Services on Sunday often begin with the singing of "Omnipresence, Omnipresence, Omnipresence, manifest Thyself in me!" by a few minutes of meditation for the concentration of mind before the discourse is given. Speakers are chosen without regard to creed or race, etc. Their main qualification lies in their experience of oneness with the Great All. At the circles, rooms are set apart for daily noon-hour meditation. In the rooms are also private classes for instruction, etc. The circles are maintained by voluntary contributions, but

no teachers, excepting private class teachers, are paid.

New-Thought healers are many, but New-Thought teachers are many more. Experience has shown that no man or woman can heal for more than a very limited period of their lives. When they can heal no more, they teach others the method. The methods of healing run through the whole scale of impressing the "new" thought by suggestion, hypnotism, faith or simple rationality. Healing is done also by "absent treatment" or telepathy.

A New-Thought convention was held in Chicago, 17-20 Nov. 1903, attended by many thousands. The following "progressive" declaration of principles was adopted:

1. The New-Thought is the new interpretation of universal and eternal Truth.
2. God — Universal Spirit, Mind, Principle — is omnipresent, omniscient and omnipotent.
3. Man is the individual expression of God, possessing inherently and capable of manifesting all the aspects of God.
4. Man unfolds to a continuously expanding consciousness and manifestation of these aspects, through right thinking and right living.
5. The consciousness of harmony is Heaven, here and now; in the realization of which abide peace of mind and health of body.
6. The essentials of the New-Thought are suggested by the words — Unity, Co-operation, Freedom, Brotherhood and Individuality.

Since then many attempts have been made upon forming a bond tying the various societies together. Many still stand apart, but *The International New-Thought Alliance*, with James A. Idgerton as president, has been formed and its purpose, as published in *The Nautilus* of November 1915, is as follows: "To teach the Infinitude of the Supreme One; the Divinity of Man and his Infinite Possibilities through the creative power of constructive thinking, and obedience to the voice of the Indwelling Presence, which is our source of Inspiration, Power, Health and Prosperity."

C. H. A. BJERREGAARD.

NEW ULM, Minn., city, county-seat of Brown County, on the Minnesota River, and on the Minneapolis and Saint Louis and the Chicago and Northwestern railroads, about 80 miles in direct line west by south of Saint Paul and 25 miles west by north of Mankato. It was settled in 1854 by a German land company, incorporated in 1870 and chartered as a city in 1876. It was the scene of an Indian massacre in 1862. A monument has been erected to the memory of those who fell in the massacre. It is in a productive agricultural region in which there is considerable attention given to stock-raising. Its chief industrial establishments are flour-mills, breweries, cigar factories, a creamery, a cooperage, machine-shops, a pottery, green-houses, organ works, electric appliance works, shirt factories, brick and lumber yards and grain elevators. It has an extensive trade in farm products and livestock. There are several churches, and the educational institutions are public and parish schools, Dr. Martin Luther College, Saint Michael's Academy, a public school library and the Turnverein Library. The banks have a combined capital of over \$200,000, and the annual business exceeds \$15,000,000. The government, under a revised charter of 1891, is vested in a mayor, who holds office two years, and a council. The electric-light plant and the waterworks are owned and

operated by the city. The majority of the inhabitants are German or of German descent. Pop. (1920) 6,745.

NEW WAY TO PAY OLD DEBTS, A.

— Though he wrote one play that has lasted to succeeding times, Massinger was not a dramatist of first rank. Coming to London 20 years after Shakespeare, he fell into the confusion of influences of the most tangled period of English theatrical history. Of these the chief was always that of Shakespeare. But this was subjected to the heavy pressure of Ben Jonson, a dramatist who had better repute for some years after Shakespeare's death than Shakespeare himself. 'A New Way to Pay Old Debts' is the best regarded of Massinger's plays. The theme of the knave outwitted is one which Jonson might have used himself; it has indeed some points of similarity to Middleton's 'A Trick to Catch an Old One.' The characters are the well-known Platine types, snobs, sycophants, cheaters, usurers and gluttons. Instead of incorporating this as would Jonson in a form of railing and ridicule, Massinger adapts himself to the school of Shakespeare as modified by Fletcher. Judged by itself, the style is excellent. It is lucid, flowing, eloquent. The construction is simple and well-fashioned. This does not disguise the fact that the method does not fit the theme. Of psychology there is none. The characters are symbols of mental traits handled to an arbitrary moral conclusion.

The play lives in memory for one of the chief acting characters of the old drama, the figure of the usurer, Sir Giles Overreach. Like Barabas in 'The Jew of Malta,' Sir Giles is a double-dyed villain, who sets no limits to his avarice, treachery and blood-lust. The author permits him to escape due retribution, if such were possible, by going mad after a fashion dear to the hearts of play-goers of the day. This part is said to have been modeled upon life. All the other characters are profiles only.

'A New Way' was produced about 1625; it was published seven years later. Garrick revived the play in 1748, though he did not play Sir Giles. The rôle was played by Edmund Kean in 1827. The play has been at least twice translated into German.

THOMAS H. DICKINSON.

NEW WESTMINSTER, Canada, city in the province of British Columbia, situated on the north bank of the Fraser River about 16 miles from its mouth in the Gulf of Georgia, on the line of the Canadian Pacific Railway, Canadian Northern and the Great Northern Railway, of which it is the northern terminus, 12 miles from Vancouver and 75 miles from Victoria on the island of Vancouver. It is connected with Vancouver and surrounding district by an electric railway. The climate is mild and pleasant. The Fraser River Bridge connects the city with United States lines by way of the Great Northern Railway and with the south bank of the Fraser and its farming, poultry-raising, fruit and vegetable interests. The chief industries are lumbering, the salmon fisheries and their 40 canneries up the Fraser, oatmeal and woolen mills, machinery and boiler shops, foundry, furniture factory, fruit canning factory, cold storage works, carriage works, creameries, shingle mills and car shops. The steamers ply up and down the river. There is deep

water (30 to 40 feet) all the way and large ships are loaded at the mills with lumber for all parts of the world. There is an Anglican and a Roman Catholic cathedral, and the educational facilities include Columbia College. There is a free library. The electric-light, water and street railway systems are municipally owned. The city was founded in 1859 by Colonel Moody, and was the first capital of the colony of British Columbia, with the early designation of Queenborough. In 1860 municipal government was established. In 1873 New Westminster was incorporated as a city. There was a widely destructive fire in September 1898. Pop. about 20,000.

NEW YEAR'S DAY. The observance of the first day of the year is of very ancient origin. The Romans on this day were accustomed to exchange greetings and make presents. New Year's under the Cæsars was a great source of profit to the emperor and quite burdensome to his subjects. The Church at first prohibited Christians from having anything to do with it, but at last made the day a Christian festival, the Feast of the Circumcision. The Julian or Old Style Calendar was abandoned in favor of the Gregorian or New Style Calendar in 1582 in Catholic countries; but it was not until 1752 that the change was made in Great Britain. In Persia the year is supposed to begin on 21 March, and the day is one of universal rejoicing. In Japan the new year is a season of much festivity and innocent mirth. Every portal is decorated, and each object of which the decoration is composed has a symbolic meaning. The usual form of the decoration is a green arch. Among the Chinese the day is the greatest festival of the year, and in France, French Canada and Scotland it is observed more than Christmas. The custom of bringing in the New Year is the occasion of much festivity in Germany and Scotland. A custom similar to that of making New Year's calls is the sending of cards to one's friends on the day. After the restoration of the Bourbons it became fashionable in Paris to send bonbons on New Year's day, and in 1822 a thousand tons of them were sold in the two days preceding the festival.

The day was more or less observed among the American Indian tribes. The Moqui celebration, called So-yal-u-na, is largely a presentation of a singular and elaborate mythic drama, divided into two parts, in which offerings are made to effigies of the great plume-headed serpent, the enemy of the sun, followed by a sun dance, in which the conflict between the sun and the inferior hostile gods is admirably portrayed by Moqui men personifying the various deities.

In the United States it has always been the custom of the Presidents to receive on New Year's day. In 1790, when New York was the seat of government, Washington held a reception between the hours of 12 and 3 and was visited by all the home and foreign dignitaries. He expressed the hope on that occasion that whatever change might take place in the manners and customs of the city, the observance of New Year's day might never be given up. In New York and other cities there are watch-night and services in many churches and receptions in many clubs and drawing-rooms. The

formal custom of receiving New Year's calls has nearly become obsolete in our larger cities, it having been superseded by the regular afternoon and informal evening receptions, to which gentlemen take more kindly than to the old-fashioned New Year's party. The good old Knickerbocker custom is still maintained by some families. Some give formal dinners, and in the country carriage loads not infrequently go round from house to house making merry calls, picking up additions to the party and finally ending with supper at some hospitable house and in an evening with games, refreshed by apples, roast chestnuts, plum cake and sweet cider. The day was not observed in Colonial times with the formality which has marked its observation in later years. After the colonies had adjusted business affairs to the new date, the first of January grew in importance and in course of time became a legal holiday. (See CALENDAR). Consult Chamber's 'Book of Days.'

NEW YORK (the "Empire State"), a State in the northeastern part of the United States, lying between lat. $40^{\circ} 30'$ and $45^{\circ} 1' N.$ and long. $71^{\circ} 50'$ and $79^{\circ} 46' W.$; bounded on the north by Lake Ontario, Saint Lawrence River and Canada; on the east by Vermont, Massachusetts and Connecticut; on the south by the Atlantic Ocean, New Jersey and Pennsylvania; on the west by Pennsylvania, Lake Erie and the Niagara River. Lake Ontario is west of the northern part of the State and New Jersey is west of the southern part of the State. Lake Champlain is on the boundary between New York and Vermont. The extreme length of the State from north to south is 312 miles; and from east to west 326 miles, or 412 miles including Long Island. The area is 49,170 square miles, of which 1,550 square miles are water surface. The State contains 30,476,800 acres of land, of which in 1910 22,030,367, a decrease from 1900, were in farms. It ranks in area the 26th among the States of the Union.

Topography.—About one-half the boundary of the State, exclusive of Long Island, is water. The chief inlet is New York Bay. Long Island, southeast of the mainland of the State is separated from New Jersey by Staten Island Sound; Staten Island, southwest of the mainland, is separated from New Jersey by Staten Island Sound, Arthur Kill and Newark Bay. Both these islands have inlets along the coast, some of which are good harbors. Along the shores of Lake Champlain and Lake Ontario there are a number of small inlets. In the Saint Lawrence River, where it leaves Lake Ontario, are numerous islands, many of them well wooded and beautiful. The group is called "The Thousand Islands." These islands are favorite summer resorts. Long Island on the south is a part of the coastal plain; the greater part low; the highest elevation is 382 feet. The eastern part of the State is mountainous, the ranges extending generally northeast and southwest. The central and western parts of the State are rolling or level land. The mountains belong to the Appalachian system. In the northeastern part of the State are the Adirondacks. Mount Marcy, the highest elevation in the State, 5,344 feet, is a peak of the Adirondacks. There are several peaks from 2,000 to 4,000 feet. These mountains

are covered with forests, largely pine. The Adirondacks extend along Lake Champlain south of the valley of the Mohawk and west nearly to Lake Ontario. They are noted summer and health resorts; more people visit the Adirondacks annually for health or pleasure than any other outing place in the country. These mountains toward the south become ranges of hills which slope to the Mohawk in the east and to the lake shore plain on the west. South of the Mohawk Valley the land again rises to what is known as Catskill Mountains. Some of the peaks amid the Catskills are fully 3,000 feet high. Slide Mountain, the highest peak, is 4,205 feet above the sea. The Shawangunk Mountains, more a plateau, are south of the Catskills. The highest part of the plateau is in the west back from the Hudson from 1,000 to 2,000 feet. On the southeast and north is a limestone escarpment, Helderberg Mountain, which in some places attains a height of several hundred feet. In the western part of the State and parallel with Lake Ontario are two well-defined terraces each about 200 feet in height. The Lower Terrace, called Lake Ridge, extends from the Genesee River to the Niagara, and is from three to eight miles distant from Lake Ontario. This Lake Ridge marked at one time the southern shore of Lake Ontario, when the outlet of the lake was by way of the Mohawk Valley. The Upper Terrace, called Mountain Ridge, is about 30 miles inland, and extends east and west almost parallel with Lake Ridge. The highest part of the plain or plateau portion of the State is in Otsego County, where it attains the altitude of 2,300 feet. "Rock City," Allegany County, upon a summit 1,400 feet above the surrounding valleys, consists of a tract of 40 acres covered with rocks broken into layers forming streets and alleys.

Hydrography.—The waters of all the rivers of the State finally enter the Atlantic Ocean. They reach the ocean by way of the Saint Lawrence, Hudson, Susquehanna, Delaware and Mississippi rivers. The great valleys of the State are the Hudson and Mohawk valleys, which divide the State into three sections, one east of the Hudson and south of Lake Champlain, one in the northern part of the State, almost surrounded by water; Lake Champlain and the Hudson on the east, the Mohawk and Oswego rivers on the south and southwest and Lake Ontario and the Saint Lawrence River on the west and north. The remaining section embraces the central and western parts of the State. The main stream lying wholly within the State is the Hudson River (q.v.), which with its tributaries, the largest being the Mohawk (q.v.), has been a great aid in the development of the commerce of the State. Through the Mohawk Valley the Erie Canal extends, and beyond to the Great Lakes, thus making a continuous waterway from the ocean north to the Mohawk and thence west across the State. The northern part of the State is drained by rivers which flow direct to the Saint Lawrence. The largest are the Black, Oswegatchie, Grasse, Racquette, Saint Regis and Salmon. The Saranac enters the Saint Lawrence through Lake Champlain, and the Genesee and Oswego through Lake Ontario. The Susquehanna has its head waters in Otsego County, and the source of the Delaware is southeast of Otsego Lake. The Allegheny River, in the

NEW YORK

Adams, (H3)..... 1,557	Briarcliff Manor, (C1)..... 1,027	Colton, (L1)..... 700	Florida, (B1)..... 560	Hoosick Falls, (O5) 4,896
Adams Center, (J3) 650	Bridgehampton, (G2)..... 1,500	Conesus, (E5)..... 500	Fonda, (M5)..... 1,208	Hornell, (E6)..... 15,025
Addison, (F6)..... 1,699	Brighton, (E4)..... 1,000	Conesville, (M6)..... 730	Forestville, (B6)..... 620	Horseheads, (G6) 2,078
Afton, (J6)..... 782	Broadalbin, (M4)..... 800	Congers, (C1)..... 700	Forks, (C5)..... 3,300	Hudson, (N6)..... 11,745
Akron, (C5)..... 1,960	Brookport, (E4) 2,980	Connelly, (N7)..... 800	Ft. Covington, (M1) 836	Hudson Falls, (N4) 5,761
ALBANY, (N5) 113,344	Brocton, (B6)..... 1,383	Cooperstown, (L5) 2,725	Ft. Edward, (N4) 3,871	Hughsonville, (N7) 680
Albion, (D4)..... 4,683	Bronxville, (C2) 3,055	Copenhagen, (J3) 754	Ft. Hunter, (M5) 700	Hunter, (M6)..... 683
Alburg, (L1)..... 360	Brooklyn, (C2) 2,018,356	Corinth, (N4)..... 2,576	Ft. Johnson, (M5) 680	Huntington, (D2) 5,000
Alden, (C5)..... 755	Brownville, (J2) 967	Corning, (F6)..... 15,820	Ft. Plain, (L5)..... 2,747	Hurleyville, (L7) 700
Alexandria Bay, (J2) 1,649	Brushton, (M1)..... 660	Cornwall, (C1)..... 1,755	Frankfort, (K4)..... 4,198	Hyde Park, (N7)..... 700
Alfred, (E6)..... 598	Buffalo, (C5)..... 506,775	Cornwall-on-the-Hudson, (C1) 2,240	Franklinville, (D6) 2,015	Iilon, (K4)..... 10,169
Allegheny, (D6) 1,350	Cadosia, (K7)..... 500	Cortland, (H5)..... 13,294	Fredonia, (B6)..... 6,051	Interlaken, (G5)..... 633
Allenstown, (D6) 660	Cairo, (N6)..... 800	Coxsackie, (N6)..... 2,121	Freeport, (D2)..... 8,599	Inwood, (C2)..... 2,000
Almond, (E6)..... 680	Caldwell, (N4) 650	Creek Locks, (M7) 500	Frewsburg, (B6)..... 800	Irvington, (C1)..... 2,701
Altamont, (M5)..... 797	Caledonia, (E5) 1,170	Croghan, (K3)..... 646	Friendship, (D6) 1,026	Islip, (E2)..... 2,300
Altona, (N1)..... 500	Callicoon, (K7) 800	Croton-on-Hudson, (C1) 2,286	Fulton, (H4)..... 13,043	Ithaca, (G6)..... 2,304
Amagansett, (G2) 600	Cambridge, (O4) 1,559	Crown Point, (O3) 900	Fultonville, (M5) 869	Jamestown, (B6) 38,917
Amenia, (N7)..... 1,200	Camden, (J4) 1,941	Cuba, (D6)..... 1,611	Garden City, (D2) 2,420	Jameville, (H5)..... 500
Amityville, (D2) 3,265	Cameron, (F6)..... 500	Cutchogue, (F1) 850	Gardenville, (C5) 700	Jefferson, (L6)..... 550
Amsterdam, (M5) 33,524	Canarus, (H4) 808	Dalton, (E5)..... 530	Garnerville, (C1) 1,309	Johnson City, (J6) 8,587
Andover, (E6)..... 1,132	Campbell, (F6) 500	Dannemora, (N1) 2,623	Garrison, (C1)..... 500	Johnsonville, (O5) 515
Angelica, (D6)..... 972	Canajoharie, (L5) 2,415	Dansville, (E5) 4,631	Geneseo, (E5)..... 2,157	Johnstown, (M4) 10,908
Angola, (B5)..... 1,367	Canandaigua, (F5) 3,356	Dayton, (C6)..... 500	Geneva, (F5)..... 14,648	Jordan, (H4)..... 1,012
Antwerp, (J2)..... 1,012	Canaseraga, (E6) 651	Deerfield, (K4) 760	Georgetown, (J5) 900	Katonah, (D1)..... 1,500
Apalachin, (H6) 400	Canastota, (J4) 3,995	Deeriet, (J2)..... 800	Germantown, (N6) 800	Kesville, (N1)..... 1,524
Aquebogue, (F2) 320	Candor, (H6)..... 699	Delevan, (C6)..... 547	Getzville, (C4)..... 500	Kenmore, (C5)..... 3,160
Arche, (D5)..... 1,609	Canisteo, (E6) 2,201	Delhi, (L6)..... 1,669	Glascow, (N6)..... 1,603	Kennedy, (B6)..... 600
Ardsley, (C1)..... 730	Canton, (K1)..... 2,631	Demster, (H3)..... 509	Glen Cove, (D2) 8,664	Kerwood, (J4)..... 600
Arkport, (E6)..... 463	Cape Vincent, (H2) 913	Depew, (C5)..... 5,850	Glenham, (N7)..... 800	Kerhonkson, (M7) 550
Arkville, (E6)..... 430	Capron, (K4)..... 600	Deposit, (K6)..... 1,943	Glenpark, (J3)..... 661	Kinderhook, (N6) 722
Arlington, (N7) 750	Carmel, (D1)..... 800	De Ruyter, (J5) 519	Glen Falls, (N4) 16,638	Kings Park, (D2) 700
Ashland, (M6)..... 400	Carthage, (J3) 4,320	Dexter, (H2)..... 1,164	Gloversville, (M4) 22,075	Kingston, (N7) 26,688
Ashville, (B6)..... 1,844	Castile, (D5)..... 1,013	Dobbs Ferry, (C1) 4,401	Goshen, (B1)..... 2,843	Lackawanna, (C5) 17,918
Athens, (N6)..... 550	Castleton, (N5) 1,595	Dolgeville, (L4) 3,448	Gouverneur, (K2) 4,143	Lake George, (N4) 630
Atlanta, (F5)..... 2,015	Catskill, (N6) 4,728	Dover Plains, (N7) 800	Gowanda, (C6)..... 2,673	Lake Katrine, (N7) 500
Attica, (D5)..... 36,192	Cattaraugus, (C6) 1,347	Downsville, (L6) 550	Grafton, (O5)..... 500	Lake Placid, (N2) 2,009
Auburn, (G5)..... 36,192	Cazenovia, (J5) 1,683	Dundee, (G5)..... 1,143	Granville, (O4) 3,024	Lakeview, (C5)..... 500
Ausable Chasm, (O1) 500	Cedarhurst, (C2) 2,838	Dunkirk, (B6) 19,336	Grassy Point, (C1) 700	Lakewood, (B6)..... 714
Ausable Forks, (N2) 1,500	Celoron, (B6)..... 757	Durhamville, (J4) 800	Greene, (J6)..... 1,297	Lancaster, (C5) 6,059
Averillpark, (N5) 450	Cementon, (N6) 600	Eagle Mills, (N5) 500	Green Island, (N5) 4,411	Larchmont, (C2) 2,468
Avoca, (F6)..... 1,019	Center Moriches, (E2) 1,100	Earlville, (J5)..... 792	Greenport, (F1) 3,122	La Salle, (C4) 3,813
Avon, (E5)..... 2,585	Centerport, (D2) 490	E. Aurora, (C5) 3,703	Greenwich, (O4) 2,384	Lawrence, (C2)..... 2,861
Awosting, (M7) 500	Central Bridge, (M5) 400	E. Hampton, (G2) 2,100	Greenwood, (E6) 500	Lebanon Spgs., (O6) 550
Babylon, (D2) 2,523	Central Islip, (E2) 550	E. Islip, (E2)..... 1,300	Groton, (H5)..... 2,235	Le Roy, (D5)..... 4,203
Bainbridge, (J6) 1,259	Central Park, (D2) 530	E. Kingston, (N7) 509	Hagamon, (M5) 855	Levant, (B6)..... 723
Baldwin, (D2) 3,000	Central Valley, (C1) 800	E. Moriches, (E2) 850	Halesite, (D2)..... 1,000	Lewiston, (B4)..... 700
Baldwinsville, (H4) 3,685	Champlain, (O1) 1,140	E. Norwiche, (D2) 500	Hamburg, (C5) 3,185	Liberty, (L7)..... 2,559
Ballston Spa, (N4) 4,103	Chappaqua, (C1) 900	E. Pembroke, (D5) 500	Hamilton, (J5) 1,505	Lima, (E5)..... 843
Bangor, (M1)..... 600	Charlotte, (E4) 2,302	E. Randolph, (C6) 544	Hammondsport, (F6) 1,060	Lincoln Park, (E4) 900
Batavia, (D5) 13,541	Chateaugay, (M1) 1,291	E. Rochester, (E4) 3,901	Hampton, (O3) 680	Linden Park, (D2) 1,800
Bath, (F6)..... 4,795	Chatham, (N6) 2,710	E. Rockaway, (C2) 2,005	Hampton Bays, (F2) 1,000	Little Falls, (L4) 13,029
Bayport, (E2)..... 740	Chaumont, (H2) 595	E. Setauket, (E2) 690	Hancock, (K7) 1,326	Little Valley, (C6) 1,253
Bay Shore, (E2) 3,400	Chautauque, (B6) 500	E. Syracuse, (H4) 4,106	Harford, (H6)..... 680	Liverpool, (H4) 1,831
Bayville, (D2) 500	Chazy, (O1)..... 700	Eastwood, (H4) 2,194	Harriman, (C1) 680	Livingston Manor, (L7) 1,000
Beacon, (C1) 10,996	Chenango Forks, (J6) 500	E. Worcester, (L5) 503	Harrison, (D2) 1,500	Livonia, (E5)..... 743
Beaver Dams, (G6) 500	Cherry Creek, (B6) 527	Eaton, (J5)..... 1,200	Harrisville, (K2) 900	Lockport, (C4) 21,308
Beaver Falls, (K3) 800	Cherry Valley, (L5) 728	Ebenezer, (C5) 500	Hartford, (O4) 700	Long Eddy, (K7) 700
Bedford Hills, (D1) 600	Chester, (B1) 1,049	Eddyville, (M7) 600	Hartsdale, (C1) 700	Loudonville, (N5) 500
Belfast, (D6)..... 900	Chichester, (M6) 600	Eden, (C5)..... 700	Hartwick, (K5) 600	Lowville, (J3) 3,127
Bellmore, (D2)..... 600	Chittenango, (J4) 650	Edmeston, (K5) 800	Hastings upon Hud-son, (C2) 5,526	Luzerne, (N4) 900
Bellport, (E2)..... 614	Churchville, (E4) 513	Edwards, (K2) 577	Haverstraw, (C1) 5,226	Lynbrook, (D2) 4,371
Belmont, (D6) 1,021	Cincinnati, (J5) 750	Elizabethtown, (N2) 518	Hempstead, (D2) 6,382	Lynbrook, (D2) 4,371
Benson Mines, (L2) 900	Clarence, (C5)..... 500	Ellenburg, (N1) 500	Herkimer, (L4) 10,453	Lyons Falls, (K3) 818
Bergen, (E4)..... 576	Clark Mills, (K4) 600	Ellenville, (M7) 3,116	Herkimer, (L4) 10,453	Lyons Falls, (K3) 818
Berkshire, (H6) 500	Clayton, (H2) 1,849	Ellicottville, (C6) 950	Heron, (K2)..... 622	McGraw, (H5) 1,032
Berlin, (O5)..... 700	Clayville, (K5) 999	Elmira, (G6) 45,393	Heuvelton, (K1) 559	Macedon, (F4) 526
Big Flats, (G6) 700	Cleveland, (J4) 541	Elmira Hgts., (G6) 4,188	Hewlett, (D2) 510	Machias, (C6) 600
Binghamton, (J6) 66,800	Clifton Springs, (F5) 1,628	Elmsford, (C1) 1,535	Hicksville, (D2) 3,000	Madalin, (N6) 600
Black River, (J3) 937	Clinton, (K4) 1,270	Emerick, (N5)..... 500	High Falls, (M7) 700	Madrid, (K1)..... 920
Blisdell, (C5) 1,401	Clintondale, (M7) 500	Endicott, (H6) 9,500	Highland, (N7) 2,000	Malone, (M1) 7,556
Bloomingburg, (M7) 500	Clyde, (G4)..... 2,528	Ephratah, (L4) 500	Highland Falls, (C1) 2,588	Mamaroneck, (C2) 6,271
Bloomingdale, (M2) 490	Cobleskill, (M5) 2,410	Essex, (O2)..... 500	Highland Mills, (C1) 500	Manchester, (F5) 1,418
Blue Point, (E2) 500	Coeymans, (N6) 1,000	Fair Haven, (G4) 552	Hillburn, (C1) 1,112	Manhasset, (D2) 1,050
Bolivar, (D6) 1,146	Cohocton, (F5) 843	Fairport, (F4) 4,626	Hilldale, (N6) 500	Manlius, (J4) 1,296
Boonville, (K4) 1,914	Cohoes, (N5) 22,987	Falconer, (B6) 2,742	Hilton, (E4)..... 827	Manorville, (E2) 550
Boston, (C5)..... 500	Colden, (C5)..... 900	Farmingdale, (D2) 2,091	Hinckley, (K4) 600	Marathon, (H6) 565
Brasher Falls, (L1) 600	Cold Spring, (C1) 1,433	Farnham, (B5)..... 516	Hobart, (L6)..... 587	Marcellus, (H5) 989
Breesport, (G6) 500	Cold Spring Harbor, (D2) 970	Fayetteville, (J4) 1,584	Holland, (C5)..... 700	Margaretville, (L6) 650
Brentwood, (E2) 800		Fleischmanns, (L6) 525	Holland Patent, (K4) 328	Marion, (F4)..... 800
Brewerton, (H4) 630		Floral Park, (D2) 2,097	Holley, (D4)..... 1,625	Marlboro, (N7) 807
Brewster, (D1) 859			Homer, (H5)..... 2,356	Massena, (L1) 5,993
			Honeoye Falls, (E5) 1,107	Matteawan, (M7) 6,272





NEW YORK - Cont'd.

Mattituck, (F2) . . . 1,200	Ocean Side, (D2) . . . 500	Randolph, (C6) . . . 1,310	Sidney Center, (K6) 400	Valhalla, (C1) . . . 600
Mayfield, (M4) . . . 592	Ogdensburg, (K1) 14,609	Ransomville, (C4) . . . 500	Silver Creek, (B5) . . . 3,260	Valley Falls, (N5) . . . 633
Mayville, (A6) . . . 1,207	Old Forge, (L3) . . . 565	Ravena, (N6) . . . 2,093	Silver Springs, (D5) 1,155	Valley Stream, (D2) . . . 2,800
Mechanicville, (N5) . . . 8,166	Olean, (D6) . . . 20,506	Raymondville, (K1) 700	Sinclairville, (B6) . . . 514	Varysburg, (D5) . . . 400
Medina, (D4) . . . 6,011	Oneida, (J4) . . . 10,541	Red Creek, (G4) . . . 499	Skaneateles, (H5) . . . 1,635	Vernon, (J4) . . . 541
Mellenville, (N6) . . . 600	Oneonta, (K6) . . . 11,582	Red Hook, (N7) . . . 827	Skaneateles Falls, (H5) . . . 500	Verplanck, (C1) . . . 1,000
Merrick, (D2) . . . 520	Onondaga Valley, (H4) . . . 500	Red House, (C6) . . . 500	Slaterville Springs, (H6) . . . 400	Veteran, (M6) . . . 945
Mexico, (H4) . . . 1,336	Onoville, (C6) . . . 600	Remsen, (K4) . . . 448	Slingerlands, (N5) . . . 500	Victor, (F5) . . . 725
Middleburg, (M5) . . . 986	Ontario, (F4) . . . 400	Rensselaer, (N5) 10,823	Sloan, (C5) . . . 1,791	Victory Mills, (N4) . . . 614
Middle Granville, (O4) . . . 700	Orchard Park, (C5) 800	Rensselaerville, (M5) 600	Sloatsburg, (C1) . . . 1,150	Waddington, (K1) . . . 702
Middleport, (C4) . . . 1,416	Orient, (G1) . . . 880	Reserve, (C5) . . . 600	Smithtown Branch, (E2) . . . 670	Wading River, (E2) . . . 400
Middletown, (B1) 18,420	Oriskany, (K4) . . . 1,101	Rexford, (N5) . . . 400	Smithville South, (D2) . . . 600	Walden, (M7) . . . 5,493
Middleville, (L4) . . . 790	Oriskany Falls, (K5) 1,014	Rhinebeck, (N7) . . . 1,397	Sodus, (F4) . . . 1,329	Walkkill, (M7) . . . 700
Millford, (L5) . . . 505	Orwell, (J3) . . . 400	Rhinecliff, (N7) . . . 600	Sodus Point, (F4) . . . 700	Walton, (K6) . . . 3,598
Millbrook, (N7) . . . 1,096	Ossining, (C1) . . . 10,739	Richfield Sprs., (L5) . . . 1,388	Solvay, (H4) . . . 7,352	Walworth, (F4) . . . 450
Millerton, (N7) . . . 820	Oswegatchie, (K2) . . . 400	Richmondville, (L5) 581	Southampton, (F2) 2,891	Wantagh, (D2) . . . 710
Mill Port, (G6) . . . 500	Oswego, (G4) . . . 23,626	Rimondy, (A6) . . . 1,000	So. Bethlehem, (N5) 500	Wappingers Falls, (N7) . . . 3,235
Milton, (N7) . . . 1,200	Otego, (K6) . . . 540	Riverhead, (F2) . . . 2,800	So. Dayton, (B6) . . . 655	Warner, (H4) . . . 500
Mincola, (D2) . . . 3,016	Ovid, (G5) . . . 438	Rochester, (E4) 295,750	So. Fallsburg, (L7) 400	Warrensburg, (N4) 2,200
Mineville, (O2) . . . 2,000	Owego, (H6) . . . 4,147	Rockland Lake, (C1) 550	So. Glens Falls, (N4) . . . 2,158	Warsaw, (D5) . . . 3,622
Minoa, (J4) . . . 867	Oxford, (J6) . . . 1,590	Rockville Center, (D2) . . . 6,262	So. New Berlin, (K5) 400	Warwick, (B1) . . . 2,420
Mohawk, (K5) . . . 2,919	Oyster Bay, (D2) 3,800	Rome, (K4) . . . 26,341	So. Nyack, (C1) . . . 1,799	Washingtonville, (C1) 631
Moir, (L1) . . . 620	Painted Post, (F6) 2,170	Rosevelt, (D2) . . . 1,000	Southold, (F1) . . . 1,600	Watford, (N5) . . . 2,637
Monroe, (C1) . . . 1,527	Palatine Bridge, (L5) 443	Roscoe, (L7) . . . 1,000	So. Schenectady, (M5) 400	Waterloo, (G5) . . . 3,809
Montgomery, (M7) . . . 906	Palmville, (M6) . . . 600	Rose, (G4) . . . 900	Spafford, (H5) . . . 450	Watertown, (J3) 31,285
Monticello, (L7) . . . 2,330	Palmyra, (F4) . . . 2,480	Rosendale, (M7) . . . 555	Sparkill, (C1) . . . 950	Waterville, (K5) . . . 1,255
Montour Falls, (G6) 1,560	Parish, (H4) . . . 476	Roseton, (M7) . . . 2,004	Sparrow Bush, (A1) 400	Watervliet, (N5) 16,073
Moers, (N1) . . . 512	Parishville, (L1) . . . 710	Roslyn, (D2) . . . 2,500	Spencer, (H6) . . . 661	Watkins, (G6) . . . 2,785
Moravia, (H5) . . . 1,331	Patchogue, (E2) . . . 4,031	Rouses Pt., (O1) . . . 1,700	Spencerport, (E4) . . . 926	Watts Flats, (B6) . . . 400
Moriah, (N2) . . . 1,300	Patterson, (N7) . . . 800	Roxbury, (L6) . . . 500	Spring Valley, (C1) 3,818	Waverly, (G6) . . . 5,270
Morley, (C1) . . . 500	Pavilion, (D5) . . . 400	Rushford, (D6) . . . 600	Springville, (C5) . . . 2,331	Wayland, (E5) . . . 1,790
Mottville, (H5) . . . 600	Pawling, (N7) . . . 1,032	Rushville, (F5) . . . 541	Springwater, (E5) . . . 600	Webster, (F4) . . . 1,247
Mt. Kisco, (D1) . . . 3,944	Pearl River, (C1) . . . 1,500	Russell, (K2) . . . 400	Staatsburg, (N7) . . . 400	Weedsport, (G4) . . . 1,379
Mt. Morris, (E5) . . . 3,312	Peekskill, (C1) . . . 15,868	Rye, (D2) . . . 5,308	Stamford, (L6) . . . 947	Wells, (M4) . . . 400
Mt. Vernon, (C2) 42,726	Peconic, (F1) . . . 600	Sacket Harbor, (H3) 667	Stanfordville, (N7) . . . 400	Wellsburg, (G6) . . . 465
Nanuet, (C1) . . . 700	Pelham, (C2) . . . 1,056	Sag Harbor, (G1) . . . 2,993	Stanley, (F5) . . . 450	Wellsville, (E6) . . . 4,996
Napanoch, (M7) . . . 650	Pelham Manor, (C2) . . . 1,754	St. Johnsville, (L4) 2,469	Stillwater, (N5) . . . 982	W. Burlington, (K5) 100
Naples, (F5) . . . 1,148	Penfield, (F4) . . . 700	St. Regis Falls, (L1) 1,500	Stockport, (N6) . . . 700	W. Carthage, (J3) . . . 1,666
Nassau, (N5) . . . 655	Penn Yan, (F5) . . . 4,517	Salamanca, (C6) . . . 9,276	Stockton, (B6) . . . 600	W. Coxsackie, (N6) 500
Nelliston, (L5) . . . 664	Perkinsville, (E5) . . . 400	Salem, (O4) . . . 1,083	Stony Brook, (E2) . . . 700	W. Eaton, (J5) . . . 500
Nelsonville, (C1) . . . 412	Perry, (E5) . . . 4,717	Sand Lake, (N5) . . . 400	Stony Point, (C1) . . . 950	Westfield, (A6) . . . 3,413
Newark, (F4) . . . 6,964	Petersburg, (O5) . . . 821	Sandy Creek, (H3) . . . 566	Stottville, (N6) . . . 720	West Hampton, (F2) 450
Newark Valley, (H6) 821	Phelps, (F5) . . . 1,200	Saranac, (N1) . . . 800	Strykersville, (D5) . . . 530	West Haverstraw, (C1) . . . 2,018
New Baltimore, (N6) 800	Philadelphia, (J2) . . . 794	Saranac Lake, (M2) 5,174	Stuyvesant, (N6) . . . 400	W. Hurley, (M7) . . . 400
New Berlin, (K5) . . . 1,070	Philmont, (N6) . . . 1,919	Saratoga Springs, (N4) . . . 13,181	Stuyvesant Falls, (N6) . . . 930	Westons Mills, (D6) 500
Newburgh, (M7) . . . 30,366	Phoenixia, (M6) . . . 400	Sardinia, (C5) . . . 500	Suffer, (C1) . . . 3,154	W. Point, (C1) . . . 1,200
Newfane, (C4) . . . 650	Phoenix, (H4) . . . 1,747	Saugerties, (N6) . . . 4,013	Summer Hill, (H5) . . . 750	Westport, (O2) . . . 669
New Hamburg, (N7) 500	Piercefield, (L2) . . . 750	Sauquoit, (K5) . . . 600	Syosset, (D2) . . . 400	W. Salamanca, (C6) 530
New Hartford, (K4) 1,621	Piermont, (C1) . . . 1,600	Savannah, (G4) . . . 516	Syracuse, (H4) 171,717	W. Sayville, (E2) . . . 900
New Hyde Park, (D2) . . . 1,000	Pine Bush, (M7) . . . 500	Savona, (F6) . . . 554	Tannersville, (M6) 597	W. Valley, (C7) . . . 470
New Paltz, (M7) . . . 1,056	Pine Plains, (N7) . . . 1,600	Sayville, (E2) . . . 3,200	Tarrytown, (C1) . . . 587	W. Winfield, (K5) . . . 725
Newport, (K4) . . . 703	Pittsford, (E4) . . . 1,328	Scarsdale, (C2) . . . 3,506	Theresa, (J2) . . . 507	White Creek, (O5) . . . 500
New Rochelle, (C2) . . . 36,213	Pittsburg, (O1) . . . 10,909	Scaghticoke, (N5) . . . 568	Thornwood, (C1) . . . 600	Whitehall, (O3) . . . 5,258
New Windsor, (C1) 610	Pleasant Plains, (N7) . . . 490	Schenectady, (N5) 88,723	Three Mile Bay, (H2) 400	White Plains, (C1) 21,031
New York, (C2) 5,020,408	Pleasantville, (C1) 3,590	Schenectady, (L5) . . . 526	Ticonderoga, (O3) 2,102	Whiteport, (M7) . . . 600
New York Mills, (K4) . . . 2,600	Portageville, (D5) . . . 450	Schockad Landing, (N6) . . . 400	Tivoli, (N6) . . . 876	Whitesboro, (K4) . . . 3,038
Niagara Falls, (B4) 50,760	Port Byron, (G4) . . . 1,035	Schoharie, (M5) . . . 851	Tomkins Cove, (C1) . . . 1,200	Whitney Point, (H6) 665
Nichols, (H6) . . . 554	Port Chester, (D2) 16,573	Schoon Lake, (N3) 800	Tonawanda, (C4) 10,068	Willet, (J6) . . . 500
Nineveh, (J6) . . . 450	Port Crane, (J6) . . . 500	Schoyerville, (N4) 1,625	Tribes Hill, (M5) . . . 400	Williamson, (F4) . . . 650
Norfolk, (K1) . . . 1,600	Port Dickinson, (J6) 883	Scio, (E6) . . . 800	Troy, (N5) . . . 72,013	Williamstown, (J4) . . . 600
Northampton, (M4) 500	Port Ewen, (N7) . . . 1,600	Scotia, (N5) . . . 4,358	Trumansburg, (G5) 1,011	Williamsville, (C5) 1,753
No. Blenheim, (M6) 530	Port Gibson, (F4) . . . 400	Schenectady, (E4) . . . 784	Truxton, (H5) . . . 700	Willowvale, (K4) . . . 400
No. Collins, (C5) . . . 1,158	Port Henry, (O2) . . . 2,183	Sea Cliff, (D2) . . . 2,108	Tuckahoe, (C2) . . . 3,509	Willson, (C4) . . . 631
No. Granville, (O4) 630	Port Jefferson, (E2) . . . 2,800	Seaford, (D2) . . . 720	Tully, (H5) . . . 477	Windsor, (J6) . . . 598
No. Lawrence, (L1) . . . 500	Port Jervis, (A1) . . . 10,171	Setauket, (E2) . . . 600	Tupper Lake, (M2) 2,508	Wolcott, (G4) . . . 1,186
No. Pelham, (C2) . . . 2,385	Portland, (B6) . . . 500	Sharon Springs, (L5) 400	Tuxedo Park, (B1) 2,000	Wolcottville, (C4) . . . 800
Northport, (D2) . . . 1,977	Port Leyden, (K3) . . . 735	Shelter Island, (G1) 400	Tyrone, (F6) . . . 400	Woodmere, (C2) . . . 600
No. Tarrytown, (C1) . . . 5,927	Portville, (D6) . . . 606	Shelter Island Heights, (G1) . . . 800	Unadilla, (K6) . . . 1,157	Woodridge, (L7) . . . 944
No. Tonawanda, (C4) . . . 15,482	Port Washington, (D2) . . . 3,200	Sherburne, (K5) . . . 1,104	Union, (H6) . . . 3,303	Worcester, (L5) . . . 1,500
Northville, (M4) . . . 1,190	Potsdam, (L1) . . . 4,039	Sherman, (A6) . . . 847	Union Springs, (G5) 642	Yaphank, (E2) . . . 570
Norwich, (J5) . . . 8,268	Poughkeepsie, (N7) . . . 35,000	Sherrill, (J4) . . . 1,761	Unionville, (B1) . . . 402	Yonkers, (C2) . . . 100,176
Norwood, (K1) . . . 1,808	Prattsburg, (F5) . . . 654	Shortsville, (F5) . . . 1,300	Upper Jay, (N2) . . . 500	York, (E5) . . . 500
Nunda, (E5) . . . 1,152	Pulaski, (H3) . . . 1,895	Short Tract, (D6) . . . 510	Upper Nyack, (C1) 538	Yorktown Heights, (C1) . . . 1,250
Nyack, (C1) . . . 4,444	Quaker Street, (M5) 420	Shushan, (O4) . . . 500	Utica, (K4) . . . 94,156	Yorkville, (K4) . . . 1,512
Oakfield, (D4) . . . 1,422	Ramapo, (C1) . . . 500	Shushan, (K6) . . . 2,670	Valatie, (N6) . . . 1,301	Youngstown, (B4) . . . 539

western part of the State, enters the Mississippi through the Ohio River. There are a number of falls and picturesque gorges in the Genesee River in the vicinity of the points where the stream breaks through the terraces. In the Adirondack region there are a number of beautiful lakes, the waters of which are remarkably clear. Lake George (q.v.), on the south slope of the mountains, is famous for its scenery and the points of historic interest surrounding it. Lake Champlain (q.v.), on the eastern boundary, together with Lake George, belong to the Saint Lawrence River Basin. In the central part of the State are a number of lakes, long and narrow, which are called the Finger Lakes. The largest are Cayuga and Seneca, about 40 miles long, and from two to four miles wide. Oneida (q.v.) Lake is nearly circular in form. Lake Chautauqua, in the western part of the State, 1,212 feet above sea-level, is the highest navigable body of water east of the Rocky Mountains. The waters of this lake enter the Mississippi although it is only nine miles from Lake Erie. The most noted water-falls and natural curiosities in the State are Niagara Falls, in Niagara River, 2,900 feet wide and 160 feet high; Portage Falls, in Genesee River, consisting of two falls, of 70 feet and 110 feet, and a series of rapids 150 feet; Genesee Falls, in Genesee River, at and below Rochester, consisting of three falls, of 96 feet, 25 feet and 84 feet, within a distance of two and a half miles; Trenton Falls, in West Canada Creek, Herkimer County, consisting of five cascades with a total fall of 200 feet in half a mile; Taughannock Falls, in Tompkins County, 230 feet; Chittenango Falls, in Chittenango Creek, Madison County, 136 feet; Lyon Falls, in Black River, Lewis County, flowing down an inclined plane 63 feet, at an angle of 60 degrees; Kaaterskill Falls, Greene County, consisting of two falls, 175 feet and 85 feet; Baker's Falls, Washington County, consisting of a succession of falls and rapids, having a total descent of 76 feet in 60 rods; Cohoes Falls, in the Mohawk, near its mouth, with a total fall including rapids, of 103 feet; Glens Falls, Warren County, 50 feet; High Falls, in the Hudson, Warren County, 60 feet; High Falls, Ulster County, 50 feet; the Ausable Falls, in Wilmington, Essex County, 100 feet; Enfield Falls, Tompkins County, consisting of a series of cascades with a total fall of 230 feet; Buttermilk Falls, Genesee County, 90 feet; and the falls in Fall Creek, Tompkins County, consisting of five falls with a total descent of over 500 feet in a mile. In East Canada Creek, about two and a half miles from its mouth, is a series of cascades and rapids having a total fall of 75 feet in 80 rods. Upon Stone Bridge Creek, Warren County, is a natural bridge 40 feet high, 80 rods broad and 247 feet long. Dover Stone Church, Dutchess County, is a ravine 25 feet wide at the bottom, one to three feet wide at the top, about 40 feet long and 40 to 50 feet high. Near Kyserike, Ulster County, is a cave which has been explored one and one-half miles from its entrance. On Black River, at Lyons Falls, are the "Pictured Rocks"; and in Onondaga County are the "Cratean Lakes" and "Green Lakes."

Geology.—Nearly all the geological formations are present in New York. The Archæan is represented in the Adirondacks and the High-

lands of the Hudson, by gneisses, granites, ancient crystalline and metamorphic rocks. Potsdam sandstone of a kind which denotes existence in the Cambrian Age is on the north-east and west of the Archæan area of the north. The lower Cambrian rock shows in a narrow strip extending south from the head of Lake Champlain and in the vicinity of Lake George. The palæozoic constitutes four-fifths of the State and is represented by schists, slates, metamorphosed rocks in the east and by massive and hard sandstones in the Catskills. The palæozoic is represented by the Cambrian, Silurian and Devonian periods. The Adirondacks, Highlands and lands west were above sea-level in the Silurian period, but the area of the State west of this uplift remained submerged into the Devonian period. The Triassic and Jurassic are represented by Newark sandstones and shales, in Rockland County; and the Pleistocene, by glacial drift, and lacustrine and estuarine clays cover a great part of the State. The Pleistocene ice-sheet covered the entire State and accounts for many of the peculiarities of the topography.

Mineralogy.—The chief minerals of New York State are salt, iron ore, sandstone, limestone, fire-clay, marble, granite, slate, gypsum, petroleum, talc, mortar colors, natural gas and cement. The salt output of Michigan exceeded that of New York until 1893, since which year New York has ranked first as a salt-producing State. Gold in small quantities has been found in the Adirondack region, and natural gas is found near Lake Erie. Coal does not seem to exist in the State, although found in large quantities not far south of the boundary. The Catskill and Potsdam sandstone, the Hudson River bluestone and most of the limestone are valuable for building stone. The greatest deposits of hematite and magnetite are found in the Adirondack region. Rock salt is found south of Lake Ontario in the vicinity of Warsaw. The mineral springs exceed in value any other State except Wisconsin. The principal mineral and medicinal springs are the salt springs of Onondaga County; Saratoga Springs; New Lebanon and Stockport, Columbia County; Massena, Saint Lawrence County; Richfield, Otsego County; Avon, Livingston County; Clifton, Ontario County; Sharon, Schoharie County; Chittenango, Madison County, and Alabama, Genesee County.

The latest available report gives as the principal mineral productions of a year: Salt, 1,455,014 short tons, valued at \$6,505,041; gypsum, 712,665 short tons, valued in crude and manufactured form at \$6,410,221; petroleum, 1,000,000 barrels, valued at \$3,200,000; talc, 41,937 short tons, valued at \$530,154; metallic paint, 4,925 short tons, valued at \$45,050; Portland cement, 4,993,341 barrels, valued at \$9,403,015; natural gas, valued at \$2,798,000; limestone, valued at \$4,597,942; building brick, tile, etc., \$8,813,000; pottery, \$4,726,000; other clay products \$2,234,804; building sand, \$1,185,812; other sand and gravel, \$1,065,133; iron ore, 191,195 long tons, valued at \$1,049,050; sand stone, \$301,315; mineral waters, \$736,173.

Climate.—The climate of the State, as a whole, is continental; but that of Manhattan Island, Long Island and Staten Island is modified by the ocean. The average maximum temperature for the State is 100° and the minimum

is a little below zero. The Adirondack region, north of the highest point, or on the northern slope, is the coldest, having the longest and most severe winters. The mean temperature for January is, in the Adirondacks, 15°; on the coast 30°; in the western part 26°. The mean temperature for July, in the Adirondacks, is 64°; on the coast 70°, and in the western part 72°. The rainfall is copious, averaging for the eastern part of the State about 50 inches and for the western part 40 inches. The State is remarkably free from malarial conditions. The Adirondack region is noted for its freedom from conditions inducing tuberculosis.

Flora.—New York State was a densely wooded region prior to and during the early Colonial Period. As shown under the industrial interests of Forestry (q.v.), all the varieties of trees are found common to the latitudes in which the territory lies. The Adirondack and Catskill mountains are still covered with spruce, white pine and hemlock, while maple, birch, beech, basswood, ash and elm are found in lesser quantities and larch and cedar in the lake and marshland of the regions. In the western part of the State the more common trees besides pine are the hardwoods—oak, chestnut, maple, beech and hickory,—while tulip, walnut, locust, sycamore, poplar and butternut are widely spread. In the hill and mountain regions, laurel, rhododendron and whortleberry are found in profusion and shrubs of the lower plains are sumac, elder, hazel and sassafras. The native fruit plants include the berries,—strawberry, blackberry, raspberry, cranberry and huckleberry,—grapes, black and red cherries, red and yellow plums. The medicinal plants comprise ginseng, snake-root, wormwood, horehound, blue flag, tansy, wintergreen, peony-pleurisy or epilepsy-root, burdock, plantain and sarsaparilla. Conspicuous spring flowers are violets, buttercups, cowslips and anemones; in summer white and yellow water lilies; and in autumn, golden rod and asters. Different species of ferns abound and over 1,500 varieties of flowering plants besides the more popular ones here mentioned.

Fauna.—In the Adirondacks are still to be found, although in diminished numbers, the indigenous animals of the wild pre-Colonial Period. The puma or panther alone has disappeared, and the lynx is seldom seen. The gray wolf and black bear occasionally appear. Deer abound in the Adirondack region and under government protection elk, moose and beaver have increased in numbers. Mink, otter, sable and red fox are trapped occasionally; porcupine, woodchucks, skunks, weasels and muskrats are common. Deer also in Long Island, raccoon, and in southern counties opossum are found, while squirrel and rabbits are prolific in all parts of the State. Nearly 400 species of fish are found in the fresh and salt waters of the State, which now are periodically replenished from the government fish stations and hatcheries. (See paragraph *Fisheries*). The popular song birds are the robin, chickadee, song-sparrow, warbler, thrushes, orioles, vireos, wrens, bluebird, catbird and phoebe; while occasionally the acclimated English meadow lark is heard singing above the plains of Long Island. Geese, ducks, plovers, part-ridge, snipe, loons, terns, rails, grebes, woodcock and ruffed grouse are among wild game

birds, while pheasants in some parts of the State and quail on Long Island are liberated at certain seasons for the purpose of sport. A State game bird farm exists since 1909 near Sherburne in Chenango County. Shrikes and hawks and occasional golden eagles and bald eagles are the distinctive birds of prey.

Fisheries.—The oyster fisheries are the most productive, representing over half the total value of the fishing industries of the State. Next in value are the bluefish, clams and menhaden. The most valuable fisheries are on the coast of Long Island; Suffolk County ranks first. The shad and alewives are found in the Hudson; trout in the Adirondack lakes. The number of persons engaged in the fisheries has diminished from 1904. The State conservation commissioner, who has charge of the fishing industry, is pursuing a scientific system, looking to the preservation of the fish of the State.

Agriculture and Stock-raising.—The soil of two-thirds of the State is suitable for agriculture, only the rocky mountain area and some sand-belts are considered so unproductive as not to be classed with agricultural lands. All the other conditions for productive farming exist in a favorable degree. Until 1890 New York State ranked first in the value of its agricultural products; in that year some of the Western States reached first place and the farm products of each of three of them were greater that year than those of New York. As the wheat and corn output of the West has increased, the farm products and farm improvements of New York State have decreased. The average of improved land has decreased since 1880, and the nature of the crops raised has varied. The Western wheat and corn in competition has caused the decrease of wheat and corn crops and an increase in the hay acreage. Corn for forage is increasing. The annual hay forage acreage is about half the total crop acreage of the State. The 14th census reported 193,195 farms in the State with an aggregate area of 20,632,803 acres, including 13,158,781 acres of improved land. The same year the total value of all farm property was \$1,908,483,201. Market gardening, fruit growing, sugar beet raising and tobacco are the principal crops. The chief crops, with their acreage, yield and value for the year 1922 were: Corn, 798,000 acres, 28,329,000 bushels, \$23,513,000; spring wheat, 21,000 acres, 336,000 bushels, \$396,000; winter wheat, 445,000 acres, 8,678,000 bushels, \$10,240,000; barley, 158,000 acres, 4,108,000 bushels, \$3,040,000; clover seed, 11,000 acres, 28,000 bushels, \$280,000; oats, 1,059,000 acres, 31,770,000 bushels, \$16,203,000; buckwheat, 208,000 acres, 4,368,000 bushels, \$4,368,000; rye, 55,000 acres, 880,000 bushels, \$854,000; tame hay, 4,870,000 acres, 6,818,000 tons, \$96,134,000; beans, 93,000 acres, 1,302,000 bushels, \$4,948,000; potatoes, 340,000 acres, 37,400,000 bushels, \$22,440,000; tobacco, 2,000 acres, 2,500,000 pounds, \$814,000; apples, 36,000,000 bushels; peaches, 3,400,000 bushels, and pears, 3,200,000 bushels. On 1 Jan. 1923 there were in the State 510,000 horses, valued at \$58,650,000; 7,000 mules, valued at \$931,000; 1,678,000 milch cows, valued at \$105,714,000; 410,000 other cattle, valued at \$10,045,000; 532,000 sheep, valued at \$4,522,000 and 546,000 swine, valued at \$8,463,000. The wool clip of 1922 was 2,882,000 pounds. The census in 1920 placed the value of all farm crops that



Lower Saranac Lake, Adirondack Mountains

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year at \$417,046,864. The State that year was second in the production of hay and grapes. It was also second in the quantity of buckwheat grown and was second in the value of dairy products which were valued at \$756,045,942. The State also led in the value of livestock products with \$225,465,739.

High in importance of farm products is potatoes. New York State occupies a very high rank in the acreage devoted to potatoes, but in value of the crop New York surpasses Minnesota, Wisconsin and Michigan which surpass it in acreage and production. Market gardening is of considerable importance. Nearly all the farm lands of Long Island and the counties near New York City, on both sides of the Hudson, are devoted to market gardening. In 1850 the average size of farms was 112.1 acres, and in 1920, 106.8 acres. Farms occupied by tenants are 19.2 per cent of the total number. The dairy products of the State are of great importance and great value. The State ranks first in the production of milk, and second in the production of cheese. The amount produced is sometimes greater in some of the other States, but the quality in New York is the best and always brings the highest prices. The soil, vegetable and climatic conditions and the introduction of scientific methods in dairy farming have greatly improved the quality of the dairy products. The milk sold yearly brings on an average about \$159,000,000; butter, \$10,000,000. The dairy products bring about 31 per cent of the total income from the farms. Along the Hudson, especially in Ulster County and in the Genesee Valley and west there are large fruit orchards, apples predominating. In the lake region in the central part of the State grapes flourish. In production of grapes New York is second to California. New York annually produces 152,482,000 pounds with a value of \$10,673,790. Hops and tobacco are cultivated in the central part, hops especially in Franklin County. Floriculture is increasing in counties near the city markets.

Stock holdings were as follows for the years given:

	1920	1910
Dairy cows.....	2,081,074	1,508,672
Other cattle.....	63,737	812,921
Horses.....	536,171	590,150
Mules and asses.....	7,534	4,335
Sheep.....	578,726	929,547
Swine.....	600,560	665,027

Forests and Lumbering.—The original forests of the Adirondack region were composed chiefly of white pine, hemlock and spruce; near the base of the northern slope of these mountains there were large forests of maple, birch, elm, white pine, basswood, hemlock and spruce. The hard and soft woods were also found in the southern and western parts of the State. At one time New York ranked first among the States in lumbering interests. The only forests still standing in which there is much lumbering are in the northern part of the State. Spruce and hemlock now form the principal output for lumber. The pulp wood mills and paper mills are now using large quantities of timber, mostly spruce. The State now owns 1,814,550 acres in the Adirondack and Catskill areas, known as the Forest Preserve. This is under the control of the Conservation Commission under whose jurisdiction deputies work for the

prevention of forest fires and maintain tree nurseries from which they sell seedling trees at cost to private owners. Much of the forest land is still in the hands of private individuals and is subject to exploitation. The State has appropriated large sums to acquire some of it. New York State produced in 1921, 283,863,000 feet of lumber. See FORESTRY.

Manufactures.—New York ranks first among the States in the value of manufactured products. The Erie Canal was a great aid in developing many of the manufacturing industries of the State. It gave an opportunity to bring the raw material at small cost to places where there was water power, and then, still at low cost, to send the finished products to the markets. The rivers with their extensive water power have continued to hold the large share of the manufacturing even during the period when steam was the main power in many places, and now the water power is of greater importance in the development of electrical power. The enormous power of Niagara Falls is causing a remarkable increase in the output of manufactories, especially the aluminum, carbondum and machinery made at the city of Niagara Falls. The great electrical plants of the State are increasing the manufacturing power; as at Schenectady, Mechanicville and other places on and near the Hudson River (q.v.); also at Massena (q.v.) near the Saint Lawrence River and in many other parts of the State. The agricultural and mining interests of New York State are large and important, but her great manufacturing products are not only immense in amount, but of a wide and varied diversity. According to the 1920 United States census New York has held the foremost rank in manufacturing for many years, though, since 1849, when the first authoritative census of manufactures was taken, the proportion which the State has contributed to the total value of manufactured products in the entire United States has decreased somewhat. This proportion was 23.3 per cent in 1849 and only 11 per cent in 1920.

In 1849 the total value of the manufactured products of New York, including those of the neighborhood and hand industries, amounted to \$237,597,249, while in 1920, exclusive of the value of the products of the neighborhood and hand industries, it reached a total of \$8,867,005,000, or more than 40 times that in 1849. During the same period the population of the State increased nearly 200 per cent. In 1849 an average of 199,349 wage-earners, representing 6.4 per cent of the total population, were employed in manufactures, while in 1920, an average of 1,228,130 wage-earners, or over 10 per cent of the total population, were so engaged. During this period the gross value of products per capita of the total population of the State increased from \$77 to over \$800.

In 1920 the State of New York had 49,330 manufacturing establishments, which gave employment to an average of 1,524,761 persons during the year and paid out \$1,971,754,707 in salaries and wages. Of the persons employed, 1,228,130 were wage-earners. These establishments turned out products to the value of \$8,867,004,906, to produce which materials costing \$4,943,213,919 were utilized. The value added by manufacture was thus \$3,923,790,987,

which figure best represents the net wealth created by manufacturing that year.

The latest available statistics of leading manufacturing industries (census of 1920) will prove of interest. Clothing (men and women's)—Value of output for 1919, \$1,431,038,000; average number of wage-earners, 164,660. The increase in the value of clothing manufactured in New York from 1909 to 1919 was \$892,445,000. Textiles—Value of output, \$536,478,330; average number of wage-earners, 121,860. New York is the fourth State in the Union in the production of all textiles combined, third in silk and silk goods, fourth in fur-felt hats, first in the manufacture of hosiery and knit goods and of carpets and rugs, other than rag, and second in that of cordage and twine and jute and linen goods. It ranks fifth in the production of woolen, worsted and felt goods and wool hats, and 12th in that of cotton goods, including cotton small wares. Millinery and lace goods—Value of products, \$165,718,000. New York leads all other States in the Union in this industry. Fur goods—Value of products, \$134,219,000, constituting about 75 per cent of the total of the United States. Printing and publishing—Value of products, \$478,898,000. New York leads all the States in this industry as a whole and in each of its branches. Foundry and machine-shop products—Value of products, \$251,688,000, being the second State in the Union in this industry. Lumber and timber products (including logging operations, saw mills, planing mills and establishments manufacturing wooden boxes)—Value of products, \$82,508,000, giving New York ninth rank among the States in the lumber industry. Iron and steel works, rolling mills and blast furnaces—Value of products, \$100,593,000; average number of wage-earners employed, 17,901. The State ranks fifth in this industry. Paper and wood pulp—Value of products, \$129,381,000. New York leads all other States in this industry. Boots and shoes—Value of products, \$190,476,000, giving the State second place among the States. Electrical machinery, etc.—Value of products, \$179,973,000. Tobacco manufactures—Value of products, \$163,105,000, leading all States. Slaughtering and meat packing—Value of products, \$256,038,000, ranking third in this industry. Butter, cheese and condensed milk—Value of products, \$129,008,000. New York is second in this industry, Wisconsin being first. Gas (illuminating and heating)—Value, \$69,339,000, the State holding first rank. Furnishing goods (men's)—Value of products, \$53,261,000. Patent medicines and compounds—New York leads all other States with a total output valued at \$57,958,000. Chemicals—Total value, \$88,102,000. Automobiles—Total value of products, \$140,722,000, more than four times the amount reported for 1910. Sugar refining, cane—Value of products, \$268,318,000. Paint and varnish—Value of products, \$66,244,000 the largest of any of the States. Leather—New York occupies second place in this industry with products valued at \$98,095,000. Musical instruments—Total value of products, \$52,231,000, giving the State first place in this industry.

Industrial Importance of Cities.—The following table (United States census 1920) shows the average number of wage-earners and the value of products in many cities and towns of the State:

CITY OR VILLAGE	Average number of wage earners. 1919	Value of products. 1919
New York city.....	638,775	\$5,260,707,577
Boroughs		
Manhattan.....	386,907	\$3,525,574,539
Bronx.....	20,036	114,975,501
Brooklyn.....	166,724	1,184,973,144
Queens.....	47,222	331,285,294
Richmond.....	17,886	103,899,098
Buffalo.....	75,899	\$634,409,733
Rochester.....	63,792	351,416,379
Yonkers.....	11,932	140,016,561
Syracuse.....	28,153	150,091,278
Schenectady.....	21,062	106,531,182
Troy.....	15,929	74,837,435
Utica.....	16,423	77,745,720
Niagara Falls.....	12,238	89,247,170
Albany.....	11,216	45,454,955
Amsterdam.....	10,713	52,851,242
Binghamton.....	7,477	40,637,625
Auburn.....	7,272	40,642,435
Cohoes.....	5,013	21,551,429
Jamestown.....	8,559	37,985,306
Rome.....	4,428	34,868,489
Gloversville.....	5,612	38,913,000
Oswego.....	4,470	25,211,643
Olean.....	4,669	32,121,169
Newburgh.....	5,389	29,872,407
North Tonawanda.....	4,366	25,430,663
Poughkeepsie.....	5,935	28,908,852
Watertown.....	3,914	19,037,031
Little Falls.....	3,688	24,851,536
Lockport.....	4,074	29,302,597
Elmira.....	8,024	33,494,164
Peekskill.....	2,066	10,623,628
Fulton.....	3,627	23,096,499
Dunkirk.....	4,319	28,028,067
Johnstown.....	2,664	17,502,938
Cortland.....	3,013	14,902,884
Port Chester.....	2,685	17,139,079
Kingston.....	3,903	15,857,451
Geneva.....	2,428	10,219,321
Ogdensburg.....	757	5,154,923
Glens Falls.....	2,784	11,503,066
Middletown.....	2,162	9,803,344
Batavia.....	2,226	9,414,705
Hornell.....	1,851	7,339,419
Hudson.....	1,481	7,514,339
Mount Vernon.....	2,746	12,003,417
Plattsburg.....	787	4,015,151
Corning.....	3,517	10,774,091
Saratoga Springs.....	855	4,093,058
Rensselaer.....	1,363	9,800,098
Ithaca.....	1,690	9,934,693
New Rochelle.....	1,293	4,406,301
Watervliet.....	1,600	8,502,864
Ossining.....	387	2,301,450
White Plains.....	329	1,753,392

Transportation and Commerce.—The principal railroad systems crossing the State are the New York Central and subsidiaries, the West Shore (New York, Chicago and Saint Louis), the Erie, the Lehigh Valley, the New York, Ontario and Western, the Delaware Lackawanna and Western, the Pennsylvania and Delaware and Hudson. The great trunk lines of the country make connections with all these roads. In 1923 there were 8,390 miles of railroad in the State. The Mohawk and Hudson was the first railroad in the State; it was completed and ready for operation in 1831, extended from Albany to Schenectady and was 17 miles long. About 11 years afterward there was a railroad completed from Albany to Buffalo; next came the Erie, and then the road from New York City to Albany. In 1825 the Erie Canal (q.v.) was opened, and it has been in use in the carrying trade since that time. Other canals of the State are the Oswego, the Champlain and several branches. At the general election, in November 1903, the people voted an appropriation of \$101,000,000 to enlarge the Erie Canal and this has been added to from time to time until the total is approach-

ing \$200,000,000. The enlarged waterways system of central New York is now known as the New York State Barge Canal. (See **BARGE CANAL**). The State public service commission has general supervision of railroads, especially with reference to public safety and convenience and to any violations of the law governing the railroads of New York. New York ranks first in the Union in foreign commerce. Its exports and imports include every variety of raw or manufactured material that enters the United States. New York City ranks as the first shipping port of the world, coming ahead of London and Liverpool. The imports for the fiscal year ending 1921 amounted to the value of \$1,332,265,342 and the exports to the value of \$1,730,255,845. The exports consist largely of grain, flour, cotton, tobacco, apples and other fruits, preserved provisions, cattle and frozen meat. Most of the great railroad lines which bring merchandise from the West have their terminals on the New Jersey side of the harbor, but there are ample facilities for the transfer of goods to the docks on the eastern side by means of lighters and of barges which carry the loaded cars across. In New York State in 1923 there were 8,390 miles of railroad and 5,772 miles of electric railroad track. The canals of the State, used for commercial purposes, have a length of 638 miles, of which the Erie Canal has 340.7 miles. The commerce between the places in New York State and other points in the Union is much greater than the foreign trade of the State. Roads (highways) built by the State or with State aid aggregated in January 1921, 8,357 miles. There were in addition 80,112 miles of rural roads in the State, 17,500 of which were surfaced. The first State-aid Law for roads was passed in 1898, and up to 1 Jan. 1923, over \$100,000,000 from State and other sources have been spent on roads. In 1922 there were 1,002,293 automobiles in the State. For the year 1921, \$28,775,806 of State funds were made available for roads. In addition, the towns and counties spend several millions of dollars annually for the maintenance and construction of highways.

Banks.—In 1782 the first bank in the State was incorporated as the Capital Bank of North America. The second bank was chartered in 1791 as the Bank of New York. The privilege to establish a bank or the granting of a bank charter became a political favor after 1804, when the law was passed making it necessary to have the sanction of the legislature to establish a bank or issue currency. In 1812 there were 20 banks in the State, and in 1829, 48 banks. The charters were for a specified term of years, and various means were resorted to to secure renewals. It was deemed necessary to change the laws for the establishment and government of banks, and in 1829–30 a change was effected. The "safety fund" method was established. A board of bank commissioners was created, examinations and annual reports were established. (See **BANKS**). The system of clearing houses, now deemed essential, began in New York City. In 1854, the first year of trial for the new system, the exchange amounted to \$5,500,000,000. The total exchanges in the year 1922 were \$213,326,386,000. The conditions which govern commerce and finance make the clearing house of New York, practically, the clearing house of the United States.

Including the national banks of this State, the combined resources of banking institutions under State or Federal supervision are over \$13,000,000,000, not considering at all the enormous resources of private banks and brokers not under supervision, especially those of international reputation.

The statistics shown in tables on following page give valuable information regarding the growth of the banking system of the State.

Finance.—The State income is derived mainly from a tax for general expenses and for schools, 29 per cent; corporation tax, 25.5 per cent; excise tax, 17.5, and inheritance tax, 14 per cent. The first arrangement made for an income for State expenditures was the formation of a productive fund from the sale of public land. For a time the income derived from this general fund was sufficient for the support for the State government and the schools. In 1814 it was found necessary to increase the revenue, and this was done by forming another productive fund for school purposes. Later a direct tax was levied, but in 1826 this was discontinued. A system of public improvements was instituted in 1817, and a public debt of \$7,000,000 was incurred. The Erie Canal and other public improvements increased the debt. An effort was made to meet the new obligations by a sinking fund and by canal tolls and other means. The plan of loaning State credit to private corporations, principally railroads, was begun in 1827. In 1842 the Erie Railroad failed with a large indebtedness to the State. Other smaller creditors failed also, and this new debt, together with that of the former, amounted to \$20,310,000. A tax was imposed sufficient to meet expenses, many public improvements were stopped and outside debts were funded. The constitution adopted in 1846 inserted clauses looking to a prevention of such conditions. No debt could be contracted except for war, and then popular sanction by a referendum was necessary. A general sinking fund and a canal sinking fund were created. The constitution now in force retains the provision relative to popular sanction by a referendum. In the year 1895 the State debt was \$53,000,000. Of this amount \$30,000,000 was war bounty debt. In five years the debt was reduced to \$32,400,000; another decade saw it only \$8,988,000; and the whole debt was canceled before 1900. In 1900 a new debt was created for improvement of the Erie Canal. For the fiscal year 1920, the bonded debt was \$236,744,660, divided as follows: Canal, \$148,000,000; highway, \$80,000,000; Palisades Park, \$5,000,000; Saratoga Reserve, \$619,000. The income at present is derived from taxes on assessable property, fees from foreign corporations, licenses, taxes on certain public franchises, trusts and banks. For the year 1922 the expenditures were \$172,943,706.21, and the revenues, \$153,242,723.91.

Insurance Statistics.—In the year 1916 there were in force life insurance policies in the State of New York to the number of 8,036,874, aggregating in amount \$3,757,103,221. Premiums amounting to \$134,321,244.60 were received and claims under policies amounting to \$52,203,964.75 were paid. Fire insurance to the amount of \$7,141,805,428, and marine and

BANKS BANKING ASSOCIATIONS AND INDIVIDUAL BANKERS.

	1850	1860	1870	1880	1890	1900	1910*	1922*
Number.....	244	306	59	68	164	211	203	238
Capital.....	\$55,580,181	\$111,834,347	\$19,759,810	\$18,738,200	\$29,539,825	\$28,810,700	\$34,273,000	\$58,098,000
Resources.....		311,245,555	79,281,601	99,850,755	254,068,296	351,080,252	610,142,579	1,444,748,000
Bank-note circulation....	27,511,787	31,759,127	439,303	37,553	8,064			
Profits.....	9,232,473	13,316,468	7,384,299	8,058,180	21,146,448	28,308,438	50,637,539	83,041,000
Deposits.....	54,467,682	116,190,466	46,447,905	61,795,773	177,109,131	238,194,498	519,319,671	1,222,820,000

Note.—Dec. 15, 1850. The 73 incorporated banks reported capital, \$27,664,860; circulation, \$20,669,178.50. For years 1834 and 1840, banks reporting, both safety fund and not safety fund, to the commissioners were used.

* State banks only.

SAVINGS BANKS.

	1880	1890	1900	1910	1922
Number.....	128	124	128	142	144
Resources.....	\$400,944,380 00	\$667,865,396 40	\$1,037,869,160 34	\$1,676,416,322	\$3,091,662,000
Deposits.....	353,629,657 00	574,669,972 59	922,081,596 26	1,526,935 581	2,791,353,000
Number of accounts open.	953,707 00	1,477,819 00	2,036,016 00	2,886,910	3,915,912
Average account.....	\$370 79	\$388 86	\$452 88	\$529	\$712 82

PRIVATE BANKS.

SAVINGS AND LOAN ASSOCIATIONS.

	1922		1922
Number.....	97	Number.....	280
Resources.....	\$32,412,000	Resources.....	\$131,270,091
Deposits.....	22,503,000		

TRUST AND MORTGAGE COMPANIES.

	1880	1890	1900	1910	1922
Number.....	12	32	59	88	98
Assets or resources.....	\$104,707,575 41	\$280,688,768 47	\$796,483,887 12	\$1,508,177,326	\$3,515,266,000
Deposits.....	*91,304,510 62	211,320,275 05	640,837,146 35	1,003,076,009	2,753,615,000
Surplus.....	8,493,064 79	25,800,304 84	74,506,401 87	185,661,593	217,438,000

* Includes other liabilities.

NATIONAL BANKS IN NEW YORK STATE.

	1880	1890	1900	1910	1922
Number.....	319	295	337	449	504
Capital.....	\$85,736,060 00	\$85,287,160 00	\$97,322,340 00	\$169,817,100	\$228,474,000
Circulation.....	16,818,677 00	46,504,807 00	51,355,465 00		
Individual deposits.....	340,204,504 45	406,440,215 38	617,656,663 39		4,063,894,000
Resources.....	693,426,072 82	720,213,916 79	1,322,249,445 22		4,946,492,000

inland insurance to the amount of \$5,226,335,741 were written. In fire premiums \$51,158,907.53 were received and fire losses amounting to \$22,988,434.87 were paid. Premiums paid for policies in casualty, credit, title and other companies amounted to \$42,350,393.78 and losses paid amounted to \$18,102,251.46. Assessment life and accident associations had certificates in force amounting to \$69,070,038, and fraternal orders had \$533,362,492. Co-operative fire associations had in force insurance amounting to \$152,243,485.

Government.—The government of the State is administered in accordance with the provisions of the State constitution. This constitution may be amended by a majority vote of the house in two consecutive legislatures and adopted by popular vote of the people. It may be revised by a constitutional convention and the popular vote of the people. The last revision of the State constitution was made in 1894, and went into effect 1 Jan. 1895. This constitution provides for amendments and revisions as stated, and that the question of a

NEW YORK



1



2

1 View looking eastward from the summit of Mount Marcy with Hay Stack Mountain in the immediate foreground. Marcy is the highest mountain in the State of New York. It was called by the Iroquois Tahawus, which meant the Cloud Splitter. Around it are massed on all sides the highest summits of the Adirondacks.

2 Remarkable panorama of the Mohawk valley showing the New York Central Railroad, the Barge Canal and the river. The Mohawk was the pathway of the pioneers for a century or more before the canal was built; then came the canal and finally the railroad, both in their day great arteries of transportation.

NEW YORK



1 State plantation near the Ray Brook Hospital on State land. The hospital buildings are to be seen in the distance. This in time will be as fine a forest as are the European forests

2 A garden tree garden at Salamanca, N. Y., containing about ten million seedling tree plants. This and several other New York gardens are considered as good as there are in this or any other country. The experimental stage has been passed

NEW YORK



Old Pines on Ampersand Pond in the Adirondacks, near Saranac Lake. This spot was made famous as the "philosopher's camp" where Ralph Waldo Emerson, James Russell Lowell, Prof. Louis Agassiz, and other notable men, camped more than sixty years ago

NEW YORK



Mount Colden, one of the highest Adirondack summits, rising to a height of 4,713 feet in the chain of great peaks about twelve miles south of Lake Placid

constitutional convention and of a revision of the constitution must be submitted to the general vote of the people every 20 years, or more frequently if so ordered by the legislature. It provides also for a State census every 10 years. All citizens in New York State can vote, unless debarred by crimes against the law or of unsound mind. To be a citizen of New York State a man must have been a citizen 90 days, one year a resident of the State, four months a resident of the county and 30 days a resident of the town or precinct. It is also required that voters to be entitled to vote must register, but registration for town and village elections cannot be made obligatory unless by express provision of law. In the cities the holding of party primaries are regulated by law; and the way in which votes shall be cast in all parts of the State is also regulated by law. The officers of the government are the executive, the members of the legislature, the judiciary and their subordinates.

Executive.—The governor of New York is elected biennially, by popular vote at a general election held throughout the State the first Tuesday after the first Monday in November. He appoints a superintendent of public works, a superintendent of banks, of insurance, of State prisons, a council of farms and markets, a State architect, conservation commissioner, commissioner of highways, health commissioner and an excise commissioner. He has a veto right which may be used to prevent appropriations or other legislative measures; but the legislature may overrule the veto of the governor by a two-thirds vote of the members of the senate and assembly. He may pardon or reprieve criminals, and he may commute a sentence. He has power to make appointments other than those mentioned subject to approval by the senate. The officials elected with the governor and for the same number of years are the lieutenant-governor, secretary of State, comptroller, treasurer, attorney-general and State engineer and surveyor. The most important State boards or commissions are for hospitals and charities, for industry, civil service, public service, prisons and tax equalization.

Legislature.—The legislature is composed of a senate of 51 members, who hold office two years; and an assembly of 150 members, who hold office one year. The State is divided into senatorial and assembly districts. The senatorial districts, being less in number, have each a much greater population than each of the assembly districts. The lieutenant-governor is president of the senate. The members of the assembly elect their own presiding officer, who is called the speaker. The populous counties are divided into two or more assembly districts. The members of the legislature receive a salary of \$1,500 and mileage for each session. The legislature holds its sessions in the State Capitol at Albany.

Judiciary.—The Court of Appeals is the highest court in the State. It consists of the chief justice and six associate justices, each chosen by a popular vote and for a term of 14 years. Additional associate justices may be designated by the governor from among the Supreme Court justices to help out with increased business. There are 107 judges belonging to the Supreme Court, each one of whom is chosen by popular vote for 14 years.

The State is divided into nine judicial districts. Other courts provided for by law are County Courts, City Courts, Surrogate's Courts, Justice's Courts.

Local Government.—The incorporation of villages, chartering cities and organization of counties is within the jurisdiction of the legislature. The legislature decides the limit of taxation and assessment for incorporated villages and cities and restricts their power of borrowing money. Any special legislation for a city or the cities of the State shall be submitted to the cities concerned for their approval or rejection; but the legislature may later overrule the veto of the city. Cities are divided, according to population, into three classes. The first class includes cities having a population of 175,000 or more; the second class includes cities having a population of over 50,000 and less than 175,000; the third class includes all other cities in the State.

Militia.—The National Guard, a portion of the State militia, is armed, equipped and ready for service at all times. It numbered 20,243 in 1923 (officers and enlisted men). The Naval Militia is also a part of the State Militia and it also is ready for service at any time. It numbered 2,057 officers and enlisted men. There are four brigades of the National Guard. The headquarters are in Albany.

Political Divisions.—The State is divided into 62 counties. The county officers are judge, surrogate, sheriff, clerk, treasurer, district attorney, superintendent of the poor, coroners, and in some counties auditor and register. Each county, except New York, is divided into towns. The officers of the town are supervisor, clerk, commissioner of highways, assessors, collector, constables. There are 59 cities (1910), the largest of which are: New York, pop. (1920), 5,620,048; Buffalo, 506,775; Rochester, 295,750; Syracuse, 171,717; Albany, 113,344; Troy, 72,013; Utica, 94,156; Schenectady, 88,723; Yonkers, 100,176. The government of the cities is vested in a mayor, board of aldermen and the subordinate officials. Some cities are governed under a special charter. The villages are usually smaller than the cities and the government is administered by a president and a board of village trustees. There are 43 congressional districts; the State sends 43 representatives to Congress. There are State parks and reservations in the Adirondack Mountains and Catskills and others at Niagara Falls, Saratoga Springs and elsewhere. There are eight State Reservations for Indians in various parts of the State.

Religion.—All Christian denominations and the Jews have churches and large congregations throughout the State. Among Christian churches the Roman Catholic predominates in number of communicants and church attendance in the large cities, and Protestants in the smaller cities and country places. The Protestant denominations, according to number of communicants and attendance, rank as follows: Methodists, Presbyterians, Baptists, Protestant Episcopalians, Lutherans and Congregationalists.

Education.—The system of education aims to furnish free schools for all the minors of the State, and in late years a system of education for adults has been organized and put into force with success. Education is compulsory

between the ages of 7 and 16 years. The annual report of the education department (1922) gives the following statistics: Attendance.—Common elementary schools, 1,744,758; special elementary schools, 1,100; common high schools, 230,165; special high schools, 5,816; academies, 54,318; normal schools, 8,121; teachers training classes and schools, 3,543; universities, colleges and professional schools, 67,196; private schools (estimated), 275,000; Indian schools, 758; evening schools, 211,006; evening vocational schools, and trade and vocational schools, 99,644; total, 2,634,229. The number of teachers employed in elementary schools was 55,825; the net value of property, \$600,000,000, and the total expenditures average \$150,000,000. The teachers in public schools are in receipt of an average annual salary of \$1,256, and the total number employed in all departments—elementary, high school and college—averages 71,000.

Training for teachers is given in the State normal and training schools, one State college for teachers and a large number of training classes located in different villages and cities, according to the needs of the sections asking for the establishment of such schools. The system of granting certificates or of licensing teachers is by uniform examinations. The examination division of the State education department makes out the questions, assigns the time (for State examinations, the place), examines all the papers of the candidates and decides who shall or shall not receive certificates. Many of the cities have special rules regarding other examinations, and also the establishment and maintenance of city training schools and classes. The local educational officer in a city and in some of the villages is the superintendent of schools. The country sections are divided into 10,319 school districts and these are grouped in 207 supervisory districts each under a district superintendent. The State education department awards annually on the basis of an examination 750 scholarships, which entitle the recipient to \$100 a year, for four years, to attend any college in the State.

Cornell University (q.v.) is the only institution of collegiate grade in the State which awards special State scholarships by examinations. Columbia University (q.v.), founded under the auspices of the Protestant Episcopal Church, is the oldest institution of the kind in the State. Other colleges and universities are New York University, New York City; College of the City of New York; Union College, Schenectady; Hamilton College, Clinton; Hobart College, Geneva; Colgate University, Hamilton; Saint Lawrence, Canton; Fordham, New York City; Saint Francis Xavier, Manhattan and De la Salle colleges, New York City; Vassar, Poughkeepsie; colleges and universities in Buffalo, Syracuse, Rochester and Elmira; Barnard is affiliated with Columbia. There are 15 theological seminaries, 9 medical schools, 5 schools of pharmacy, 4 dental schools, 9 law schools. The State requires a certain degree of education before beginning the study of a profession, in a State school, and an examination is given at the end of the course to determine fitness and ability for graduation. The New York State Library claims to be the first public library in the State; it was founded in 1700. See LIBRARIES; REGENTS.

Charitable Institutions.—The governor and the senate appoints a State board of charities and a State hospital commission. The duties of the board of charities are to exercise an advisory supervision over charitable institutions, State and local, and over private institutions to which public charges have been committed. The institutions thus supervised number over 500, and the number of inmates in these institutions is about 60,000. The office of fiscal supervisor of State charities was created by chapter 252, Laws of 1902. He is appointed by the governor subject to confirmation by the senate, and has the general supervision over the accounts and expenditures of the charitable and correctional institutions of the State, which include reformatories, industrial schools, institutions for the mentally defective, institutions for soldiers, for the blind, orphans, crippled, deformed and treatment of tuberculosis. State charity institution buildings are contracted for under the supervision or by the approval of the governor, president of the State board of charities and the State comptroller. Among the present State institutions are a house of refuge for women at Albion, a training school for girls at Hudson, reformatory for women at Bedford Hills, soldiers and sailors' home at Bath, Craig colony for epileptics at Sonyea, home for feeble-minded women at Newark, home for orphan Indian children at Iroquois, industrial school, Industry, home for feeble-minded children, Syracuse, home for soldiers' widows, female dependents, orphans and army nurses at Oxford, hospital for crippled and deformed children at West Haverstraw, school for the blind at Batavia, hospital for cases of incipient pulmonary diseases at Raybrook. There are schools for the deaf and dumb, and many private institutions which receive State aid, but are not wholly supported by the State. There are supported annually in county almshouses during a single year about 20,000 persons with a daily average of about 7,500. In city and town almshouses a daily average of about 8,500 are supported. During the same time about 390,000 receive temporary relief. The expenditures for all the institutions supervised by the board of charities for a single year are about \$23,500,000.

The hospital commission has supervision of the State insane hospitals. They are located at Binghamton, Brooklyn, Buffalo, Gowanda, Kings Park, Middletown, New York City, Ogdensburg, Poughkeepsie, Rochester, Utica, Willard. This commission also has control over the two hospitals for the criminal insane at Matteawan and Dannemora. There are about 37,000 patients in these institutions. There are also 20 private institutions authorized by the State board to receive insane patients. The private institutions, partially under State supervision, have about 1,000 inmates. The cost for maintenance and operation of the State insane asylums or hospitals is about \$7,000,000.

Penal Institutions.—The State prisons are located at Ossining (Sing Sing), Auburn, Clinton (Dannemora). The State reformatories are at Elmira and Napanoch; one for women is at Bedford. Houses of refuge for women are at Albion and Hudson. The State penitentiaries (county institutions for short term convicts) are in the counties of Albany, Erie, Monroe,

Onondaga and Westchester. New York has numerous institutions of its own. The counties which do not have penitentiaries arrange with the penitentiary of some other county for care and support of those sentenced to such a place of detention and punishment. The following statement shows the number of convicts in the several State prisons 30 June in each of the last six years:

PRISON	1912	1913	1914	1915	1916	1917
Auburn.....	1,436	1,445	1,416	1,546	1,472	1,244
Clinton.....	1,282	1,382	1,430	1,400	1,443	1,227
Great Meadow.....	507	612	598	916	989	682
Sing Sing.....	1,421	1,281	1,511	1,539	1,582	1,356

The following are the expenditures of the State prisons for the year ending 30 June 1917, for maintenance and ordinary repairs:

Auburn prison.....	\$332,874.58
Clinton prison.....	294,735.95
Great Meadow.....	207,629.03
Sing Sing.....	334,253.03

The abolition of the fee system in many of the counties, the more general application of the law of suspended sentence, the efforts to induce prisoners to reform, all have contributed to the decrease in the number of prison inmates. The system of instruction and training employed at Elmira is resulting in practical reforms. The parole law and the indeterminate sentence are being introduced into many other prisons. Capital punishment is still in force in the State; death by electricity, since 1880, has been substituted for hanging. Murder in the first degree is the only crime for which capital punishment is inflicted.

Population.—Since 1820 the State has held first rank in population. The State receives the majority of the emigrants of whom great numbers domicile. The number of foreign born, resident in the State in 1920, was 2,786,112, or more than double the number in any other State. The population born in the State but of foreign parents was 2,844,083. There were the same year 5,503 Indians, 5,793 Chinese and 198,483 negroes. The urban population has increased and the rural has decreased. In the decade from 1890 to 1900, the rate of increase in population for the State was 21.2 per cent; the rate for the same year for the whole United States was 20.7 per cent. From 1910 to 1920 the rate of increase was 14.0. Pop. (1800) 589,051; (1810) 959,049; (1820); 1,372,111; (1830) 1,918,608; (1840) 2,428,921; (1850) 3,097,394; (1860) 3,880,735; (1870) 4,382,759; (1880) 5,082,871; (1890) 5,997,853; (1900) 7,268,012; (1910) 9,113,614; (1920) 10,385,227.

History.—As the credit for the discovery of America belongs to one Italian, Christopher Columbus, the protégé of the far-seeing Queen Isabella of Spain, the credit for the discovery of New York is linked with the name of another Italian, Giovanni da Verrazano, the Florentine, in the service of Francis I of France. Verrazano's ship, *La Dauphine*, which left Dieppe with several others in the autumn of 1523, unquestionably sailed by Sandy Hook in the middle of April 1524; proceeded as far as Raritan Bay, when by stress of weather Verrazano was forced to return to the open sea and continue his journey to the eastward. While Spain's discovery of the continent antedated the French discovery of New York by 42 years, the

French navigators anticipated the Dutch on the same lines by 85 years. The English who were the last to arrive had no part in discovering any of the land which is now known as New York, although eventually they controlled the entire territory from Florida northward.

French enterprise early determined the importance commercially and politically of the New World, although handicapped by the fierce civil wars that raged from 1560 until the accession of Henry IV in 1594. The year made memorable by the Edict of Nantes, 1598, which secured freedom of worship for the Protestants, the Marquis de la Roche obtained a commission to conquer Canada. His expedition was a lamentable failure. Five years later De Monts, who had been commissioned governor of Acadia, brought a number of colonists to Port Royal, subsequently called Annapolis by the English, but after two years of hardships the settlement was abandoned, the pioneers returning to France. De Monts' commission, which had been revoked, was revived by a company of French merchants who entrusted their fortunes to Samuel de Champlain, a man who by education, ability and perseverance was thoroughly competent to execute the responsible trust committed to him. What William Penn was to the English court, that was Champlain to the French king, Henry of Navarre. He was a soldier and sailor of fortune; a sincere and devoted Christian. To him must be accorded the imperishable honor of being the first man who set his foot in New York, as he was the first to teach religion to the Iroquois. In 1608 he founded the city of Quebec. The 12 years' truce which acknowledged the sovereignty and independence of the Netherlands by Philip II after their long and sanguinary struggle for liberty marked the beginning of a historic era in the New World. On the evening of 29 July 1609, Champlain at the head of a band of Montagnais Indians encountered a war party of Iroquois on the west bank of Lake Champlain near Ticonderoga in Essex County. The next morning the unfortunate Iroquois were introduced violently to gunpowder and the white man's sway and the white man's way opened on the Western Hemisphere.

On 3 September following, Hendrik Hudson sailed into New York Bay on the 80-ton ship *Half Moon*, with a crew of 18 men, half English and half Dutch. Hudson's son accompanied him. Hudson was an Englishman who had twice essayed to reach far Cathay by the northwest passage. The Dutch East India Company, which was the pioneer company to take advantage of discoveries of new territory and whose powers were elastic for the colonization of new empires and the government thereof, persuaded Hudson by the offer of a seductive pecuniary inducement to lend his ability and fearlessness as an explorer to their enterprise. Accordingly on the fourth day of April 1609, he sailed from Amsterdam to seek for the third time the passage to India by the north. Again he was thwarted by gigantic icebergs and impassable seas of frozen ice which blocked his way. He changed his course to the westward, passed Greenland and Newfoundland, and sailed south until he descried the promontory of Cape Cod. He designated the region beyond it New

Netherlands and for a long time the Dutch considered Cape Cod as the northeast boundary line of their territorial possessions. Continuing on his way, Hudson made Chesapeake Bay, but from letters which he had received from John Smith he understood his countrymen were in possession by right of discovery. He put about and headed to the north. He discovered Delaware Bay and river which he christened the Dutch South River. He fixed the southern boundary of New Netherlands from that point. On the second of September the Highlands of Navesink appeared over the horizon to the north. For a week Hudson loitered in the vicinity of Staten Island, which he named—an object of curiosity to the Indians as his ship was of wonder to them. September twelfth Hudson sailed into the Upper Bay and de Groote River, which was called by the natives Shatemuc or Mohicanituck, subsequently the North River, in contradistinction to the South and the East, and eventually the Hudson River in honor of the distinguished explorer who discovered it. Hudson had explored the neighborhood from Sandy Hook to Amboy, indulged in amiable converse with the aborigines and proceeded on his course in search of the northwest passage to India by the way of the Hudson River. It was only after 11 days' sail when he reached the end of navigable waters that he was compelled reluctantly to abandon the undertaking. With a deep feeling of disappointment he turned the prow of the *Half Moon* to the southward. The reports of his success, however, were forwarded to Holland and stimulated further enterprises in the way of exploring and colonization while Hudson was detained at Dartmouth, England, whither he had put in, owing to the threatened mutiny of his crew.

The following year the fur merchants of Holland dispatched another vessel to the River of the Mountains, which for the time was called the Mauritius after Prince Maurice, the stadtholder. In 1611 Hendrik Christiaensen of Cleves sailed for the same destination and returned with two young Indians, the sons of a Manhattan chief. In 1612 three Amsterdam merchants, Hans Hongers, Paulus Pelgrom and Lambert Van Tweenhuysen, sent two ships, the *Fortune* and the *Tiger*, to open up trade along the Hudson River. The *Tiger* was accidentally burned at Manhattan Island and Adriaen Block, its commander, during the winter of 1613-14, built a new vessel, the *Onrest*, of 18 tons, the first to be constructed on Manhattan Island.

Two settlements had already been started in what is now the State of New York; one by Christiaensen on Castle or Patroon's Island, on the west bank of the Hudson, a mile or two south of the present Albany, called Fort Nassau; the second on Manhattan Island, covering the space midway between the Battery and Rector street on the west side of Broadway. Block in the meantime had sailed away to the eastward in the vessel he had built, discovered the island which bears his name, drew a map of all the region and in consequence secured from the States-General a charter for the "New Netherlands Company" under which he enjoyed the monopoly of trade in that region until 1621, when the charter expired. In the latter year the Dutch West India Company came into existence, with a charter granted by the States-

General of Holland. Two years later additions were made and an act of amplification given. Under this charter, which was to endure for 24 years, the company was permitted to trade with the West Indies, Africa and "other places"; all other inhabitants of the United Netherlands were prohibited from trafficking with those countries. It was permitted to appoint governors and other officers; to determine the forms of administering justice, to make treaties and enact laws. Their first packet, the *New Netherland*—under the superintendence of Cornelis Jacobsen May—which plied her ocean trade for 30 years, brought in May 1624 over 30 families, 18 of whom established a settlement at Fort Orange near Albany under Adriaen Joris. Two years later two ships loaded with emigrants, agricultural implements and domestic animals left Holland for Manhattan Island, where the company had decided to erect a larger colony and their headquarters for New Netherlands. With the later colonists came the director-general, Peter Minuit, who the following year, 1626, purchased the island of Manhattan, containing 22,000 acres, from the Indians for 60 guilders, or about \$24.

The colony "boomed" from the beginning and the stock of the West India Company sailed upward. Under "the Freedoms and Exemptions" Act, adopted in 1628, the company gave authority to every person who should send over a colony of 50 souls above the age of 15 years, the title of "patroon" and the privilege of selecting tracts of land, except on Manhattan Island, eight miles in length along the river and as far inland as he pleased. It was obligatory for the patroon to be a member of the company. He was looked upon as a feudal prince. His possessions were exempt from taxation for 10 years. The colonists were prohibited from manufacturing woolen, linen or cotton cloth. Under authority thus conferred Kiliaen Van Rensselaer of Amsterdam, a diamond and pearl polisher, obtained, through Sebastian Jansen Krol, who had come out with Jan Huyck two years before as "a consoler of the sick," a tract of land 20 miles in length, from Baeren Island to Smacks Island, and 24 miles on either side of the river "stretching two days' journey into the interior," constituting the greater part of the present counties of Albany, Rensselaer and Columbia. Michael Pauw purchased from the Indians Staten Island and the land upon which Jersey City and Bayonne are now built. With the development of the land and trade the inevitable occurred. The patroons practically became rivals of the West India Company in the fur trade. As the business of the latter diminished the wealth of the former expanded. Minuit, unable to readjust the differences, was recalled. For two years the office was vacant. It was then filled by Wouter Van Twiller, a name that has been rendered synonymous with farce, burlesque, contempt and arrogance. Van Twiller had married a niece of Van Rensselaer and was an administrator of fair parts. He began the construction of a new fort; he built the first church edifice; a bakery; a brewery; he substituted brick for frame houses and new windmills for old. But his plans failed to mature because of his peculiar disposition. Dominie Bogardus, who had accompanied him to this country in the same ship, stigmatized him as "a

child of the devil" and threatened to "shake" him "from the pulpit as would make him shudder." Van Twiller was removed under charges in 1637 and left office, as did many of his successors, with a fortune he had accumulated in service. His successor was William Kieft, a man of slender abilities and an embezzler, whose 10 years of service were conspicuous for strife — with the English and with the Indians. Like Van Twiller, Kieft was deficient in the art of conciliation. His position was too big for him to handle. He gives a discouraging report of the condition in which he found the colony; farms were barren of tenants and of cultivation or thrown into common; trading vessels in poor shape; houses out of repair; only one saw-mill out of three was in operation; the fort at New Amsterdam, for whose repair his predecessor had received 4,172 guilders, lay in a state of dilapidation and the magazine was scarcely discoverable.

The first English flag seen in the vicinity of New York floated from the vessel commanded by Capt. Samuel Argall, the roving buccaneer, who in 1612 had captured Pocahontas and held her as a hostage for the good behavior of her father. Argall had been dispatched in 1614 on an extraordinary expedition by Sir Thomas Dale, governor of Virginia, to dispossess the unfortunate French people who had settled at Acadia. On his return from this successful buccaneering expedition, Argall paid his respects to the Dutch. He proceeded up the Hudson River to Albany, forced a surrender in the name of the English king, and sailed away. New Amsterdam likewise submitted to Argall's demand, but as soon as his vessels disappeared through the Narrows, the Dutch flag replaced the English ensign as had been done at Albany. In 1633, Jacobus Eelkens, the Dutch commissary at Fort Orange, brazenly attempted to establish English trade on the Hudson, but the scheme was crushed at its inception. The New Englanders were not satisfied with their possessions but coveted the more prosperous settlements of the Dutch to the westward. In 1638 Kieft had issued a prohibition against the English trading at Fort Good Hope near the present Hartford, which had been built in 1623. Shortly afterward, owing to the insolence of the English, an order in council was issued, to strengthen the post, to maintain Dutch supremacy. We first hear of English settlers in New York in 1640 on Long Island. They had crossed the Sound from Connecticut. When the English audaciously confiscated land, near Fort Good Hope, which the Dutch had prepared for planting and brutally chastised farmers who tried to plant, Kieft threw a detachment across the Sound in retaliation and dispersed an English settlement at Oyster Bay.

But Kieft found more trouble on his hands. The Indians of New Jersey betrayed signs of restlessness toward the governor of New Netherlands; he was threatened by the Swedes at the south; he realized the unfriendliness with which the Cavaliers of Virginia, Maryland and Delaware regarded his colony; he could expect no favors from the Puritans on the east. At this crisis he unwisely provoked a quarrel with the Indians by demanding tribute in maize and fur on the ground that the Dutch had supported them in defense of their enemies. From the day

Champlain introduced gunpowder to the savages on Lake Champlain, the red man of the forest had sedulously and successfully cultivated its acquaintance. So that when Kieft imprudently attempted to suppress the sale of guns and their accessories to the Indians, turbulence broke loose along the New York frontier. For three years the bloody strife continued, during which the Dutch in New Amsterdam were driven for protection under the guns of the fort and were reduced to much distress by the aggressive operations of the Manhattans, from the north, the Long Island Indians from the east and Delawares from the south and west, Roger Williams brought about an interview between Kieft and the sachems, but the peace which followed was of brief duration, for hostilities were resumed more savagely than ever before the end of the year. The Indians were bent upon a war of extermination of the whites. They felt their power, the force of their numbers and were thirsting for revenge. "When you first came to our shores you were destitute of food" exclaimed a sachem before a treaty council. "We gave you our beans and our corn. We fed you with oysters and fish. And now for our recompense, you murder our people."

In 1643 "the first germ" of our Federal Constitution was planted by the formation of a league for self-government and common defense by the colonies of Massachusetts, Plymouth, New Haven and Connecticut. For the time it was a powerful organization. To it, Kieft appealed in vain for aid, to carry on his Indian war. The confederacy was organized as much to make aggressions upon the thrifty Dutch as for defense against the Indians. Matters were going badly for Kieft until he solicited the support of Capt. John Underhill, a valiant warrior, under whose skill and energy an able-bodied force was raised, which encountered and defeated the Indians in several pitched battles. Peace was eventually assured in 1645 through the intervention of the Iroquois. Kieft failed to profit by the lesson. The act that led to his recall was the most infamous in Dutch colonial annals. Without the slightest provocation, he crossed to the west bank of the Hudson, with the soldiers from the fort, a mob from the streets and privateersmen and sailors from the harbor. Under cover of darkness he fell upon a band of peaceable and unsuspecting Indians at Pavonia and massacred men, women and children indiscriminately. Kieft left for home with a fortune. The ship was wrecked off the coast of Wales and governor and fortune went down together.

We now come to the much misrepresented and misunderstood Petrus Stuyvesant who arrived at New Amsterdam 27 May 1647, two years after his appointment as director-general. Stuyvesant was the son of a Friesland clergyman, who had been educated to the army and navy as well, had lost a leg in the attack on the Portuguese island of Saint Martin and wore as a substitute a wooden one, that was girdled with silver bands. He was 45 years of age, overbearing in manner, autocratic in speech, prompt and decisive in action and a devout churchman. He conscientiously attempted to carry out the instructions that directed him to guard against aggressions on the colony's boundaries, to preserve peace with the Indians

and to stimulate the growth of villages by the colonists. He found the colony much out of repair and the colonists next to demoralized. The dominating spirit that pervaded the West India Company and all that were connected with it, to the colonists themselves, was personal gain. New Amsterdam and Fort Orange, or Auranian as it was sometimes called, were flooded with an aggregation of unscrupulous merchants and traders, who robbed the Indians on one side and their customers on the other. The example was established by succeeding directors-general and the plain people emulated that example. Stuyvesant inherited the turbulence and the dissatisfaction left by his predecessor and struggled with it courageously and with a hand so firm as to incite unpopularity among many of whose plans he thwarted. A year before his arrival, Kieft had served notice on New England that the English "without provocation" had invaded New Netherlands, usurped divers places, done injuries and not given satisfaction, and that unless reparation were given "such means as God affords" shall be employed "manfully to redress ourselves." Stuyvesant for five years diligently attempted to establish pacificatory measures with the most powerful rivals of the Dutch, the English, and finally in 1650 by repairing personally to Hartford secured a treaty that fixed Oyster Bay, on Long Island, the western boundary of the New Englanders and Greenwich on the mainland.

In the meantime internecine quarrels aroused all the choler and tyranny in his nature. Without funds, the internal improvements he had in contemplation could not be carried out. He had seen how Kieft had quarreled with his "Eight Men," and as a concession for his taxation scheme he ordered an election, allowing the settlers in Manhattan, Brooklyn which had been established in 1645, Amersfoort and Pavonia, to elect 18 individuals from whom the governor and his council should select nine, who were to confer with the director on all measures tending "to promote the welfare of the commonalty and the country." Between the director and "the Nine," dissensions arose over finances. The latter refused to provide money for the repair of the fort, claiming the company was responsible for that expense. They objected to Stuyvesant's management; complained of the heavy assessment levied upon trade, and when he peremptorily refused permission for the people to assemble, they made a house to house canvass. The director ordered delegates from the militia and "the Nine" ordered a journal to be kept by one of their number, Adriaen Van der Donck, and forwarded eventually to the home authorities. Stuyvesant blazing with wrath arrested the writer, threw him in prison on the charge of libeling the government and seized the papers. The controversy was carried with more or less acrimony on both sides to Holland; petitions were dispatched across the sea complaining of the unreasonable and arbitrary exercise of power by the director. Stuyvesant in the meantime played into the hands of his enemies by his reduction of the Swedish possessions in Delaware. As the dissatisfaction of the Dutch burghers against him expanded, sympathy for him on the part of English settlers increased. He had established a weekly market in New York; in 1652 the city was in-

corporated; a year later the palisades were constructed to the north of the present Wall street from the East to the North River; four years later citizenship was created and the city was surveyed, streets were regulated and named and several of them paved.

Under Stuyvesant's administration religion was encouraged and fostered. As early as 1626, Sebastian Jansen Krol and Jan Huyck who had originally sailed to the country as "consolers of the sick" are found, on the Sabbath reading texts out of the Scripture and the creeds to persons who would attend. Two years later, in 1628, Michaelius, a minister of the Reformed Church, organized the first Dutch church in the New Netherlands with 50 communicants. In 1633 arrived Everardus Bogardus who sailed to this country on the same vessel with one governor, Van Twiller, to return home on the same vessel with another, Kieft, only to meet his fate at sea. His quarrels with both have become historical. Along in 1640 Dominie Johannes Megapolensis preached in the church which Kieft had built within the fort, before proceeding to his charge at Fort Orange, the present Albany. The Rev. Johannes Backerus, formerly a clergyman at Curaçoa, in 1647, superseded Dominie Bogardus in the pastoral charge of the Dutch church. New York had not escaped the wave of religious intolerance that had rolled over Europe during the preceding half century. An ordinance was adopted by the Dutch in 1640 that prohibited the exercise of all other religions except the "Reformed as it is at present preached and practised by public Authority" in the United Netherlands. The following year, however, this bigoted mandate was temporarily revoked. Father Jogues, the first Catholic missionary to New Netherlands, found that the colony harbored Catholics, English Puritans, Quakers, Lutherans, Anabaptists termed "Ministes" (the Mennists or Mennonites) and Dutch Reformers. He reported an order was in force denying "public worship" to all but Calvinists. In 1654 the application of the Lutherans to erect a church in New Amsterdam was refused; "no doctrine shall be encouraged in the colony" but "the true reformed," ruled the director-general. The English settlements repudiated the teachings of Megapolensis who in 1649 had succeeded Backerus and who claimed the Classis of Amsterdam in Holland exercised spiritual jurisdiction over the colony. Quakers were arrested, beaten with ropes, were fined and imprisoned for their presumption in preaching their heresies.

The outbreak of war between Holland and England called in play all of Stuyvesant's great ability as an executive officer. The city was put in a state of defense. He had established the city of New Amsterdam and appointed the burgomasters, the schepens and fiscal. He now attempted to adjust affairs with New England but in vain. Indian outbreaks excited the colony for several years. An uprising near New Netherlands was followed by massacres at Pavonia, Hoboken and Staten Island. In three days 100 Dutch colonists were killed, 150 were taken prisoners and a financial loss of 200,000 guilders, \$80,000, was sustained. Devastations at Esopus and the destruction of Wiltwyck were not the least disturbing problems he encountered in dealing with the Indians.

In the meantime the villages of Jamaica and New Haerlem had been created; a municipal court was established at Esopus, known as Wiltwyck; Arendt van Curler, long loved and trusted by the Indians as "Corlaer," had purchased the great flats at Schenectady and the colony was spreading forth like a blossoming plant, north, west and southwest of Albany.

The aggressions of the "malignant English" had been a source of annoyance to the Dutch for years. Cromwell at one time threatened to seize New Netherlands. In 1657 the commissioners of the United New England Colonies conceded Oyster Bay and Huntington to the jurisdiction of New Haven and three years later Huntington and Seatauket. In 1662 Connecticut laid claim to Westchester in spite of provisional treaty. Charles II had granted to the younger Winthrop Massachusetts Bay, including Connecticut, and to his brother James, New Netherlands; the fact that a great part of this territory was not his to give, but belonged to the Dutch, was not included in the consideration in the least. About this time John Scott appeared on the scene. He produced orders for the stringent enforcement of the British navigation laws in the colonies, claimed that Long Island belonged to the Duke of York and proceeded to place the English Long Island towns under one organization, of which he was elected "president." When he attempted to seduce the Dutch towns he encountered the strong arm and the stubborn will of the director-general. The contest was acrimoniously conducted, was protracted and only ended by the appearance, 29 Aug. 1664, in the bay, of the English fleet under Col. Richard Nicolls, who had been ordered by his royal master, the Duke, to take possession of the Dutch province, to reduce the Dutch to entire obedience, "to put them out of capacity of doing such mischief" as they had perpetrated in other quarters. It was repugnant and mortifying to Stuyvesant's courage to surrender his charge without firing a shot and, like a soldier of high spirit, he prepared to make determined resistance, in spite of the appeals of the city authorities and the clergy. "I would much rather be carried out dead," he exclaimed. Stuyvesant appealed in vain for help and for several days cleverly delayed the inevitable. He only yielded when Nicolls entered the harbor with his ships and an overpowering force, and he regretfully signed the articles of capitulation that had been agreed to by the magistrates. On 3 September, New Amsterdam became New York in honor of the Duke, the name of the fort was changed to James, also in honor of the Duke, and three weeks later Fort Orange surrendered and was called Albany, in honor of the Duke. One of the inconsistencies conspicuous in the seizure of New Netherlands by the English is that at the time peace prevailed between England and Holland.

The province received the name of New York. Its population was estimated from 6,000 to 10,000 souls. Municipal officers continued in power, but no more elections of magistrates were to be held by the people. Stuyvesant had insisted upon the guaranty of property and civil rights and freedom of worship — the Church of England service to be held in the Dutch church at New York upon the termination of the service of the Reformed Church. Court proceedings were to follow English models. The

province felt the direful effects of the next 10 years of European wars. On 30 July 1673 with war under way between Holland on one side and France and England allied, a Dutch fleet under Cornelis Evertsen and Jacob Benckes suddenly appeared off Staten Island. Capt. John Manning, in the absence of Gov. Francis Lovelace, who had succeeded the Duke of York's personal representative, Colonel Nicolls, was not disposed to offer resistance, for his soldiers refused to fight and his own people spiked his guns. He surrendered, and the name of New York was temporarily changed, and that of the fort to "William Hendrick." Anthony Colve was proclaimed governor of the province. Under the treaty of 1674 New York was restored to the English. Sir Edmund Andros, an intelligent and wise officer, was appointed governor. In 1678 he describes the province as containing 24 towns or villages with 20 churches, specifies its products and exports as provisions, tar, furs and lumber, fixes the value of estates of £150,000, and the number of men capable of bearing arms at 2,000. Under his régime the Navigation Act was enforced; friendship with the Indians was cultivated to neutralize the influence of the French; a classis of the Reformed Church was established 1679 in New York to ordain ministers, and the governor endeavored to individualize New York as "the most English in sentiment of the American Colonies." Owing to disputes with New Jersey, complaints were filed against Andros with the home authorities. He was recalled, and exonerated; in 1688 he returned under a viceregal government to consolidate the Northern colonies. In the interim the office had been filled by Thomas Dongan, an Irish soldier, a Catholic and a discreet and conservative leader. He brought instructions to issue writs for an assembly; and the people now saw in reality the culmination of hopes began during Stuyvesant's time — the possibility of popular franchise. Accordingly 17 Oct. 1683 the representatives of the people of New York met for the first time in assembly in New York City. The sessions continued until 3 November. It was ordained that assemblies should convene triennially. In 1685 a charter was granted to New York and in 1686 to Albany. The hopes of the colonists for better things were dashed to the ground; the assembly promised by the Charter of Liberties and Privileges never convened, for in February 1685, Charles II died, his brother James the Duke ascended the throne and as James the King repudiated the acts of James the Duke; the charter was vetoed, and the assembly abolished. Dongan had fallen under the royal displeasure by his failure to push forward the doctrines of the Church of Rome and was recalled.

Governor Andros was in arrest at Boston when the news arrived that James had been dethroned and the lieutenant-governor, Francis Nicholson, lacked energy and decision for the crisis. People moreover distrusted him. Wild and exciting rumors were abroad in the land. Stories were circulated that the Catholics were to join hands with the French and overturn the existing order of things. Jacob Leisler was a prosperous merchant and captain of one of the train bands. He had been born at Frankfort and had seen service in the German army. The people turned to him. But the three councillors

remained loyal to Nicholson. Leisler and his friends, fearful of the intrigues of the Catholics, proclaimed William of Orange, king. Ten members of the assembly were appointed by Leisler as a committee of safety, and Leisler was declared by them to be governor. He carried his authority with a high hand. He usurped the functions of the lieutenant-governor and claimed the title; he opened letters addressed to Nicholson and arrested and imprisoned those who refused to obey him. When French invasion upon the destruction of Schenectady in 1689 was imminent, he displayed great energy, declared himself as the acting governor and forced recognition from Peter Schuyler, mayor of Albany, who had resisted the authority of Jacob Milborne, son-in-law of Leisler, whom he dispatched up the Hudson with an armed force to subdue the thriving city. On the strife between Leisler on the one side and Capt. Richard Ingoldesby and Col. Henry Sloughter, who had been appointed governor by William and Mary on the other; on Leisler's imprudent actions, it is not necessary to dwell. Eventually he was forced to submit. Pursued by vindictive enemies, he and Milborne died as martyrs. Sloughter, stupefied with rum, signed their death warrants and they were hanged near the site of the present *World* building in New York City 16 May 1691. Leisler was unquestionably a sincere but misguided man. Four years later Parliament reversed the attainder of Leisler and his associates. Lord Bellomont, afterward the enlightened governor of the province, declared that Leisler and his son-in-law were "not only murdered but barbarously murdered."

The history of the province for the following 84 years is conspicuous for brawls between the governor and the assembly; for efforts to disseminate the doctrines of the Episcopal Church and to weaken the influence of the French and of the Catholic Church; to develop the land and the fur trade; to increase the growth of the towns; to preserve peace with the Indians; to cultivate privateering, and to wink at piracy; to reconcile differences with neighboring colonies. Much depended upon the sincerity, honesty and integrity of the governors. In the whole line of administrators from Nicolls to Tryon, under English rule not more than three governors can be cited in whom those three traits can be found. The governor's power was absolute. He not only made the laws but interpreted and executed them and when necessary unmade them. He usurped the prerogatives of the assembly and of the courts; his council were mere automatons who danced when he pulled the string. No act of the assembly was placed on the statute book without his signature, and no decision of the court was valid until he, as chief justice, passed judgment; and in this respect he exercised powers denied to the king for his majesty, while permitted to sit on the king's bench, was prohibited from expressing judgment. Time and again the governor was threatened with removal; now and then charges were preferred against him and once the grand jury was urged to indict him for high treason. It is a sad commentary on the record, that every colonial governor who took office poor left office a wealthy man. There were three notable exceptions, the Irish earl, Lord Bellomont; Robert Hunter, the friend of Addison and Swift, and William

Burnet, son of the bishop of Salisbury. The province had already become the haven of the persecuted of foreign countries. Between the years 1678 and 1696 the population of New York City had nearly doubled—from 3,400 to 6,000; that of the province had increased to nearly 30,000. The infamous practice of transporting felons to America and the degrading slave trade produced the most pernicious effects upon the cause of labor, stamping it with the stigma of disgrace in the one instance and involving a contraction of wages in the other.

Under General Hunter was tried the experiment of colonizing the Palatines. The scheme originated with English politicians who saw in it a vast profit in developing the British commercial resources, at the same time menacing French supremacy by strengthening the frontiers. Settlements were established first at Livingston's Manor, and subsequently along the Mohawk and in the Schoharie region. The experiment involved a loss of £100,000 to its projectors.

In 1732 occurred the memorable struggle between Rip Van Dam, the senior councillor, and Governor Cosby. The original cause was puerile and insignificant, and involved only a few pounds, a fraction of the salary Van Dam claimed during the 13 months he acted as governor; it culminated in one of the most glorious episodes in history and established the principles for the freedom of the press in this country for all time; through the courage of John Peter Zenger, editor, and the brilliant scholarship of Andrew Hamilton, his advocate in the famous trial for libel. Nine years later, the province was thrown into paroxysms of alarm over the so-called "Negro Plot." Several mysterious fires occurred in New York about the same time and the impression got abroad that negroes had kindled them with the ultimate determination of burning down the town. The only basis for the suspicion was the unsupported testimony of an ignorant immigrant woman who was bound out to the keeper of a disreputable resort. Every negro became a suspect and large rewards were offered for the conviction of an incendiary. Before the frenzy ended, under the judgment of the court, 13 unfortunates were burned to death, 18 were hanged and 70 transported.

For years, more or less apprehension prevailed over French invasion. The French wielded greater influence over the Indians through religion and princely presents. Settlements had been established at Oswego and at Niagara, and the governors were periodically at their wits' ends to protect them. November 1745, instigated by the French, a band of redskins rushed upon Saratoga—after Fort Hoosick had surrendered—killed the brother of Peter Schuyler and a number of others, spread destruction over the surrounding country and carried off to Canada a number of captives. The assembly of New York then followed the example set by Massachusetts and offered a bounty for Indian scalps. England had been remiss to a degree in neglecting even ordinary protection for its settlers. The home ministry permitted France to fortify and hold Crown Point, in spite of the protests from the province, whence war parties darted on their incursions of devastation, desolation and death.

Governor Clinton who succeeded Clarke as

governor in 1743 was a sailor by profession and carried into the office all the old-time martinetism of the quarter deck. He attempted to overcome England's handicap with her redskin neighbors. In August and September 1746 he held a council at Albany with the Iroquois with the intention of establishing an alliance and to counteract the marplotting of the French and the Jesuits. To strengthen the bonds of friendship and as an effective object lesson, Sir William Johnson, the English Indian agent for New York, appeared in the full garb of a savage, paint and all, and walked as an Indian chief at the head of the Mohawks. Owing to the illness of Governor Clinton, Cadwallader Colden explained to them that the French had been defeated at Annapolis; and that troops from Massachusetts, Connecticut and New Hampshire had captured Louisbourg. He informed them that the English king had sent troops enough to take Canada from the French and urged them to join the English in the undertaking. Oration was thereupon delivered, belts exchanged and presents divided; the Indians gorged and guzzled, warbled and danced and agreed to join the English procession, and the northern part of the province was overrun with war parties who scalped and spattered blood, of male and female, young and old, the strong and the helpless, with unbridled ferocity. Governor Clinton accumulated a princely fortune during his 10 years' service as governor and could well afford to quarrel with his assembly, as several of his predecessors had done, over the permanent support bill. His successor, Sir Danvers Osborne, hanged himself with his handkerchief 21 Sept. 1753, five days after his arrival in New York.

James DeLancey, lieutenant-governor, one of the best equipped men in the province for the position, succeeded him. He had been born in Albany and was the first governor to the manner born. He presided over the congress at Albany in 1754 that contemplated union among the colonies, and opposed the plan. The Treaty of Aix-la-Chapelle was a dead letter so far as the colonies were concerned, for French aggressions were more exasperating than ever. With the outbreak of the French and Indian War, Sir William Johnson, who had married the sister of the Indian chief Joseph Brant, and who never had commanded a company of troops on the field, was placed at the head of a force of 3,400, who marched to the northward. At Lake George on 8 Sept. 1755, occurred the battle which brought a baronetcy and a fortune to Johnson, deprived the officers who really won the victory of credit, led to the death of the celebrated Mohawk, Hendrick, and put to rout the French forces under the accomplished French general, Dieskau.

The main incidents in the French and Indian war were the capture of Fort Oswego by the French general, Montcalm, 14 Aug. 1756; the surrender and massacre at Fort William Henry at Lake George on 9 Aug. 1757 where Montcalm with 8,000 French and 2,000 Indians overcame the garrison of Colonel Monroe of 3,000 men; the surrender of Fort Frontenac to Col. John Bradstreet, and the surrender of Fort Niagara to the English 20 July 1759.

The birth of liberty in the State of New York practically occurred in the colonial con-

vention to consider the Stamp Act, 7 Oct. 1765. With the accession of George III, 25 Oct. 1760, a new conflict broke out between the colonists and the authorities. All commissions expired with the sovereign. It was now contemplated to permit the judges to hold office only "during his Majesty's pleasure" instead of "during good behavior." Up to 31 March 1774, when the Boston Port Bill became a law, agitation throughout the provinces had become more and more pronounced and the people more and more unsettled. The battle of Golden Hill in New York City in 1770 had inflamed the public mind to the possibilities and their representatives of the Crown in their constant collisions with the Sons of Liberty over the destruction of their liberty pole contributed naught in diminishing the drift of popular sentiment. On 23 May 1774 New York published its declaration of rights at Fraunce's Tavern in New York City. Two months later delegates were chosen for the first Continental Congress which convened in Philadelphia 17 Sept. 1774. On 1 May 1775 the committee of 100 was appointed as the successor of the New York committee of correspondence and the committee of inspection, respectively. The constitutional government had gone out of existence. The sentiment of the English party in New York City was naturally in sympathy with England; the old Dutch settlers, with their bitter remembrances of the 100 years of English rule, were almost unanimously in favor of revolution, but when the second Continental Congress convened in Philadelphia 10 May 1775, and the country had tasted all the horrors of war, there were members, especially from New York, who were still hopeful that the manifold grievances might be redressed. Grave events were happening with great rapidity. Fort Ticonderoga had been surprised and captured by Ethan Allen and Benedict Arnold 10 May; two days later Crown Point surrendered; within a week Arnold had captured Saint Johns, Canada, and William Tryon the last English governor, who five years before had succeeded Lord Dunmore, sought refuge on the British gunboat *Asia* in the harbor of New York. Throughout the war New York was the real battle ground; topographically and strategically its position was recognized as of the utmost value to English and American as well. The English plan of campaign was based upon that of the French of 1689 and of Montcalm in 1757; namely, to break the back of the province by an invasion operating from the north and from the south along the valley of the Hudson. It was the objective that brought Burgoyne to America in the summer of 1777, when the American forces and American people were disheartened by successive defeats that included the battles of Long Island and the evacuation of New York City; the defeat at White Plains and surrender and massacre at Fort Mifflin. Three of the most important battles of the Revolution were fought on the soil of New York; that of Oriskany, 6 Aug. 1777, which practically shattered the right arm of Burgoyne, and that of Walloomsac, for many years mistakenly called Bennington, which shattered his left arm, both of which contributed immeasurably to the culminating defeat at Saratoga where the first British army in the history of England lay down its arms to an army composed of farmers.

Sir Henry Clinton had started from New York only too late to assist Burgoyne and had captured Forts Clinton and Montgomery in the Highlands of the Hudson 6 October, 11 days before the surrender. On 16 Oct. 1777, the British colonel, Vaughan, ascended the Hudson to Kingston, which was burned without the slightest provocation, leaving a stigma upon the British name for pure vandalism that has never been effaced.

With Burgoyne's surrender, New York State was relieved of large standing armies, but was called upon to encounter straggling foes that menaced the frontiers and exposed towns to the close of the war. During the campaign of 1776 the safety of the people was indubitably secured by the tireless energy and countless resources of General Schuyler, but with his retirement from the Continental army as commander of the Northern District, the frontiers were left to shift to a large extent for themselves, and the Indians under Brant with the Tories under the bloodthirsty Butler swept over them with torch and scalping-knife, meeting with feeble resistance until Congress and General Washington selected John Sullivan to destroy their crops and burn their villages from the Chemung to Niagara.

In October 1780 the Schoharie and Mohawk valleys were ravaged by a force of 800 Indians and Tories under Sir John Johnson. With the exception of the slight skirmish at Johnson Hall where Col. Marinus Willett put the enemy to rout, New York saw no more active fighting except sporadic brushes here and there between the militia and straggling bands of Indians.

The constitutional history of New York dates from the adoption of the Declaration of Independence. The Provincial Congress which had been elected in April met in the city of New York 14 May 1776. Before the convention adjourned the subject of independence was considered and it was resolved that it was the sense of the colony that the people desired to continue dependent upon Great Britain. As soon, however, as it was known that the Continental Congress recommended that each colony should establish its own form of government, a decided change of sentiment occurred in New York. When the newly-elected convention assembled at White Plains 9 July 1776, the old régime had ceased to exist and the New York Congress became "the convention of the representatives of the State of New York," the Declaration of Independence was speedily ratified and a committee was selected, of which John Jay was chairman, to draft a constitution for the State of New York. The enemy seriously interfered with the plans of the convention. New York had been abandoned. The British men of war patrolled the harbor within seven miles of the place where the constitution framers were at work. Courts of law had been abolished, but the convention ordered that all magistrates and civil officers who were affected toward independence should continue to exercise their duties and that processes hereafter must issue in the name of people of the State of New York.

The draft of the constitution was submitted 12 March 1777. It was adopted 20 April and an election was ordered to be held in June. The sentiment of the constitution was decidedly

English and its tone was aristocratic. It discredited the office of governor and it distrusted the people. Its abiding faith in the judiciary stands out in a strong light. It was liberal in its religious sentiments in that it permitted "the free exercise of religious profession and worship without discrimination or preference of all mankind." Slavery was still supported, although Gouverneur Morris and John Jay, who had been most instrumental in drafting the instrument, had attempted to move for its gradual obliteration. Its two weak features were the Council of Appointment, which was supposed to be a check upon the governor, and the Council of Revision, which was supposed to be a check upon the legislature. The Constitutional Convention of 1801 was called to determine the jurisdiction of the governor and the Council of Appointment in the matter of patronage. The decision of the convention divided the responsibility equally between the four senators who constituted the Council of Appointment and the governor. The two obnoxious councils, Revision and Appointment, were abolished by the constitution of 1821 which at the same time enlarged the area of the elective franchise by removing the property qualification. The weakness of the Articles of Confederation that had become apparent within a year of their adoption threatened to shipwreck the country unless a strong form of government was organized and substituted in its place. General Washington and Alexander Hamilton had been agitating the necessity for a more powerful and cohesive instrument. On 17 Feb. 1787, the assembly of New York adopted joint resolutions instructing the delegates of the State in Congress to move that a convention be held for the purpose of amending the Articles of Confederation so as "to render them adequate to the preservation and support of the Union."

Messrs. Robert Yates, John Lansing, Jr., and Alexander Hamilton were appointed delegates to the Federal Constitutional Convention which met in Philadelphia on the second Monday in May 1787, and which concluded its work 17 September. Messrs. Yates and Lansing withdrew and Hamilton was the only delegate from this State who signed the new constitution. The State convention to act upon the new constitution convened at Poughkeepsie 17 June, and adjourned 26 July. Ten of the 13 States had ratified the constitution—one more than the number necessary—with New York rebellious. George Clinton, governor of the State from 1777-95, appeared as the most resourceful opponent of the new constitution and led the anti-Federalist forces on the argument that New York was too powerful and wealthy to place herself on a par with States not her equal in income and resources. Alexander Hamilton and Robert R. Livingston were the strongest advocates of the new constitution. In July notification was officially made that Virginia and New Hampshire had approved the new constitution, and the Federalists thereupon offered a resolution "that the Constitution be ratified in full confidence that the amendments proposed by this convention will be adopted." The resolution was adopted 30 to 27, eight members, including Governor Clinton, declining to vote. From this time forth two parties existed in the State of New York, the strict and the loose constructionists. The State of New York, owing to the

failure of the legislature to agree in the choice of electors, lost its vote for President at the first election under the Federal Constitution.

The first political struggle in the State occurred in 1792 over the election for governor, when Governor Clinton by a fluke defeated John Jay. New York had experienced a number of disputes with her neighbors over boundary jurisdiction, especially with New Jersey, Vermont, New Hampshire and Massachusetts. New York was the first of the States to cede lands belonging to her to the United States for the encouragement and development of immigration. Within a space of seven years, 5,500,000 acres of land within the State had been thrown open to settlers, bringing to the State treasury \$1,030,433. Population fairly jumped and it was necessary to create a number of new counties north and west of Albany. Internal improvements, turnpikes and the development of waterways were constant subjects of discussion, and these subjects received an extraordinary stimulus in 1807 when Robert Fulton made the first trip with his steamboat on the Hudson River between New York and Albany. Three years later a commission was appointed to survey a route for a canal to Lake Erie. On 16 April 1816, commissioners of construction were appointed, and in 1817 commissioners of the canal fund were organized. As the construction of the canal proceeded a number of counties were opened to the right and left, and when the canal was completed in 1825, the population of the State had increased to 1,500,000.

Up to the outbreak of the second war with Great Britain, political struggles in New York were marked by fierce acrimony. Never was hostility more bitterly displayed and personal vituperation carried to greater excess. Hamilton had fallen in the duel with Burr, and from that hour dueling was banished as a social evil in the State of New York. The Clinton family, the venerable George, who had been a candidate for President against Madison, through the wire pulling of his brilliant nephew, DeWitt Clinton, had been elected Vice-President and opposed the Federal administration of President Madison, whose New York representative seems to have been Gov. Daniel D. Tompkins, an adroit politician and an able man.

At the opening of the Presidential campaign of 1812, DeWitt Clinton aspired, through his Republican affiliations, for the Presidential nomination and was nominated by a number of his friends in New York City; but on 18 May, President Madison was unanimously nominated. When Congress declared war in June, the President issued a patriotic proclamation which rallied to his support the entire Republican party and forced Clinton to abandon his own party and consort with Federalists.

During the second war, Governor Tompkins stands out as strong a character as George Clinton during the War of the Revolution, and like the first war governor of the State, he was selected, in honor of the distinguished services he had rendered to his party and the State, to serve as Vice-President of the United States with James Monroe from 1817 to 1825, during "the era of good feeling."

Judge Tompkins presided over the Constitutional Convention of 1821. With the adoption of this constitution, the Federalist party went

out of existence for all time in New York State, and the new conservative element under the leadership of Martin Van Buren and DeWitt Clinton took charge of the party machinery.

It was during the term of DeWitt Clinton as governor that the anti-Masonic craze swept the State and largely influenced national politics by the disappearance of William Morgan from Canada, 12 Sept. 1826. On 4 July 1827, by legislative enactment, slavery was abolished. Gov. DeWitt Clinton died suddenly at Albany on 11 Feb. 1828 and his successor, Martin Van Buren, resigned in order to become Secretary of State in the Cabinet of President Jackson.

Under the administration of Enos T. Throop, who acted as governor until the regular election in 1830 when he was chosen governor, the manufacture of brick by machinery was begun in New York; the *Albany Evening Journal* was started by Thurlow Weed; the first omnibus was built and used in New York City; the Albany and Schenectady Railway was opened; chloroform was first obtained at Sacket Harbor; the Whig party was formed; the first horse street railway in the world was opened on Fourth avenue, New York City; and the Anti-Slavery Society of New York was organized. William L. Marcy, who succeeded Mr. Throop, resigned his seat as United States senator upon his election as governor, was a rabid partisan and rigid economist and favored moderate protection to home industry. He advocated internal improvements and after his re-election in 1834 recommended enlargement of the Erie Canal and approved the construction of the Black River and Genesee Valley canals. The city of Albany now was recognized next to Washington as the political storm centre of the Union for her reputed "Albany Regency," which for years made and unmade candidates, controlled legislation and ruled the party and the State with arbitrary and at times high-handed methods. Mr. Van Buren was responsible for the breaking up of President Jackson's Cabinet by his open recognition of Peggy O'Neil; his rejection by the United States Senate as Minister to England by the casting vote of Vice-President Calhoun would have led to a general dissolution of the Democratic party had it not been for the resolute individuality of President Jackson.

New York suffered with the rest of the country by the panic of 1837, which originally can be traced to the removal of the deposits from the United States Bank in 1833, and by the deluge of "shinplasters," as a consequence of legislative prohibition of bank bills under the denomination of \$5. The election of President Van Buren was immediately followed by the financial disaster, a calamity which arrayed against the State and national administrations the entire banking and financial institutions of the entire country; that opened the way to the election of William H. Seward, the first Whig governor, in 1838, and two years later of William Henry Harrison on the "Tippecanoe and Tyler too" platform, the first Whig President of the United States. So demoralized were the finances that in 1841 the State was unable to borrow money to pay contractors upon the canals and in 1842 a law was passed suspending work and providing for the raising of money by taxation. The Erie Railway which secured a charter in 1832, which obtained from the legis-

lature in 1836 a loan of \$3,000,000 and which by 1840 was completed as far as Goshen, was abandoned, the company made an assignment and it was not until 1851 that the road was completed. Public works of all character were suspended and discouragement and depression were paramount.

During the next decade through the administrations of Governors Bouck, Silas Wright, Hamilton Fish and Washington Hunt, the anti-ent troubles were a very prominent disturbing factor in the State and the question of slavery throughout the country began to assume proportions that pointed inevitably to war. The Constitutional Convention of 1846 was held at the height of the demand of popular sentiment for the limitation of the power of the governor and of the legislature and for the extension of the elective franchise. The Convention abolished the Court of Chancery, limited the power of the legislature over the revenues, stripped the legislature of the power to appoint general administrative officers of the State, and substituted general laws for the organization of business corporations instead of special legislation. In consequence a great impetus was given to the organization of banking, telegraph, insurance and railway companies to conform with the prodigiously expanding institutions of the State.

The split in the Democratic party, owing to the slavery problem, and the rapid growth of the Free Soil movement in New York, decided the election of General Taylor for President in 1848 and the election of Hamilton Fish as governor. The Whig party in turn was torn by dissensions in 1850 when Washington Hunt was elected governor over Horatio Seymour, and two years later when Seymour carried the election, it was a natural consequence of the condemnation of the people for the Compromise measures in Congress. The Whig party ceased to exist as a factor after 1852. With the exception of the slight disturbances in the State over temperance legislation, national politics monopolized the attention of politicians until 1857. In the meantime the American party and the Republican party came into existence. The agitations in Kansas and Nebraska, with the reckless threats of the Southern leaders in Congress, opened the eyes of the most sagacious to the possibilities of war between the sections of the country. The panic of 1857 produced a temporary set-back to the rapidly growing prosperity of this State. When Edwin D. Morgan was elected governor in 1858, the most active parties were the Democrats, the Americans, the Abolitionists and the Republicans. Governor Morgan was re-elected in 1860 on the same ticket with Abraham Lincoln, who had defeated New York's favorite senator, William Henry Seward, for the nomination for President at the Chicago convention.

On 12 April 1861 Fort Sumter in Charleston Harbor was attacked. On the 15th President Lincoln issued a call for 75,000 volunteers to defend the life of the Union. The Union Defense Committee of New York was organized that evening. Within 10 days 7,334 men were on their way to Washington—the first regiment to respond to the call was the 7th New York, Colonel Leffert's. April 16th the legislature created a State board to enlist and equip 30,000 men. Eighty-two companies were accepted in one week. The first volunteer regi-

ment left the State 29 April and the last 12 July. Governor Morgan, who had been commissioned major-general, was placed in command of a separate military department of the United States constituting the State of New York. During the four years of war, New York furnished 448,850 men, or one-sixth of the total. This proportion holds good in the total losses and casualties. For organizing, uniforming, equipping, substituting and transporting troops, the State expended \$3,745,554.98; for bounties, \$50,657,406; for relief, \$500,773; or in aggregate, all-things considered in the way of official outlay on the authority of the State, \$57,569,082.56. The sentiment of New York State placed the responsibility for the war upon the Democratic party, although at the outbreak thousands upon thousands of Democrats who had stood shoulder to shoulder with the political fire-eaters of the South joined the Republican ranks, a very large proportion obtaining commissions as officers in the army of volunteers which had been hurriedly thrown together. The succession of Union disasters, however, and the declaration of the Emancipation Proclamation by President Lincoln had created a feeling of distrust, uncertainty and doubt, which led in 1862 to the overthrow of the Republican party and the election of Horatio Seymour as governor over Gen. James S. Wadsworth, an estimable gentleman and valiant soldier. The rebuke administered was not so much in the nature of a protest against the war as it was a protest against the conduct of the war. The success of the Democrats led to a marked decrease in the number of enlistments, which forced the national government to resort to the expedient of draft. The demagogical utterances of Governor Seymour had led the reckless and lawless throughout the State to believe his hostility to the conduct of the war included protection for them in the commitment of criminal acts. Unprotected by the transfer of its local militia to Pennsylvania after the battle of Gettysburg, New York City was now exposed for several days to mob law in the enforcement of the drafting, unequaled in the history of the country. Governor Seymour directly repaired to the metropolis, began a conciliatory speech by addressing the mob as "my friends," but eventually warned them by proclamation. The insurrection was only subdued by the return of the local military organizations.

Governor Reuben E. Fenton succeeded Governor Seymour in 1864, having been elected on the same ticket which returned Abraham Lincoln to the White House for his second term as President of the Nation. With the return of peace the country was confronted with the difficult problem of assimilating the hundreds of thousands of soldiers who were now seeking employment in civil life and ordinary avocations. One of the first propositions considered by the people during the second term of Governor Fenton was the agitation for the convention to revise the constitution, which culminated in the Constitutional Convention of 1867 that assembled at Albany on 4 June. The Hon. William A. Wheeler of Malone, afterward Vice-President of the United States, was president of the convention which ended its labors on 28 Feb. 1868. The new constitution was adopted in the convention by a strict party vote. It introduced several original propositions. The

NEW YORK



1 Lindenwald, the home of Martin Van Buren, Kinderhook, Columbia County, after he retired from the presidency. Mr. Van Buren resided here for 21 years from 1841 to 1862. The house was built in 1797 and is still in a good state of preservation

2 View of the spacious hallway at Lindenwald. Observe the old-fashioned wall paper put on in Van Buren's time. The pattern is of hunting scenes. In this hallway the former president received notable men of the United States and other countries

NEW YORK



1 One of the beautiful vistas on Lake George

2 Launch race course on Lake George

legislature was reorganized, restrictions were imposed upon the exercise of legislative powers; the veto power of the governor was strengthened; a court of claims was created and the judiciary system was modified. The legislature of 1868 failed to pass an act to submit the proposed constitution to the people; as a result of the general election held in that year the power of the State was transferred from Republican to Democratic hands. John T. Hoffman of New York was elected governor, largely due, it was claimed at the time, by flagitious debauchery of the ballot boxes in New York City by the Tweed ring which succeeded in carrying the State for the Democratic candidate for President, Horatio Seymour, by 10,000. From this year the vote of the city of New York in State politics was recognized as a powerful factor. Governor Hoffman was called "the veto governor" because of the unprecedented exercise of the veto power. During his four years in office he vetoed 495 bills, only two of which subsequently became laws. He established the precedent of filing his reason in writing with bills he declined to sign at the end of the legislative session. The Tweed ring during his reign attained the height of its power. For audacity and rapacity the methods of the Tweed ring were unequalled, but it was soon brought to grief through the disclosures of the *New York Times*. In the meantime it had succeeded in re-electing its favorite candidate, John T. Hoffman, who at the close of his office retired to private life. As a consequence of the operations of this ring, two Supreme Court judges, George G. Barnard and Albert Cardozo, and one Superior Court judge, John H. McCunn, were ordered to be impeached. Barnard was convicted and removed from office; Cardozo resigned and dodged his trial; McCunn was removed and shortly after died of a broken heart. While the exposé of the Tweed ring demoralized the Democrats, the Republicans were more or less torn by the dissensions in their own ranks on national affairs. An agitation for the revision of the Constitution had been general throughout the State for several years, had been advocated by Governor Hoffman and was now recommended by Governor Dix, who in his message called attention to the misuse of sinking funds and to the abuse of the appropriations by the legislature for private charities. The State was suffering from the oppressive financial weights that had been imposed by the War of the Rebellion from the reckless extravagance that had become a part of the body politic. A constitutional commission undertook to curb the expenditures and the squandering of public moneys. Samuel J. Tilden, who defeated Gen. John A. Dix for governor in 1874, and who had been actively instrumental in prosecuting the Tweed ring, carefully scrutinized the heavy expenditures that had been made on the canals, and advocated rigid retrenchment. The effect of the financial disasters of 1873 had fallen heavily upon the people of the State. In the winter of 1875 canal boatmen, owners and forwarders petitioned the governor for relief, urging a further reduction of tolls. On 18 March 1875, the governor sent a special message to the legislature arraigning the management of the canals. A commission was appointed to investigate the system. Twelve special reports were made to the governor, dis-

closing a long line of abuses and calling for the prosecution and punishment of recreant public officers.

Lucius Robinson was elected governor in 1876. He followed the efforts of his predecessor to curb extravagant outlays upon charitable institutions, urged economy in all public expenditures and used the veto power fearlessly. Governor Robinson was defeated in 1879. Alonzo B. Cornell, Republican, was the successful candidate. But for several years the Republican party, although successful in the Presidential election in 1880, was demoralized by the fierce struggle between the Stalwarts and Half-breeds, consequent upon President Garfield's repudiation of Senators Conkling and Platt in the matter of making Federal appointments in the city and State of New York. The assassination of President Garfield, the accession of Vice-President Arthur, the defeat for governor in 1882 of Charles J. Folger, the defeat for nomination to the Presidency of General Arthur and the election of Grover Cleveland for governor in 1882 and as President in 1884, all resulted from this bitter and unrelenting partisan warfare.

David B. Hill succeeded, as governor, Grover Cleveland, elected President, and held office from January 1885 to January 1892. During these years the first practical step for the creation of an Adirondack State Preserve was taken; the Niagara Falls Reservation was created; use of electricity in death sentences established; and State board of arbitration created.

Governor Hill was succeeded by another Democratic governor, Roswell P. Flower. The elections of members of the legislature were closely contested. Governor Flower urged the passage of laws for an enumeration of the population and the establishment of a forest preserve. A law was passed calling for the meeting of a constitutional convention in 1894. When this met it was under the control of the Republicans and many changes were made, the most important being that which set the governor's term at two years and another which was aimed to prevent the legislature from passing laws affecting individual cities. The constitution was accepted by the people at the election in November 1894 and is that under which the State is now operating.

Factional fights among the Democrats in the State and other issues enabled the Republicans to get control in the elections of 1894 and to retain it until 1911, electing as governors Levi P. Morton, Frank S. Black, Theodore Roosevelt, Benjamin B. Odell, Frank W. Higgins and Charles E. Hughes in the order named.

In the year 1898 the Spanish-American War broke out and gave New York and its citizens an opportunity to distinguish themselves in their service to their country. In this no one was more prominent than Theodore Roosevelt, who had now a reputation for tackling reforms in the civil service and in the management of the police in New York City. His popularity born of a dramatic career as colonel of the "Rough Riders" during the war carried him into the governor's chair. His measures for franchise taxation, civil service reform and other legislation met with considerable opposition from the older members of the Republican party, but were eventually put through.

In the last year of Governor Flower's administration, 1894, the Republicans had got control of the legislature and they began a series of investigations, particularly into matters affecting the control of New York City by the Democrats. The first, known as the Lexow committee of the senate, showed that the police of that city had been interfering in the elections, and the second, chosen in 1899, and known as the Mazet committee of the assembly, showed that Tammany candidates for judgeships were systematically levied upon for campaign contributions.

The Republicans themselves, however, were not able to keep free of accusations of wrongdoing. In 1895 a question of appropriating \$9,000,000 for Erie and other canal improvements was submitted to the people and passed, but in 1899 there was so much talk of corruptions in the canal expenditures that Governor Roosevelt appointed two Democratic lawyers to make an investigation. They made a report which showed that there had been frauds perpetrated, but carried out in such a way as to make prosecutions difficult.

A commission was appointed to make a survey of the whole canal system. This recommended widening and deepening the canals so that they would accommodate 1,000-ton barges. Though vigorously supported by Governor Roosevelt, the recommendations were not carried through the legislature. Governor Roosevelt also appointed a commission to revise the New York City charter, many of whose provisions had met with severe condemnation. Many changes were made and put through by the legislature under Roosevelt's successor, Benjamin B. Odell.

It was commonly stated that Governor Roosevelt because of his offense to old Republican leaders in his efforts to "clean up" bad conditions wherever found was nominated for Vice-President of the United States in the elections of 1900, with the idea that this office would put him in obscurity. He was elected and McKinley was chosen President. The assassination of the latter in 1901 elevated him to the Presidency.

Governor Odell was very active, proposing constructive legislation and in carrying it through. Under his successor, Frank Higgins, were begun the preliminary investigations into the political activities of the great life insurance companies, which really brought the next Republican to the chair of governor.

One of the ablest of the Republican governors in the matter of reforms was Charles E. Hughes. He came into prominence in 1905 as counsel for the Armstrong commission of the legislature, which was appointed to investigate the life insurance companies. The revelations of the use of the policyholders' money to influence legislation created so much indignation that Hughes became a popular candidate for governor and was chosen to the office in the elections of 1906. He determined to suppress gambling at race tracks and he carried his race-track bills through the legislature in spite of the bitterest kind of opposition.

He was equally determined to put through his direct primary law, which he felt would end the control of nominations for office by bosses in political conventions. He did not carry his measure and in 1910, during his last

year, he accepted an appointment as a justice in the United States Supreme Court.

The Republican party had been split by factions owing largely to the determined efforts of men like Roosevelt and Hughes to reform conditions, so that in the elections of 1910 John A. Dix, a Democrat, was elected governor. During his administration the people voted \$101,000,000 to enlarge the canals in order to make them navigable by 1,000-ton barges. Thus was begun the improvement which was to cost the State of New York nearly \$200,000,000 before it was finished.

A direct primary law to which the Democrats pledged themselves in the election campaign was also put through, but did not accomplish the purposes for which it was intended.

The Democrats did not retain their control of the State very long. In 1912 they elected William Sulzer. He began an advocacy of numerous reforms such as the child labor, minimum wage and other laws. He pushed vigorously for a perfected primary law. He soon came to serious disagreements with the party leaders and declared himself independent of them. They, through the members of the legislature, impeached him, not for anything which he had done while in office but because of his misapplication of campaign funds. On 18 Oct. 1913, he was dismissed from office and succeeded by Martin Glynn, who was the lieutenant-governor.

Under Glynn the legislature passed an improved direct primary law, abolishing State conventions. Upon his recommendation were also passed a short ballot law and a workmen's compensation law. A measure calling for the holding of a constitutional convention in 1915 was also passed and also another providing for putting into operation the amendment for the direct election of United States senators by the people instead of by the legislatures.

The dissensions in the Democratic party had so thoroughly split its forces that the Republican candidate for governor, Charles S. Whitman, was elected over Glynn in 1914 by a very large vote. The Progressive party, largely made up of Republicans, whose candidate was Frederick M. Davenport, did not draw off many votes from Whitman.

The people voted to sanction the proposed constitutional convention, and this was held in 1915. The majority of the members were Republicans and they chose as president of the convention Elihu Root. Other prominent members were Seth Low, Henry L. Stimson and George W. Wickersham. The convention proposed many changes, the most important being those which would give the governor greater power in the appointment of officials formerly elective. Many other changes met with bitter opposition from small groups all over the State. The result was that in the vote taken by the people in the November 1915 election, the proposed constitution was overwhelmingly defeated. The same fate happened to an amendment giving the suffrage to women, though the vote against it was smaller.

Governor Whitman, like his predecessor, Mr. Glynn, urged economy in expenditures, but there was nothing accomplished along such lines. A widowed mothers' pension bill was put through, but a measure to provide for State-

wide prohibition on referendum to the people was defeated by the legislature, even though it received the backing of the governor.

In 1916 Governor Whitman recommended the passage of financial measures increasing the power of the comptroller, and of other measures abolishing and reorganizing certain charitable institutions and prisons. He also recommended the establishment of a military training commission to co-operate with the board of regents in giving physical and military training to young men of high-school age.

The year 1917 was that in which the United States entered the great World War. Though almost everything was overshadowed by this event, Governor Whitman had recommended for legislative action the enactment of a township school law, by which many thousands of school districts were consolidated into less than a thousand. He favored and had put through a State constabulary bill, a military census bill, by which an enumeration of all persons under 45 years was taken, a food-control commission to keep prices under control, a food-supply commission to encourage food production and a State council of farms and markets. He also advocated, and the legislature passed, a compulsory military training bill for boys between 16 and 17 years of age.

In the November elections of 1917 the woman's suffrage amendment to the State constitution, which had been defeated by over 200,000 votes in 1915, was passed by about 90,000 majority.

In general the up-State districts were against it, and the largest vote for it was found in New York City, particularly in districts which had the reputation of being socialistic. The espousal of the cause of woman's suffrage by President Wilson and by Governor Whitman had some influence, but undoubtedly the factor most contributing to the result was the manner in which women's suffrage organizations had canvassed the State.

Governor Whitman determined to run for a third term and easily won the Republican nomination in the primaries over Merton Lewis. His Democratic opponent for the governorship was Alfred E. Smith who had had long legislative experience, was at the time president of the board of aldermen in New York City and had great personal popularity.

Many factors had combined to bring considerable opposition to Whitman's election. There was some feeling against his having a third term and many of those who had voted for Lewis in the Republican primaries turned their votes to Smith in the regular election. The farmers were said to have held up against him the increase of their taxes because of the township school bill, even though he had advocated its repeal and succeeded in having it repealed less than a year after its passage. The same people were also disaffected by the wavering policy in handling the foods and markets question. Still others were opposed to him because of his advocacy of prohibition and others because he did not go far enough in the same matter. Certain groups were hostile because of his strong advocacy of military training. All of these groups combined served to defeat him, even though the legislature chosen was Republican in both branches.

Governor Smith found himself at a disadvantage

because of this Republican majority against him. He advocated the creation of a reconstruction commission to handle problems created by the Great War, which had closed by an armistice in November 1918, bills providing for a referendum vote of the people on the prohibition amendment to the Federal Constitution, for the conservation of water power in the State, for the creation of a minimum wage commission, for maternity and compulsory health insurance, for the abolition of the State police, for the reorganization of the public service commissions and for the improvement of educational conditions by increasing the salaries of teachers. In 1920 the Republicans elected Nathan Miller governor in a close contest. In 1922 he was opposed by former Governor Smith. The latter was elected by the greatest plurality ever given any candidate for this office.

Leading Legislation.—1892-94. Roswell P. Flower, governor. Features of legislation were the establishment of the Adirondack Park; ordering a convention to amend and revise the constitution; the prohibition of pool-selling in poolrooms; the excise laws were finally codified, and the question of a Greater New York was ordered to be submitted to a public vote.

1895-96. Levi P. Morton, governor. The governor's term of office now becomes two years, instead of three. The two principal features of Governor Morton's administration were the enactment of the "Raines Law"—a high-license measure aimed at reducing the number of saloons and removing them from political influence; and the passage of the "Greater New York" bill, consolidating the local governments of the city and county of New York, the counties of Kings and Richmond and part of the county of Queens, giving the new metropolis an area of 359 square miles.

1897-98. Frank S. Black, governor. The charter of "Greater New York" received the signature of Governor Black and its provisions went into effect 1 Jan. 1898. Important canal legislation and the appointment of a commission to investigate the expenditure of canal funds were features of this administration.

1899-1900. Theodore Roosevelt, governor. Some insurance legislation is accomplished, especially as to the maintenance of a reserve fund; the "Mazet Inquiry" was held, regarding alleged levies for corrupting legislation; and a committee previously appointed to report on a more equitable distribution of taxation recommended important changes in the tax laws.

1901-04. Benjamin B. Odell, Jr., governor (two terms). "Palisades Park" was created, the New York legislature acting in conjunction with that of New Jersey; Stony Point Park was purchased and dedicated; much valuable "Greater New York" charter revision was accomplished; a new Terminal House Act was passed, introducing a number of radical changes and drastic provisions were passed looking to the suppression of anarchy.

1905-06. Frank W. Higgins, governor. This administration was chiefly notable for the preliminary insurance investigation and initiatory discussion of direct primary and direct nomination legislation.

1907-10. Charles E. Hughes, governor (two terms, but the last incomplete by his resignation in October 1910 to accept the office of justice of the Supreme Court of the United States.

Horace White, lieutenant-governor, filled out the rest of the term). The administration of Governor Hughes was one of the most important of any since the war. His first act was an attempt to remove Otto Kelsey, the State superintendent of insurance, for inefficiency, which the senate refused to ratify, and Mr. Kelsey refused to resign. A bill for making the salaries of women teachers equal to that of men in the same grade was vetoed. A long continued struggle was carried on through the latter part of his administration to secure the enactment of some form of direct primaries bill, a special session of the legislature even being called in June 1910, but without direct result, the Cobb bill, a compromise, failing of passage by only one vote. A progressive inheritance tax law was enacted. Other noteworthy legislative enactments, inspired for the most part by Governor Hughes, were (1) a law prohibiting gambling at race tracks, passed in 1908; (2) a law authorizing additional railroad construction in New York City, passed in 1909; and (3) the creation of the public service commission to exercise jurisdiction over all matters connected with public transportation and public utilities. In 1910 an act was passed licensing and regulating private banking; the child-labor laws were amended by two acts so that now no minor under 16 years of age is permitted to work in any mercantile establishment, office, hotel or as a messenger for more than 54 hours a week, nine hours a day, or between 7 at night and 8 in the morning. Among important acts of 1911 were the following: A law reapportioning the Congressional districts of the State; a direct State tax of \$6,072,763; a direct primary law was passed, providing for the direct nomination of all party candidates for public office except those voted for by the voters of the entire State, and also excepting town, ward and village officers and school directors and trustees. The candidates for State offices are nominated by State conventions, but the delegates to these conventions are nominated by a direct vote.

1911-12. John A. Dix, governor. The most important legislation of his first year's administration was the passage of a compromise election bill that provides for direct primaries in all but the State offices, which are still left to a convention. Other legislation of importance created commissions to investigate manufacturing conditions in cities of the first and second class, and to look into the production and distribution and consumption of food products in the State.

Laws for highway improvement, pure food products and for rapid transit subways in New York City were passed. Labor laws were passed designed to prevent the working in factories of children under 16 at night and for more than eight hours a day or six days in the week, of males under 18 years of age for more than six days a week or 54 hours in a week, or between the hours of midnight and four o'clock in the morning, of females under 21 before six o'clock in the morning or after nine in the evening, or more than six days in the week or 54 hours in a week.

1913. William Sulzer, governor. The legislative session was one of unusual excitement owing to the removal by impeachment of Governor Sulzer. Lieutenant-Governor Glynn who

succeeded him recommended to the legislature the passing of laws adopting the Massachusetts simplified ballot, the enactment of a law abolishing State conventions in party nominations and a workmen's compensation law—all of which were adopted. Several measures restricting the hours of labor were passed and the construction of certain types of tenement-houses were enacted. Important laws about vocational and industrial education in public schools and for medical inspection were passed. Vital statistics were taken from the control of local authorities and placed under the State department of health. Sales of securities by brokers were restricted by the Anti-Bucket Shop Law, and a commission appointed to examine the subject of pensions for widowed mothers. A department of efficiency and economy in the public service was created.

1914. Martin H. Glynn, governor. Little legislation of importance was enacted at this session, the most important being a law to permit second and third-class cities to adopt optional forms of charters such as those providing for a city manager and a commission form of government. An extra session had to be called to get the necessary appropriation bills through.

1915-18. Charles Whitman, governor. As a result of the report of a former commission established to investigate the question of pensions for widowed mothers a bill was passed providing for such pensions and a child welfare board set up in each county. A bill to set up State-wide prohibition was defeated. The influence of the war in Europe began to make itself felt. A military training commission was created and was to work with the State board of regents in setting up courses in the schools in physical training and in giving instruction in military training not to exceed three hours a week. Laws were passed for the improvement of the State Guard and the Naval Militia. Railroads were prohibited from employing any one who could not read or understand English. The Great European War into which the United States entered in April 1917 affected legislation very much. Bills were passed compelling boys between the ages of 16 and 19 years of age to undergo military training, for taking a military census of the State, for increasing the National Guard, for registering aliens, creating a council of farms and markets, establishing a commission on food production and supply and creating a council for State defense. A bill creating town boards of education and one providing for a school board in every city of the State, and making uniform their powers and duties, were passed, though the former was later repealed in the 1918 session. A department of State police, consisting of four troops of 45 men each, was created. The legislation continued to be much affected by the war and the conditions growing out of it. The discovery made by the military authorities that there were large numbers of people in the State who could not read English led to the proposal of an amendment to the constitution requiring that all voters after 1 Jan. 1920 must be able to read and write English. Bills were passed providing for military training for all boys 16 to 19 years of age; for instruction in patriotism and citizenship in all the schools of the State; requiring all persons between the ages of 18 and 50 to work 36 hours a week at



Two scenes from the construction of the new Storm King highway in the highlands of the Hudson River. The lower picture shows how the rock is blasted out in the most difficult engineering job ever undertaken by the State Highway Department. The upper picture gives a good idea of how the completed road will look in certain sections



Two views of the Barge Canal. Upper picture shows Bushnell's Basin between Rochester and Lockport; lower picture, the highest lift lock in the world at the city of Little Falls

useful labor, known as the Anti-Loafing Law; prohibiting the use in public schools of any textbooks containing seditious matter or material showing disloyalty to the United States; authorizing the State food commission to deal in food, and thus regulate the price, and preventing the taking of excess profits known as profiteering. Attempts to have the legislature ratify the National Prohibition Amendment and to pass a minimum wage bill for women and minors and one for restoring the State nominating convention for certain offices failed.

1919. Alfred Smith, governor. Exactly 4,000 bills were introduced at this legislative session, but comparatively few became law. The fact that the governor was a Democrat and the legislative houses both Republican had much to do with the seeming barrenness of the legislative program. At times a few Republican senators bolted their party and enabled the governor to get through some of his measures.

In his message Governor Smith had recommended certain social and industrial welfare legislation, most of which failed of passage. On the other hand, his recommendations for increases in salaries of school teachers in both rural districts and cities went through, as did also the measure for co-operating with New Jersey in the matter of constructing a vehicular tunnel under the Hudson River between New York and New Jersey, and for reorganizing the public service commission in New York City.

The legislature ratified the Federal Prohibition Amendment, passed bills imposing an income tax, providing for the instruction of illiterates and non-English-speaking persons over 16 years of age, establishing State scholarships for soldiers, sailors and marines in the Great War and providing for a bridge over the Mohawk River at Schenectady known as the Great Western Gateway.

Bills providing for municipal ownership of public utilities, for leasing State hydro-electric power to private corporations and for the sale of 3 per cent beer failed of enactment.

EXECUTIVES OF NEW YORK AS COLONY AND STATE

FIRST DUTCH PERIOD.

Adriaen Jorissen Tienpoint, Director ¹	1623
Cornelis Jacobzen Mey, Director	1624
William Verhulst, Director	1625
Peter Minuit, Director General	4 May 1626
Bastiaen Jansz Krol, ² Director General	March 1632
Wouter Van Twiller, Director General	April 1633
William Kieft, Director General	28 March 1638
Petrus Stuyvesant, Director General	11 May 1647

FIRST ENGLISH PERIOD.

Richard Nicolls, Governor	8 Sept. (N. S.) 1664
Francis Lovelace, Governor	17 August 1668

SECOND DUTCH PERIOD.

Cornelis Evertse and a council of war	12 Aug. (N. S.) 1673
Anthony Colve, Governor General	19 Sept. (N. S.) 1673

SECOND ENGLISH PERIOD (EARLY COLONIAL).

Edmond Andros, Governor	10 Nov. (N. S.) 1674
Anthony Brockholls, Lieutenant-Governor	16 November 1677
Sir Edmond Andros, Governor	7 August 1678
Anthony Brockholls, Governor	13 Jan. (N. S.) 1681
Thomas Dongan, Governor	27 August 1683
Sir Edmond Andros, ³ Governor	11 August 1688

¹ Under Dutch rule the powers of government, civil and ecclesiastical, were vested in the director of the West India Company and his council.

² Previously director and commissary at Fort Orange.

³ Governor of New England, New York and New Jersey.

Francis Nicholson, Lieutenant-Governor	9 October 1688
Jacob Leisler, Lieutenant-Governor	3 June 1689
Henry Sloughter, Governor	19 March 1691
Richard Ingoldesby, Commander-in-Chief	26 July 1691
Benjamin Fletcher, Governor	30 August 1692
Earl of Bellomont, Governor	2 April 1698
John Nanfan, Lieutenant-Governor	16 May 1699
Earl of Bellomont, Governor	24 July 1700
Provincial Council ⁴	5 March to 19 May 1701
John Nanfan, Lieutenant-Governor	19 May 1701
Lord Cornbury, ⁵ Governor	3 May 1702
Lord Lovelace, Governor	18 December 1708
Peter Schuyler, President of Council	6 May 1709
Richard Ingoldesby, Lieutenant-Governor	9 May 1709
Gerardus Beekman, President of Council	10 April 1710
Robert Hunter, Governor	14 June 1710
Peter Schuyler, President of Council	21 July 1719
William Burnet, Governor	17 September 1720
John Montgomerie, Governor	15 April 1728
Rip Van Dam, President of Council	1 July 1731
William Cosby, Governor	1 August 1732
George Clarke, President of Council	10 March 1736
George Clarke, Lieutenant-Governor	30 October 1736
George Clinton, ⁷ Governor	22 September 1743

THIRD ENGLISH PERIOD (PRE-REVOLUTIONARY).

Sir Danvers Osborne, Governor	10 October 1753
James De Lancey, Lieutenant-Governor	12 October 1753
Sir Charles Hardy, Governor	3 September 1755
James De Lancey, Lieutenant-Governor	3 June 1757
Cadwallader Colden, President of Council	4 August 1766
Cadwallader Colden, Lieutenant-Governor	8 August 1761
Robert Monckton, Governor	26 October 1761
Cadwallader Colden, Lieutenant-Governor	18 November 1761
Robert Monckton, Governor	14 June 1762
Cadwallader Colden, Lieutenant-Governor	28 June 1763
Sir Henry Moore, Governor	13 November 1765
Cadwallader Colden, Lieutenant-Governor	12 September 1769
Earl of Dunmore, Governor	19 October 1776
William Tryon, Governor	7 April 1774
Cadwallader Colden, Lieutenant-Governor	9 July 1771
William Tryon, Governor	26 June 1775
James Robertson, ⁸ Governor	23 March 1780
Andrew Elliott, ⁸ Lieutenant-Governor	17 April 1783

GOVERNMENT BY THE PROVINCIAL CONGRESS.

Peter Van Brugh Livingston	23 May 1775
Nathaniel Woodhull, President pro tem.	28 August 1775
Abraham Yates, Jr., President pro tem.	2 November 1775
Nathaniel Woodhull	6 December 1775
John Haring, President pro tem.	16 December 1775
Nathaniel Woodhull	12 February 1776
John Haring, President pro tem.	19 June 1776
Nathaniel Woodhull	9 July 1776
Abraham Yates, Jr., President pro tem.	10 August 1776
Abraham Yates, Jr.	28 August 1776
Peter R. Livingston	26 September 1776
Abraham Ten Broeck	6 March 1777
William Smith, President pro tem.	9 April 1777
Pierre Van Cortlandt, Vice-President	11 April 1777
Leonard Gansevoort, President pro tem.	18 April 1777
Pierre Van Cortlandt, Vice-President	21 April 1777
Abraham Ten Broeck	28 April 1777
Pierre Van Cortlandt, President Council	
Safety	14 May 1777

STATE GOVERNORS.

George Clinton	1777-95
John Jay	1795-1801
George Clinton	Democratic-Republican. 1801-04
Morgan Lewis	" " 1804-07
Daniel D. Tompkins	" " 1807-17
John Tayler (acting)	" " 1807-17
De Witt Clinton	" " 1817-22

⁴ Died 5 March 1701.

⁵ Before 1709 the administration of government, when the offices of governor and lieutenant-governor were vacant, was vested in the council, the right to preside being lodged in the eldest councillor.

⁶ From 1702 to 1738 New York and New Jersey had a joint executive.

⁷ John West, seventh Lord De La Warr, was appointed governor in June 1737, and resigned the title in September 1737; but he never came to this country or qualified for the office.

⁸ A military governor during the Revolutionary War, not recognized by the State of New York.

STATE GOVERNORS—concluded.

Joseph C. Yates.....	Democratic-Republican.	1823-24
De Witt Clinton.....	"	1825-28
Nathaniel Pitcher (act'g)	"	1828-29
Martin Van Buren.....	Democrat.....	1829
Enos T. Throop (acting)	"	1829-30
Enos T. Throop.....	"	1831-32
William L. Marcy.....	"	1833-38
William H. Seward.....	Whig.....	1839-42
William C. Bouck.....	Democrat.....	1843-44
Silas Wright.....	"	1845-47
John Young.....	Whig.....	1847-48
Hamilton Fish.....	"	1849-50
Washington Hunt.....	"	1851-52
Horatio Seymour.....	Democrat.....	1853-54
Myron H. Clark.....	Whig.....	1855-56
John A. King.....	Republican.....	1857-58
Edwin D. Morgan.....	"	1859-62
Horatio Seymour.....	Democrat.....	1863-64
Reuben E. Fenton.....	Republican.....	1865-68
John T. Hoffman.....	Democrat.....	1869-72
John Adams Dix.....	Republican.....	1873-74
Samuel J. Tilden.....	Democrat.....	1875-76
Lucius Robinson.....	"	1877-79
Alonzo B. Cornell.....	Republican.....	1880-82
Grover Cleveland.....	Democrat.....	1883-85
David Bennett Hill (act'g)	"	1885
David Bennett Hill.....	"	1886-91
Roswell P. Flower.....	"	1892-94
Levi F. Morton.....	Republican.....	1895-96
Frank S. Black.....	"	1897-98
Theodore Roosevelt.....	"	1899-1900
Benjamin B. Odell, Jr.....	"	1901-04
Frank W. Higgins.....	"	1905-06
Charles E. Hughes.....	"	1907-10
John Alden Dix.....	Democrat.....	1911-12
William Sulzer.....	"	1913
Martin H. Glynn (act'g)	"	1913-14
Charles S. Whitman.....	Republican.....	1915-18
Alfred E. Smith.....	Democrat.....	1919-20
Nathan L. Miller.....	Republican.....	1921-22
Alfred E. Smith.....	Democrat.....	1923-

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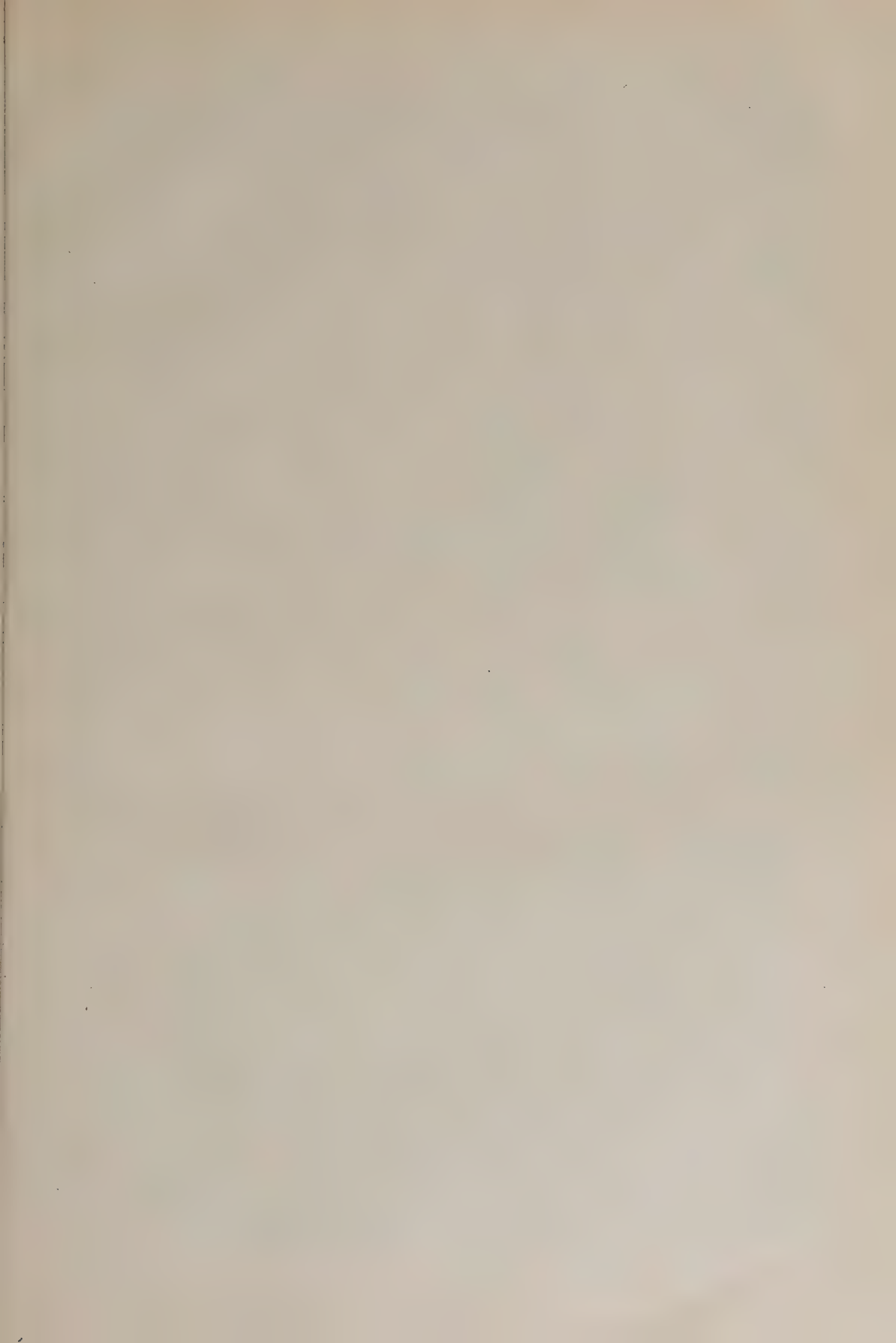
HUGH HASTINGS,
Formerly New York State Historian.

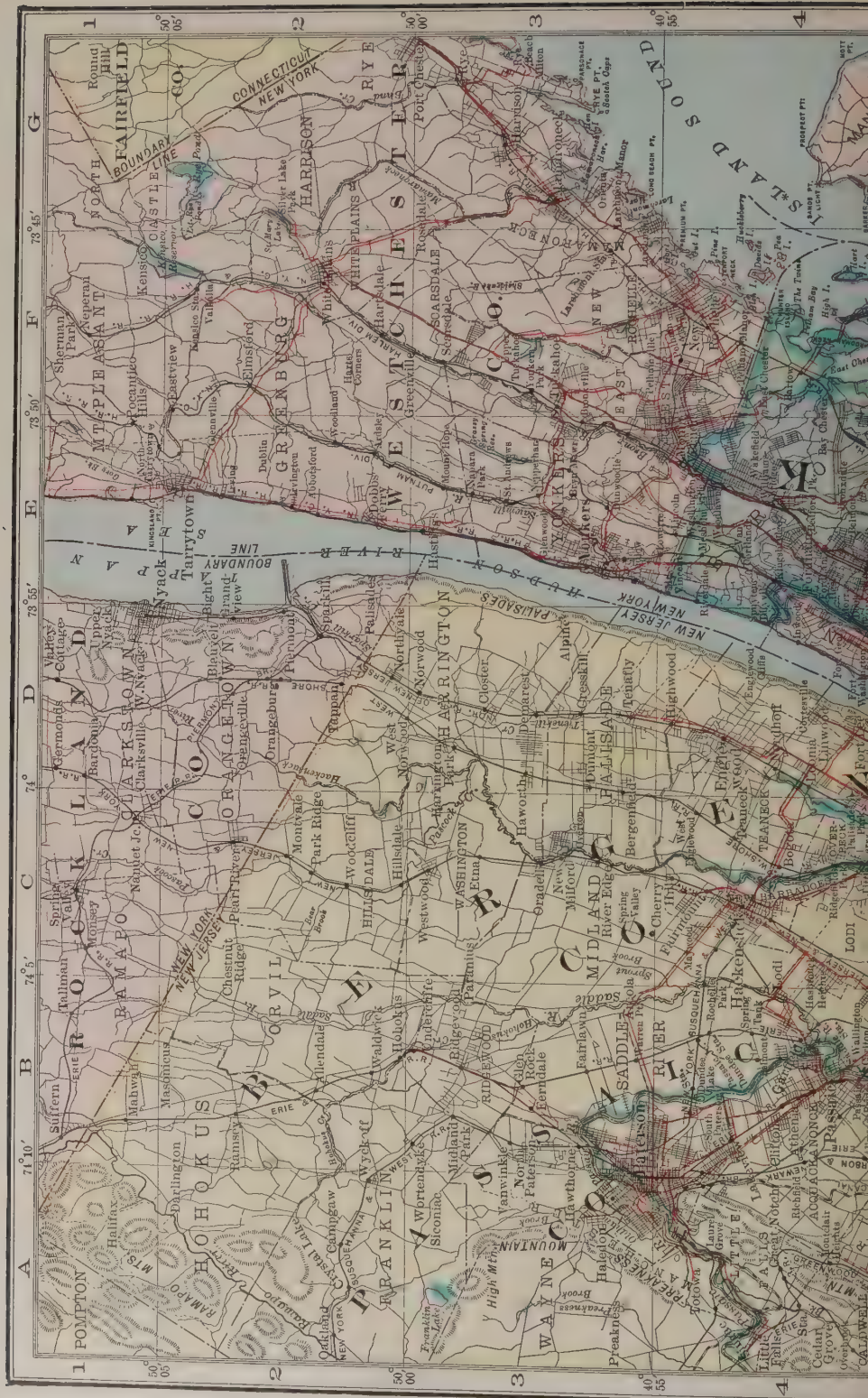
Revised by JAMES SULLIVAN,
Director of the Division of Archives and History of the University of the State of New York.

NEW YORK, N. Y., the chief city of the United States; its largest aggregate population, its richest financial centre and market, its greatest commercial port and its most productive manufacturing area. Moreover, New York holds the same proud position relatively in the whole world. No other city has so large a population within equivalent boundaries; no other city controls so great monetary wealth or buys and sells so great a value of commodities; no other city handles so large a volume of foreign commerce; and no other city manufactures an equal value of commercial articles.

Topography.—The city of New York is located on New York Bay, at the mouth of the Hudson River, and extends to and along the Atlantic Ocean eastwardly from the bay. The whole of the East River and of the Harlem River and the southwesterly end of Long Island Sound are included within its boundaries. The larger part of the city lies east of the Hudson, but Staten Island, lying adjacent to the New Jersey shore, and forming the southwestern shore of the Upper Bay and the northwestern shore of the Lower Bay, is an important section of the city. The East River, so-called, is not a river in the strict meaning of the word, but a strait connecting the Upper Bay with Long Island Sound. Since the cutting of the ship canal between it and Spuyten Duyvil Creek, Harlem River has become a similar tidal connection between the Hudson River and the East River. Other bodies of water lying within the city limits are Newtown Creek, Wallabout Creek, Jamaica Bay, Bronx River and Hutchinson River, besides several smaller streams.

Population.—The people composing this greatest of all cities, by the State census of 1915, numbered 5,047,221. Numerous complaints of omissions on the part of the State enumerators led to a city census by the police department which placed the number at 5,585,772. In 1920 the Federal census placed the number at 5,620,048. This population is made up of three principal groups, the largest being the foreign-born white; the second in size being the native whites born of foreign parentage; the third, the native whites of native parentage. The latest authoritative figures by which these groups may be differentiated are those of the United States census of 1920. In that year the number of foreign-born whites was 1,991,547, out of a total of 5,620,048, or 32 per cent. These foreigners represented over 60 different nations,







NEW YORK CITY AND VICINITY

SCALE OF MILES
1 0 1 2 3 4

Hammond's 8 x 11 Map of New York City & Vicinity,
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- Railroads
- Subways
- Trolley Lines
- Canals

A 74° 10' B 74° 5' C Longitude 74° West D from 73° 55' Greenwich E 73° 50' F 73° 45' G



the largest groups being: Russians, 479,797; Italians, 390,832; Germans, 194,154; Irish, 203,450; Austrians, 126,739; English, 71,404; Hungarians, 64,393; Swedes, 33,703; Rumanians, 38,139; Canadians, 25,271; Scots, 21,545; Norwegians, 24,500; French, 23,020; Swiss, 9,233; Poles, 145,679; Czechoslovakians, 26,437; Greeks, 21,455; Danes, 9,092; Finns, 10,240; and of all others—Mexicans, Welsh, Portuguese, Belgians, Spaniards, Bulgarians, Australians, Montenegrins, Serbians, South Americans and Central Americans—72,464. The group of native born of foreign parentage numbered 1,873,013. The native whites of native parentage numbered 1,164,834. Negroes numbered 152,467, and Chinese, Japanese and natives of India, 8,118.

The growth of the city, at first slow, has been in a constantly increasing ratio. In 1650 the population was 1,000; at the time of the Revolution it was 22,000; it reached 100,000 in 1815, and 696,115 in 1850. The increase between 1850 and 1890 was 300 per cent; between 1900 and 1910 there was an increase of 1,329,681 or 26 per cent. The official census for 1920 gives 5,620,048. Within the last two or three years the annual increase in New York's population has been about 150,000.

Composition.—Greater New York is composed of five boroughs, each being coextensive with a county of the State. The borough of Manhattan constitutes New York County; the borough of Brooklyn, Kings County; the borough of Queens, Queens County; the borough of The Bronx, Bronx County; the borough of Richmond, Richmond County.

The Borough of Manhattan comprises Manhattan Island, on which the city of New York was founded, together with Blackwell's (Welfare) Island, Randall's Island and Ward's Island in the East River; Marble Hill, north of the Ship Canal, and Governor's Island, Bedloe's Island and Ellis Island in the Upper Bay. Its aggregate area is 21.9 square miles.

The Borough of The Bronx lies on the mainland of New York State to the north and northeast of Manhattan Island, extending from the Hudson River on the west to the East River and Long Island Sound on the east, and northward to the boundaries of Yonkers, Mount Vernon and New Rochelle in Westchester County. Included in its domain are the Brothers Islands, North and South, and Riker's Island, in the East River; and City Island, Hunters' Island and Hart's Island in Long Island Sound. Its total area is 38.87 square miles.

The Borough of Brooklyn, formerly a separate city, and the fourth in population in the United States at the time of its consolidation with New York, occupies the southwestern extremity of Long Island, between the East River and the Atlantic Ocean, and includes Coney Island, which is the southernmost outpost of Long Island, and a part of the numerous islands in Jamaica Bay. It covers an area of 80.95 square miles.

The Borough of Queens, also on Long Island, extends around Brooklyn to the north, northeast and east, from Newtown Creek at the East River, along the latter to and along Long Island Sound, and by a devious line across Long Island embracing the former municipalities of Long Island City, Newtown,

College Point, Corona, Whitestone, Flushing and Jamaica, reaches the ocean at Far Rockaway, which is also included. It includes Berrian Island in the sound, and the remainder of the islands in Jamaica Bay not within the boundaries of Brooklyn. It is by far the largest of the boroughs, comprising 121.11 square miles.

The Borough of Richmond covers Staten Island, Shooters' Island, Prall's Island, Meadow Island, a part of Buckwheat Island, and a few low-lying marshy islets to the west and north, and Hoffman and Swinburne islands in the Lower Bay.

Intercommunication.—The East River, on account of its width the most serious barrier to intercommunication between Brooklyn and Queens on the one side and New York and The Bronx on the other, was for many years crossed only by ferries at several intervals along its shores. It is now spanned by four monumental bridges, ranking as to length of open span with the largest in the world. Three of these, connecting New York with Brooklyn, are suspension bridges; the fourth, connecting New York with Queens Borough, is a massive cantilever structure. The traffic figures of these bridges afford the best idea of the activity of the population which they serve. An official count made by the city on 28 Oct. 1920 showed that the daily both-ways traffic amounted to 919,166 passengers (in surface cars, elevated and subway railway cars, vehicles and afoot); 11,464 subway and elevated railway cars; 13,864 surface cars; and 45,579 vehicles. *The Brooklyn Bridge*, from Park row in Manhattan to Sands and Washington streets in Brooklyn (6,016 feet), carried 161,239 passengers, of which number 1,928 were pedestrians; 3,844 elevated railway cars; 5,856 surface cars; and 5,188 vehicles. *Manhattan Bridge*, from the Bowery at Canal street, Manhattan, to Nassau street near Bridge street, Brooklyn (6,855 feet), carried 253,264 passengers, of whom 932 were pedestrians; 2,740 elevated and subway railway cars; 735 surface cars; and 20,785 vehicles. *Williamsburgh Bridge*, extending from Clinton street, Manhattan, to Havemeyer street, Brooklyn (7,308 feet), carried 404,229 passengers, of whom 981 were pedestrians; 3,680 elevated railway cars; 5,971 surface cars; and 1,748 vehicles. *Queensboro Bridge*, from Second avenue at 59th and 60th streets, Manhattan, to Crescent street, Long Island City, Queens (7,449 feet), carried 100,434 passengers, of whom 967 were pedestrians; 1,192 elevated railway cars; 1,302 surface cars; and 17,858 vehicles. The completion of these bridges resulted in the closing of some of the former ferry lines between the Brooklyn and Manhattan sections, but there are still in operation eight ferries across the East River, which, in 1916, transported 15,535,598 passengers between Manhattan and Brooklyn; 5,364,858 between Manhattan and Queens; and 21,449 between The Bronx and Queens. Two pairs of subway tunnels for electric cars connect Manhattan with Brooklyn, and one pair Manhattan with Queens.

Communication between Manhattan and The Bronx is maintained by eight roadway bridges, two elevated railway bridges and two pairs of subway tunnels, all crossing the Har-

lem River and its connecting ship canal. These bridges each carry a both-ways traffic ranging from 25,000 to 40,000 persons daily, besides a vehicle traffic of from 3,000 to 12,000, and from 450 to 3,000 surface cars.

The principal transportation systems connecting the various parts of the city are the subway lines, which, in part, are also elevated lines, or, more correctly, make use of elevated structures where engineering exigencies demand it. The long, narrow island of Manhattan has two subway lines, one near the east side of the island, the other near the west side. The former is known as the Lexington Avenue line and the latter as the Seventh Avenue-Broadway line. These are both four-track lines in the lower part of the city, local trains making frequent stops using the two outer tracks, and express trains, making few stops, the inner tracks. A very large part of the service of the local trains is the gathering of passengers between the express stations, at which points nearly the entire load of the local train will disembark and continue their journey on the express trains; with the result that the express stations in the lower part of the city suffer extreme congestion at the "rush hours"—the hours when employees and clerks are going to and returning from their place of business. Both of these subway systems continue at the lower end of Manhattan through tunnels under the East River to the same terminal at Atlantic avenue in Brooklyn, where connection is made under the same roof with the Long Island Railroad. This railroad conducts from this point a rapid transit service to Jamaica, connecting with electric and steam trains to all parts of Long Island. Electric trains from the Jamaica station of this railroad run directly to the Pennsylvania Railroad station at Seventh avenue and 33d street in Manhattan, and several steam trains from Long Island points continue west through Jamaica to Long Island City, making a number of stops for local traffic.

Besides the subways Manhattan has four longitudinal lines of elevated railroad in the lower part of the city—the Second Avenue and Third Avenue lines on the east side and the Sixth Avenue and Ninth Avenue lines on the west side. At 53d street the Sixth Avenue line joins the Ninth Avenue, which continues by a somewhat devious route to a terminal at 155th street and Eighth avenue. The Second Avenue line joins the Third Avenue line at 129th street, and thence trains continue to 183d street in The Bronx. These elevated structures carry a central third track on which express trains are run southward in the morning and northward in the evening. With the exception of Fifth avenue, Park avenue and part of Madison avenue, practically every avenue running lengthwise of lower Manhattan has a line of surface cars. Fifth avenue is served with the double-decked motor busses of the Fifth Avenue Coach Company, running from two lower downtown terminals—Washington square and the Pennsylvania Railroad station (32d street)—along Fifth avenue to 110th street and Riverside Drive from 72d street to 135th street, and upper Broadway to Fort George (190th street).

The movement of travel over these transit lines is so great as to amount to congestion, not

only in the "rush hours" but at other times through the day. Several of the lines run all night and are well patronized at all hours. In 1922 (the latest complete figures available) the subway systems carried 644,975,474 passengers; the elevated roads 348,517,216; the surface cars, 388,357,767; and the Fifth avenue busses, 52,840,135. The Bronx surface-car lines, most of them connecting with the Manhattan lines, carried 84,535,787.

In Brooklyn and Queens the transit lines spread out fanwise to cover the more expansive territory. The Fourth Avenue subway serves South Brooklyn and reaches 57th street in Manhattan by a subway under Broadway; from there it turns eastward to Queens. The northeastern section is served by elevated and surface lines radiating from the great bridges and tunnel termini. The Brooklyn travel in 1922 amounted to 444,747,228 elevated and subway passengers, and 472,538,068 surface-car passengers. In Queens the surface cars carried 58,826,451 passengers on lines independent of the Brooklyn lines. Other lines not accounted for in this classification carried over 2,000,000 passengers. The total number of fare-paying passengers in the Greater City, exclusive of those traveling on the Long Island Railroad to local stations, amounted to well over 2,000,000,000; the number traveling on transfers amounted to about 360,000,000.

Communication with Richmond Borough is maintained by a municipal ferry line, running from Battery Park, Manhattan, to Saint George, Staten Island. The distance is about five miles. This ferry carries annually about 17,000,000 passengers and 500,000 vehicles. From Saint George several lines of surface cars traverse the island.

Communication with New Jersey points on the west shore of the Hudson is accomplished by a number of ferries operated by the railroads whose terminals are on the New Jersey side of the river, and by the tunnels of the Hudson and Manhattan Railroad, popularly known as the "Hudson Tubes." There are four of these tunnels, an uptown pair and a downtown pair. The uptown, or northerly pair, reach Manhattan at Morton street, proceeding thence to Christopher street and then under Sixth avenue northward to 33d street, with an ultimate terminal (projected) at Times square. The downtown tube enters Manhattan at Cortlandt street and traverses a loop just west of Broadway to Dey street, from which the return tunnel departs. In 1922 the ferries from New Jersey carried over 100,000,000 passengers and the Hudson tubes 99,104,889. The ferries carry also an immense freight traffic, figures for which are not available. A large part of this is motor trucking from the New Jersey manufacturing plants within a radius of 40 miles, besides the freighting by New York firms from the railroad terminals along the New Jersey shore. This movement is discussed more particularly under the subheading *Commerce*, in this article.

New York City is connected with the country at large by several trunk-line railroads, two of which, the New York Central and the Pennsylvania systems, have stations in the heart of Manhattan. The Erie, West Shore, New York, Ontario and Western, Lackawanna, Central Railroad of New Jersey and Lehigh Valley sys-

tems have terminals on the New Jersey shore, opposite Manhattan, and connected intimately with the city by both passenger and freight ferries. The New York, New Haven and Hartford trains use the Grand Central station as a passenger terminal, and this line has a connection with the Pennsylvania Railroad's yard in Queens over the New York Connecting Railroad's viaduct and bridge over the East River at Hell Gate.

Principal Streets and Buildings.—The borough of Manhattan, within which is comprised the business and civic centre of the city, is laid out above 14th street in rectangular streets, but exhibits at its lower end a peculiar huddle of short streets laid out apparently without plan, and short blocks of almost every conceivable shape and size. This condition is a legacy of the days when the great city was a country town whose rambling roads were held in their purposeless confines by the title deeds of the adjacent "lots," destined to be the most valuable in the world. Out from the southern boundary of this tangle springs straight away to the north, New York's most popular street, Broadway. It is the one thoroughfare which traverses the city from end to end—from the Battery to the extremely northerly boundary at the Yonkers line, 16 miles distant; and it continues into and through the latter city under the same name. A few blocks to the north of its starting point Broadway passes the westerly end of Wall street, known by name at least, the world around. As the location of the great financial interests of the nation, its influence has so expanded during the European War that it may now truthfully be styled the financial centre of the civilized world. Wall street is not much of a street in its dimensions. It is but little more than 30 feet in width, and its length is less than half a mile. Two short blocks from its Broadway terminus, Broad street branches off toward the south, extending the financial area somewhat in that direction; while toward the north Nassau and William streets offer additional frontage for some of the thickly clustering banking institutions.

Half a mile north of Wall street Broadway passes to the west of the City Hall in its snug little park, with Park Row and Printing House Square to the east, of some fame as the home of several of the great metropolitan newspapers. Beyond the City Hall, Broadway makes a bee-line for Tenth street, where its bend toward the west is marked by Grace Church and its rectory in a spacious lawn. In this leap of one and three-eighths miles has been passed another of New York's historically famous streets, the Bowery. It lies parallel with Broadway and a few blocks to the eastward. A scant quarter-mile to the west lies old "Greenwich Village," another maze of short and crooked streets running hither and yon, as did the highways and byways in the olden time when the village flourished as a choice residence suburb of the growing city. Four blocks above Grace Church Broadway is halted by Union Square which lies squarely across it, but beyond the Square it forges on again in a northwest trend, and with many a slight swing to east and west, following the route of the old Albany Post Road. Above Fourteenth street the mathematical devotion of the city's engineers is in evidence in the

rigidly rectangular blocks of uniform width, and differing in length only as compelled by the location of the starting points of the longitudinal avenues. Broadway alone refuses to follow the path of rectitude, but goes meandering diagonally across block, street and avenue for over three miles before it consents to run parallel with any of the surveyors' lines.

At Twenty-third street Broadway intersects Fifth avenue, another of New York's most famous streets. The latter has come from the Washington Arch on Washington Square, nearly a mile to the southward, and from this point runs straight to the Harlem River, at 141st street, a total distance of nearly seven miles. Broadway continues onward in its characteristic bias to Thirty-third street where it crosses Sixth avenue at an acute angle, and this is one of the busiest section of the city, the terminal of the Hudson tubes, the location of the largest department stores, with some of New York's most famous hotels within a stone's throw. The far-famed former home of the New York Herald stands in the narrow angle between the two streets, and Broadway passes to the west of it, expanding at this point to a magnificent width worthy of its name. At 43d street Seventh avenue is crossed and from this point almost to Central Park, at 59th street, is called the "Great White Way" from the thousands upon thousands of electric lamps woven into scores of scintillating advertising signs of most ingenious construction, bordering it along this stretch. At 59th street Broadway joins its area with that of Eighth avenue to form the spacious Columbus Circle, at the south-western entrance to Central Park. From this junction Eighth avenue continues along the west side of the park under the name of Central Park, West; presenting along its western border a series of palatial apartment houses of majestic height and ornate construction. Broadway emerges from the Circle with its diagonal bent which it pursues to 78th street, where it is but two blocks from the Hudson River. From this point it bears toward the east, running between and nearly parallel to West End avenue on the west and Amsterdam avenue on the east. At 104th street Broadway resumes a devious course swinging now toward the Hudson and again away from it, with now and then a majestic stretch of noble width dividing on either side of a median line of grassy parklets. Eventually it crosses the Harlem River at Kingsbridge into The Bronx, and thence runs to and along the western edge of Van Cortlandt park, and so into Yonkers at 262d street—a total distance from its starting point at Bowling Green of nearly 16 miles, the longest continuous street in any city in the world.

The cross streets of Manhattan north from the Greenwich village zone are numbered consecutively and this decorous arrangement is continued through the western section of The Bronx to the Yonkers line, in the immediate vicinity of the park, but between Broadway and the river, here a distance of somewhat more than a mile, there is a delightful area where the streets partake of the character of the indefinitely winding roads of a great park. Between the Harlem and the Bronx rivers there are many little tangles of streets marking the former "cross roads" of village settlements,

the spaces between filled in with "city blocks" of parallel sides and with right-angled corners. East of the Bronx River there were only a few oldtime country roads to disturb the surveyors, and the layout of the streets is quite mathematical in design.

In Brooklyn, aside from the splendid parkways mentioned in another section, perhaps the most notable street is Flatbush avenue, which traverses the borough from the East River on the northwest to Jamaica Bay on the southeast, in a nearly direct line. As now laid out Flatbush avenue is nearly eight miles long, and its extension across Jamaica Bay, from island to island, will add another mile, or more. It is a thoroughfare of handsome width, and in the old Flatbush section is bordered by mansions set in spacious grounds. Myrtle avenue is another of Brooklyn's longest streets, extending from Borough Hall about eight miles to the Queens boundary at Forest Park. Broadway is the principal street of the former Williamsburgh section, and is five miles in length. In the development of South Brooklyn, Fourth avenue, with its subway, has become one of the most important business thoroughfares: it is six miles in length.

In the borough of Queens one of the oldest as well as the longest streets is Jackson avenue, running from the southwest corner of the borough at Newtown Creek northeastward six miles to Flushing Creek, and thence onward through the former town of Flushing nearly six miles further to the city boundary. Queens Boulevard is a spacious avenue, starting a mile from the East River, as an extension of 12th street, and running in a tortuous line in a generally southeasterly direction seven miles to its junction with the old Jamaica turnpike, now Jamaica avenue. The Grand Central Parkway is referred to in the section treating of the city's parks.

The notable buildings of New York may be classified within three groups: (1) the "skyscrapers," or tall steel-frame structures; (2) those prominent because of architectural excellence and beauty; (3) those of historic interest. The last-named class will be discussed in the section of this article treating of the history of the city.

The development of the skyscraper type was due to the immense demand for office room in the limited area of lower Manhattan. Competition for this area raised the value of the land per square foot to such figures that only a very tall building could return a profitable income from the investment. The same condition was the cause of the clustering of these great buildings chiefly in the downtown section, where office room was most in demand. As seen from the rivers on either side of the island this group of towering structures is dominated by the prodigious mass of the Equitable building, on Broadway at Pine street. It is of 37 stories, and reaches a height of 485 feet six inches above the sidewalk. Reckoning by floor space this building is the most spacious in the world. The tallest point in this particular group is reached by the tower of the Singer Building, near by, a pile of 41 stories attaining an elevation of 612 feet. The slender proportions of this building are augmented by the bulk of the City Investing Building standing close beside it, with 34 stories and a height of over 486 feet.

The southern outpost of this architectural uplift is the noble Whitehall building facing Battery park on the south and the Hudson River on the west, its 32 stories marking a height of 424 feet. The western sentinel of the group, West Street Building, standing among others of modest elevation, reaches a height of 300 feet, 23 stories. In the eastward edge of the group is the Bankers' Trust building of 39 stories, its striking pyramidal roof attaining the level of 539 feet above the curb. The northern escarpment is formed by the sheer white walls of the Western Union building, 28 stories, and 403 feet in height. Within the confines thus outlined, and exceeding 300 feet in height are the Adams building, 32 stories, 424 feet; the American Express Company building, 32 stories, 415 feet; Hanover National Bank building, 22 stories, 385 feet; Liberty Tower, 32 stories, 385 feet; American Bank Note Company building, 28 stories, 374 feet; "Sixty Wall Street," 26 stories, 346 feet; Commercial Cable Company, 21 stories, 317 feet; "Eighty Maiden Lane," 25 stories, 315 feet; and the Columbia Trust building, 23 stories, 305 feet. A score of others, upward of 200 feet in height, add to the mass of this cluster of skyscrapers. For a few blocks north of this main group there is a scattering of gigantic buildings, foremost among them the Woolworth building, of 51 stories, its tower reaching 750 feet in elevation above the sidewalk. This is New York's tallest building, and, indeed, is the tallest structure in the world excepting the Eiffel Tower in Paris. Eastward are the Saint Paul building, 26 stories, and 308 feet high; the Park Row building, 29 stories, 309 feet, and the Sun building, 23 stories, 306 feet. About 200 yards north of the latter is the immense Municipal Building, housing 36 of the city departments and bureaus. It covers the two city blocks from Tryon Row to Duane street, spanning Chambers street at Centre street with a great triple arch. It has 41 stories and is surmounted with a tower and statue, bringing its height to 560 feet. The other area in which skyscrapers have become notably numerous is along 42d street at its junction with Broadway, and in the neighborhood of the Grand Central Station. The tallest of these buildings is the Bush Terminal Sales building, reaching a height of 460 feet. Others of remarkable proportions are the Times Building, 28 stories, 410 feet; the Heidelberg building, 30 stories, 410 feet; Architects' building, 32 stories, 390 feet; the Hotel Commodore, 28 stories, 330 feet; the Biltmore Hotel, 26 stories, 305 feet; the World Tower, 29 stories, 335 feet; and the Lewishohn building, 22 stories, 298 feet. A number of other office buildings in the close vicinity of the Grand Central Station, ranging from 20 stories upward, are between 250 and 300 feet in height. In other parts of the city the skyscraper is only occasional: the most important of these isolated examples being the Metropolitan Life building, 700 feet high; and for several years the tallest building in New York. However, 12 to 20-story loft buildings are quite common, and give a characteristic impression of imposing massiveness and substantiality.

Among the buildings which have been commended for their architectural excellence there are a goodly number in the heart of the downtown business district. Prominent among them

NEW YORK CITY



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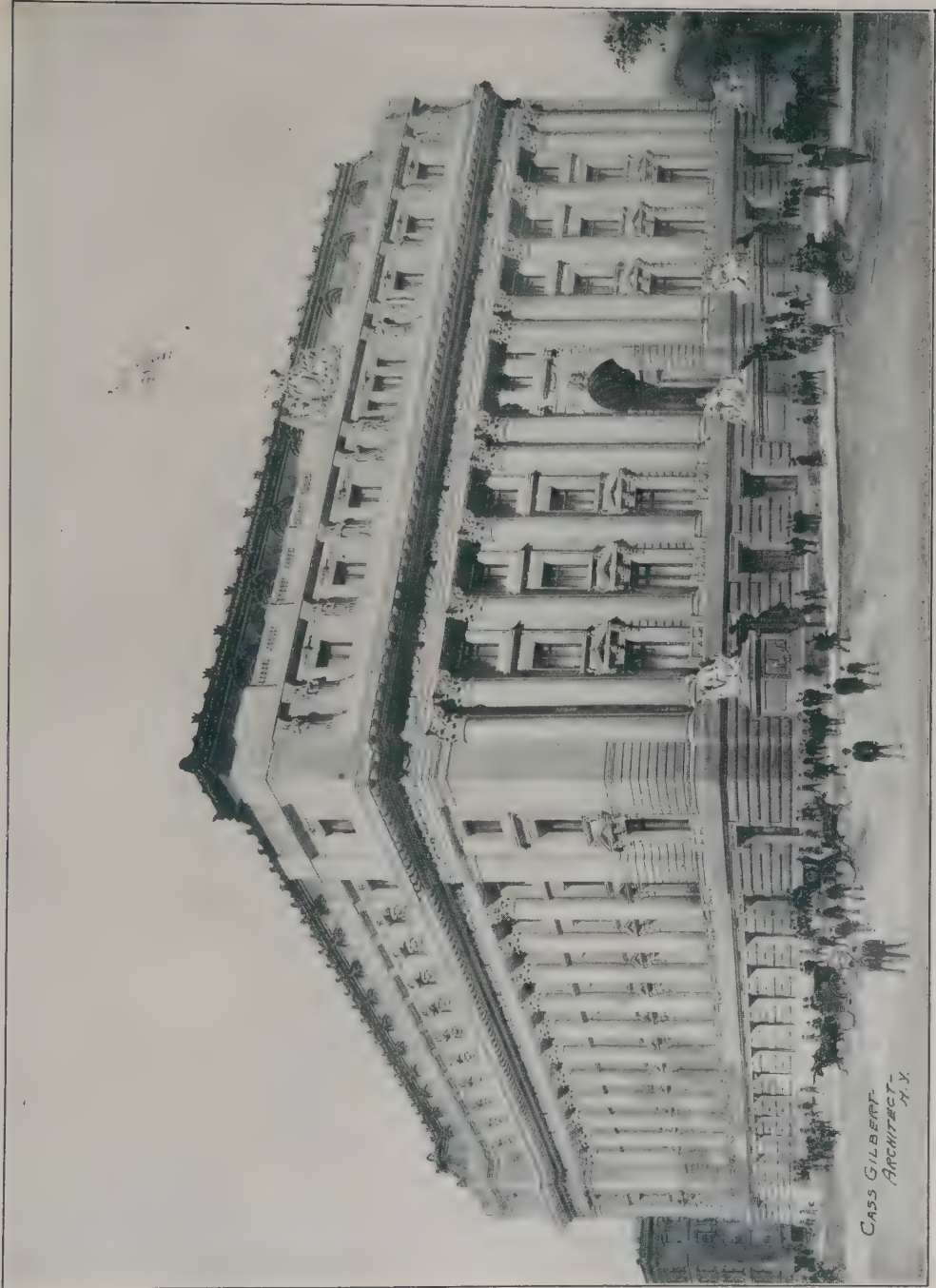
The Woolworth Building
(Cass Gilbert, Architect)

NEW YORK CITY



The New Municipal Building. The City Hall in the Foreground

NEW YORK CITY



The New York Custom House

are the Custom House, at the southern end of Broadway; the Produce Exchange, nearly opposite; Trinity Church, at the head of Wall street; the United States sub-treasury, on Wall and Nassau streets; the National City Bank, occupying the majestic granite building at Wall and William streets, erected about 1840 for the Merchants' Exchange, and covering a whole block; the chastely substantial banking house of J. P. Morgan and Company, at Wall and Broad streets; the elegant marble Stock Exchange across the way on Broad street; the New York Clearing House, a handsome marble structure on Cedar street; and the Chamber of Commerce, of granite and marble, on Liberty street. Farther north is the unique city hall, built of marble, and cherished as an especially fine and pure example of the architecture of the early 19th century. The Hall of Records near by is also notable for its architectural merit. In this connection the peculiar elegance of the great Woolworth building should be mentioned as a most successful combination of an ecclesiastic treatment of the utilitarian design of the multicellular office building. Grace Church on Broadway at 11th street and the Church of the Ascension at Fifth avenue and 10th street deserve special mention in this classification. On Madison square, East, at 25th street, is the exquisite building of the New York State Appellate Court; and two blocks north, Madison Square Garden, noted for its old Spanish façades and tower. The Knickerbocker Trust Company building, on Fifth avenue at 34th street is of a noble type, and the Tiffany and Gorham buildings at 37th and 36th streets are masterpieces of adaptation of dignified models to modern business requirements. A block away toward the east is one of the choicest architectural gems of the city, the Morgan Library on 36th street. It is of white marble and of classic type. The former Herald building, modelled after a famous Italian palace, at Broadway and 35th street; the Knickerbocker Building, at Broadway and 42d street; and the sculptured front of the New Amsterdam theatre—all of these are of special architectural interest. The Hotel Astor, a block above and *The New York Times Annex* must also be included in this group.

The superb New York Public Library building is discussed and illustrated in a separate article.

The Grand Central Station on 42d street and Park avenue is one of the city's finest achievements of the architect's skill—a rare combination of massive solidity and grace. The Biltmore Hotel, although a skyscraper, is a fine architectural production. On Fifth avenue at 43d street is the Temple Emanu-El, a notable development of the Saracenic motive. The Collegiate Church of Saint Nicholas at 48th street; the great Saint Patrick's Cathedral, 50th to 51st streets, and Saint Thomas's Church at 53d street—all on Fifth avenue—and the newly completed Saint Bartholomew's Church on Park avenue at 50th street, are each in their peculiar style superior examples of the church-builder's art. Fifth avenue in this section still retains some of the elegant mansions of the wealthier residents, notable among them being the Vanderbilt homes at 51st and 52d streets and at 58th street. The immense Plaza

Hotel on 59th street facing Central Park belongs in the class of New York's superlative buildings. At 62d street and Central Park West is the uniquely beautiful Century Theatre. Above 59th street, on both sides of Central Park are churches, hotels, clubs, apartment houses and private residences, too numerous for individual mention. Note must be made, however, of the great cathedral-like church of Saint Paul the Apostle (Roman Catholic), on Ninth avenue, 59th and 60th streets. It is regarded as one of the most majestic in the city.

A rapid review of the buildings of salient importance and excellence in this upper section of the city would include: the American Museum of Natural History, on the 77th street side of Manhattan square; the Metropolitan Museum of Art, on the Fifth avenue side of Central Park, at 82d street; the 8th Regiment Armory on Park avenue at 94th street; the cathedral of Saint John the Divine, on Amsterdam avenue, 110th to 113th street; Columbia University Library, 116th street near Broadway; the College of the City of New York, Amsterdam avenue, 138th to 140th streets; and the Hispanic Society's building on 155th street near Broadway. Lesser buildings of distinction throughout the city would number hundreds, but the necessary limit of this article prevents any particular reference.

Parks, Parkways and Playgrounds.—The park area in the greater city comprises 7,818.66 acres, valued at over a half a billion dollars. This area is well distributed, the larger parks, however, being in the newer sections. Manhattan has 32 sizable parks covering 1,487 acres, of which some 200 acres are still unimproved. The largest single area is Central Park, 843 acres, lying between Fifth avenue on the east and Eighth avenue on the west, and extending from 59th street on the south to 110th street on the north. It represents a cost to the city of over \$15,000,000. In the southwestern part is a playground and carousel for children, and beyond is the common lawn of 16 acres. The menagerie is in the southeastern part. The Mall is a broad parade over a quarter of a mile long, bordered by double rows of great elm trees and adorned with a number of statues, busts and other sculptures. The Terrace, a pile of richly carved masonry, with a spacious staircase connects the Mall with the lake, a picturesque body of water covering five acres. Beyond the lake is the Ramble, of 36 acres. Farther north is the Belvedere with its tower of stone, standing at the south end of the city reservoirs. To the left is seen the American Museum of Natural History (q.v.), located in Manhattan square, west of the park. Opposite the lower reservoir and to the east is the Obelisk, and near it, on Fifth avenue at 82d street stands the Metropolitan Museum of Art (q.v.). The upper reservoir extends across nearly the whole width of the park and is half a mile in length. North of it lies the spacious North Meadow, an unbroken sward of nearly 20 acres. The Harlem Mere, a lake of about 12 acres, fills out the northeast corner of the famous park. The other principal parks in Manhattan are Riverside Park, lying along Riverside Drive and overlooking the Hudson River, from 72d street to 129th street, 140 acres; Morningside Park, 31.2 acres; Battery Park,

21.2 acres; Mt. Morris Park, 20.2 acres; Thomas Jefferson Park, 15½ acres. Besides these are the unimproved High Bridge Park, 75.8 acres; Fort Washington Park, 40.8 acres; and Saint Nicholas Park and its extension, 27¼ acres; Riverside Drive extension, 24 acres; and an unnamed park area of 23 acres north of High Bridge. Besides the smaller parks not specifically mentioned here Manhattan has 55 playgrounds scattered about its demesne.

Brooklyn has 54 parks and playgrounds, covering a total area of 1,153 acres. Prospect Park, 526 acres, is the largest and is famed for its peculiar beauties of landscape and remarkable display of flowers, as well as for its wonderful views of New York's unequalled harbor. The larger of Brooklyn's other parks are Dyker Beach Park, on Gravesend Bay, 139.8 acres; Gerritsen Basin, on Jamaica Bay, 123 acres; Brooklyn Botanic Gardens, 61.39 acres; Coney Island Concourse, 59.7 acres; Highland Park, 46.05 acres; McCarren Park (and playground), 38.4 acres; Canarsie Park, 30.5 acres; Fort Greene Park, 28.9 acres, and Sunset Park, 24.5 acres. Brooklyn has 16 parkways, the most famous being Ocean Parkway, from Prospect Park to Coney Island, Fort Hamilton Parkway, from Prospect Park to Fort Hamilton, and the Shore road, from Coney Island to Fort Hamilton.

The borough of the Bronx has the largest parks as well as the largest park acreage in the city—a total of 3,929 acres. Pelham Bay Park, in the extreme northeastern section comprises 1,756 acres with eight miles of water front; Van Cortlandt Park, lying along the eastern side of Broadway on the northern boundary of the city, famous for its golf links, 1,132 acres; Bronx Park, on the Boston road at 180th street, 719 acres; Crotona Park, 155 acres; Claremont Park, 38 acres; Saint Mary's Park, 34 acres; and Macomb's Dam Park, 27 acres. In the southeastern section of Bronx Park an area of 264 acres is devoted to the New York Zoological Park, the largest of its kind in the world in point of space and number of specimens. There are 28 buildings and 14 groups of open air corrals, dens and aviaries. On 1 Jan. 1918, 1,130 species were represented by 4,054 living specimens. The number of persons visiting the collections in 1917 was 1,898,424. An area of 380 acres in the northern part of Bronx Park constitutes the New York Botanical Garden, in which are extensive classified plantations, large greenhouses and a botanical museum with many thousands of specimens of vegetable growth of all preservable kinds. The Bronx is especially rich in parkways. The Bronx River Parkway Reservation is the largest of these, extending from the northerly line of the botanical garden along both banks of the Bronx River 15½ miles to the Kensico reservoir. The Grand Boulevard and Concourse connects the Central Bridge district of Manhattan with the Moshulu Parkway. Its approach is through Cedar Park, 400 feet wide, for three-fourths of a mile and thence 182 feet wide, for 4½ miles. The Moshulu Parkway connects Van Cortlandt Park with Bronx Park: it is 600 feet wide and two and one-third miles long. The Bronx and Pelham Parkway connects Bronx Park and Pelham Bay Park: it is 400 feet wide and nearly four miles long. Spuyten Duyvil Parkway runs

from Van Cortlandt Park to and southward along the crest of the high ground, two and one-half miles to the heights north of Spuyten Duyvil Creek: it is 180 feet in width. Crotona Parkway is three-fourths of a mile in length, and 100 feet wide, running along the westerly boundary of Crotona Park.

Queens borough has 1,178 acres in parks. Forest Park is the largest, 536 acres, and is a fine piece of natural woodland, nearly all in the wild state. The Jacob Riis Park at Neponset, (on the sea) has an area of 263 acres. Of the other park enclosures, Kissena Lake Park (Flushing), 88 acres; Baiseley's Pond, 75 acres; Highland Park, 65 acres, and Astoria Park, 56 acres, are the largest. Queens has also the magnificent Grand Central Parkway traversing the entire width of the borough from Forest Park eastward, eight miles to the city line.

Richmond has but four parks, the only large one being Silver Lake Park of 56 acres; most of this is unimproved.

Monuments and Sculptures.—The most widely known of New York's monuments is the Statue of Liberty on Bedloe's Island in the Upper Bay. Thousands of pictures of this statue have been scattered broadcast all over Europe, as well as in this country. Next to that in point of wide familiarity is probably Grant's Tomb, on Riverside Drive. The Obelisk in Central Park is also well known. The Washington Arch, at the Fifth Avenue entrance to Washington Square, is the noblest of the city's monumental structures. The Maine Memorial Monument, at the southwestern entrance of Central Park, is of modern design and imposing proportions, a highly creditable construction of granite, marble and bronze. The Worth Monument, at 26th street, in the angle between Broadway and Fifth avenue marks with a simple granite shaft the grave of General Worth. The more important of the other monuments in Manhattan are the Soldiers and Sailors' Monument, and the Firemen's Memorial on Riverside Drive, at 89th street and 100th street, respectively. Among the statues should be first mentioned the equestrian statues of Washington, at Union Square; of Sherman, at the southeast entrance to Central Park; of General Sigel, and of Joan of Arc on Riverside Drive. Scattered about the city, chiefly in the parks, are statues of Columbus, Benjamin Franklin, Daniel Webster, Horace Greeley, Garibaldi, Alexander Hamilton, Farragut, Shakespeare, Lafayette, and the group of Sir Walter Scott and Robert Burns (in Central Park). Busts are much more numerous and include among others those of Audubon, Beethoven, Edwin Booth, William Cullen Bryant, Darwin, Ericsson, Washington Irving, Mazzini, Commodore Peary, Schiller and Verrazano. Prominent among the sculptures are The Pilgrim, The Still Hunt, The Indian Hunter and The Falconer—all in Central Park. The Bethesda Fountain on the Esplanade in Central Park, the Pulitzer Memorial Fountain, the Strauss Memorial and the Richard Morris Hunt Memorial exemplify another type of sculpture in which the city is very rich. The great bronze memorial of Commodore Vanderbilt, 150 feet long and 30 feet high, is on the wall of the Varick Street terminal.

Brooklyn has a magnificent memorial arch of the Soldiers and Sailors' at the main en-

trance to Prospect Park, a fine equestrian statue of Washington on the plaza of the Williamsburgh Bridge, the Lincoln Memorial with a seated statue, and the Prison Ship Martyrs' Monument in Fort Greene Park. See BROOKLYN.

Municipal Service and Improvements.—The streets of New York have a total length of 3,543 miles, of which 2,226 miles are paved. The total length of the city's sewers is 1,577 miles. The department of street cleaning which takes care of the streets and the removal of rubbish, garbage and ashes, employs about 3,000 sweepers popularly known from their white duck uniforms as "white wings," while 1,800 drivers collect the refuse. The annual cost of this department is \$3,450,000. The garbage is converted into grease and fertilizer on Barren Island in Jamaica Bay, the ashes and rubbish are used as "land filler," 65 acres of land having thus been reclaimed at Riker's Island in Long Island Sound. The department of water supply, gas and electricity, supervises the illumination of the city by private companies and supplies water of which Greater New York consumes daily (1918) 617,000,000 gallons; over 100 gallons for each person. The city owns its waterworks including 2,984 miles of mains, exclusive of the high pressure fire mains, more than 100 miles. The water supply of Manhattan, received formerly only from the Croton watershed with an area of 360 square miles, 30 miles north of the borough, is supplemented since 1916 by the Catskill aqueduct 92 miles long, tapping the watersheds of the Esopus and Rondout creeks, in the southern Catskills affording an additional capacity of 700,000,000 gallons a day and bringing the city's daily supply up to 955,000,000. The Catskills water is distributed to all of the boroughs of the city. The Ashokan reservoir on Esopus creek, 12 miles from Kingston, has a water surface of 12.8 square miles and an average depth of 50 feet. When full it holds enough water to last the city 335 days at the present rate of consumption and is used for impounding the water. The Kensico reservoir is used for storing the water; the Hill View reservoir in Yonkers for equalizing and distributing, while the terminal reservoir at Silver Lake on Staten Island 225 feet above sea-level, is used for distributing. The entire cost of this gigantic undertaking, including the watershed area purchased was \$138,154,089. The cost of the Croton water system was \$192,021,000, making the entire outlay for the city's water supply up to 1918, \$330,175,089. As the need arises it has been arranged to connect the watersheds of the Schoharie and the Catskill creeks with the Ashokan aqueduct, thus insuring an abundant supply for many years to come. There is no municipal lighting system. The city contracts with the commercial companies for this service. In 1918 the cost was \$825,000 for gas and \$2,330,000 for electricity. The city supports free public floating baths on the Hudson and East rivers, which are used annually for five to six million baths between June and September. There are also free interior permanent baths. All these conveniences help to keep the city death rate down to about 14 per 1,000. The birth rate is 21.60 per 1,000. The police department numbered in 1918, 10,884 men. The waterfront is protected by patrol steamers, launches and skiffs, active principally

at night. In 1918 the arrests numbered 187,913. The department in that year cost \$20,146,892. The fire department in 1918 numbered 5,039 paid men, with 931 volunteer firemen in Queens and Richmond. Horse drawn apparatus has been almost entirely replaced by motor equipment. The cost of the fire department in 1918 was \$9,119,285.

Industries and Manufactures.—The industries of New York are of the widest variety. The city's industrial supremacy is due chiefly to its immense volume of light manufacturing, most of it done in small factories. The United States Census of Manufactures for the year 1919 reported 32,590 manufacturing establishments of factory grade, covering about seven-eighths of the listed industries of the entire country. Of the whole number, 13,346 employed less than six hands, and 8,967 between 6 and 20 hands. Only 39 had more than 1,000 hands; 73 from 500 to 1,000; 179 from 250 to 500; 635 from 100 to 250; 1,333 from 50 to 100; and 3,766 from 20 to 50 hands. The entire number of persons occupied in manufacturing was 825,056, of whom 638,775 were wage-earners; receiving annually as wages and salaries the sum of \$805,822,000. Of the wage-earners 468,444 were males and 230,665 were females. Workers under 16 years of age numbered 3,125. The capital invested aggregated \$3,038,557,492. The cost of materials used was \$2,801,619,388; the value of products was \$5,260,707,577. The horsepower employed was 718,577. The fuel used was 2,169,218 tons of anthracite and 2,037,155 tons of bituminous coal; 235,079 tons of coke; 5,009,999 barrels of fuel oil; 33,818 barrels of gasoline; and 1,990,842,000 cubic feet of gas. The wholesale manufacture of clothing leads in point of value of product; over half of the clothing worn in the country being made in New York City. The value of women's clothing produced in 1919 was \$866,243,561; and of men's clothing, \$480,596,385. Printing and publishing held second place in value, with a total of \$345,989,264. Other leading industries with the value of the output are: slaughtering and meat packing amounting to \$191,838,000. Bread and bakery products, \$173,510,009; foundry and machine shop products, \$155,595,000; tobacco manufactures, \$146,033,207; millinery and lace goods, \$162,186,055; fur goods, \$132,145,251; patent medicines and druggists' preparations, \$75,280,000; coffee roasting and spice grinding, \$51,225,279; paints and varnishes, \$56,361,000; confectionery, \$84,564,630; copper, tin and sheet-iron products, \$59,682,000; boots and shoes, \$66,478,600; men's furnishing goods, \$61,472,000; musical instruments and materials, \$40,091,833; furniture and refrigerators, \$42,590,856; lumber and timber products, \$16,615,568; and jewelry, \$65,391,579. Sugar refining, the smelting and refining of copper and the refining of petroleum were also among the industries whose production reached a value of above \$20,000,000; but exact figures are withheld as tending to disclose private affairs. Other leading industries in which the value of the production reaches large figures are: soaps, leather goods, electrical machinery, food preparations, paper and fancy boxes, chemicals, gas fixtures, hosiery and knit goods, marble and stone work, artificial flowers and feathers, and ship and boat building. Allied

to the printing trade also are the fine lithographing, engraving and map making in which New York holds first place in America.

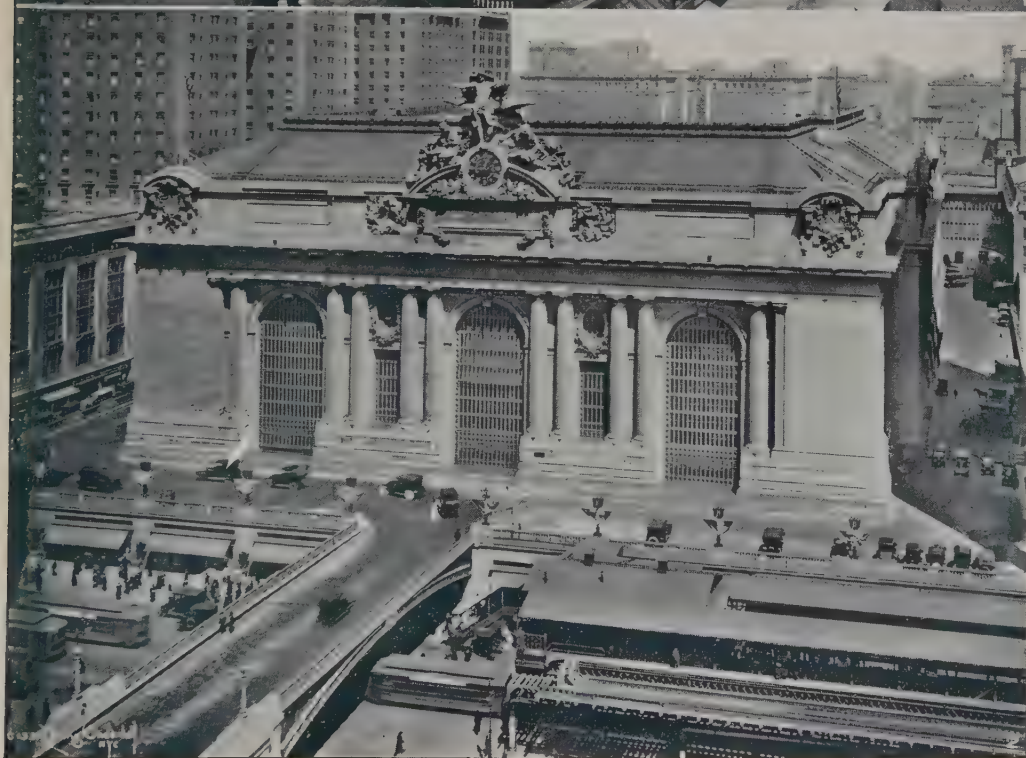
Trade and Commerce.—Nature and man have made New York the main portal of the foreign commerce of the United States, its commercial supremacy being due in large part to its harbor facilities as well as to its geographical location. The city has a water front of 578 miles, divided among the boroughs as follows: Manhattan, 48.2 miles; Brooklyn, 201.5 miles; Queens, 196.8 miles; Bronx, 79.8 miles; Richmond, 57.1 miles. The exigencies of the European War so greatly increased the commerce of the port as to strain severely the accommodations of the water front; of which only 103 miles are now occupied by docks. The wharfage on Manhattan has been within recent years improved by huge piers, notably the range of Chelsea docks, 800 to 850 feet long, extending from 12th to 22d streets, and the 1,000-foot piers between 44th and 59th streets. Large sections of the Hudson River front on the New Jersey side are owned by the great railroad corporations but some of the largest steamships find spacious berths along that shore. Across the East River on the Brooklyn shore are the docks of sugar refineries, factories, warehouses, government storage houses, the famous Brooklyn navy yard, with its great dry docks, and the South Brooklyn terminal basins for canal boats; while the shores of Staten Island also are lined with docks and fringed with piers. In the calendar year 1921 the foreign commerce of the port of New York amounted to \$3,062,521,187—imports, \$1,332,265,342; exports, \$1,730,255,845. As imports of the whole United States were valued at \$2,509,147,570, and the exports at \$4,485,031,356, it is seen that New York handled nearly 53 per cent of the imports and more than 33 per cent of the exports of the nation. In 1922 imports were valued at \$1,365,484,094 and exports at \$1,317,440,816. During year ended 31 Dec. 1921 the number of merchant ships entering and leaving the harbor of New York had an aggregate tonnage of 31,940,000, of which 16,625,000 tons entered and 15,315,000 tons cleared. There are 99 ocean steamship lines having their headquarters in New York and 38 lines of river and coastwise steamers, operating between New York and points on the Atlantic and Pacific coasts, Long Island Sound and the Hudson River, and ports in Central and South America, Europe, Africa, Asia and Australia. The port of New York is also the freight terminal of the main line of the Central Railroad of New Jersey, the Pennsylvania, the New York Central, the Erie, the New York, New Haven and Hartford, the West Shore, the Delaware, Lackawanna and Western, the New York, Lake Erie and Western, the Long Island and the New York, Ontario and Western railroads. See NEW YORK, HARBOR OF.

Government.—The charter of New York, as revised by the legislature in 1901, follows, in the main, the lines of the charter of the old city, with important provisions adopted from the charter of the former city of Brooklyn and from those of other American and European cities. The greater part of it is the law as it has existed for half a century, and the chief changes have to do with the adoption of the borough system and the policy of giving

control to localities over their own affairs. The executive power is vested in the mayor, the presidents of the boroughs and the heads of the departments. The mayor, who holds office for four years and is eligible for re-election, appoints the heads of departments and commissioners; except those over which the presidents of the boroughs have jurisdiction, and except also the comptroller or head of the department of finance, who is elected by the people. He can, with few exceptions, remove any official appointed by him, and can himself be removed by the governor, after a hearing upon charges. The mayor has the power of veto over all ordinances and resolutions of the board of aldermen, but an ordinance or resolution can be passed over his veto by a vote of two-thirds of the members of that body, except that when it involves the expenditure of money, the creation of a debt or the laying of an assessment, a three-fourths vote is required. The president of each borough holds office for two years. He presides over each local board in his borough, with the right to vote on and of veto over its actions, and is ex-officio member of the board of estimate and apportionment. He is also a member of the board of aldermen and has the same right to vote as any member elected to that body. The borough president appoints and may at pleasure remove a commissioner of public works for his borough with control of all matters relating to the improvement and repair of streets and sewers. He also has control of the public buildings in his borough except schools, hospitals, penitentiaries and fire and police stations, and exercises the supervision vested in the city over the construction of buildings in his borough, except such powers as are directly vested in the tenement-house commission. The borough presidents also are removable by the governor. The board of estimate and apportionment, besides the functions implied by its name, acts as a general board of directors of the city, determining its policy as to financial affairs, public improvements, franchises and special permits, in which matters it has practically the sole authority. The departments of administration comprise: 1, the board of estimate and apportionment; 2, finance; 3, law; 4, police; 5, fire; 6, water supply, gas and electricity; 7, street cleaning; 8, plant and structures; 9, parks; 10, docks and ferries; 11, public charities; 12, correction; 13, health, including an important division of child hygiene; 14, tenement house; 15, education; 16, taxes and assessments; 17, licenses.

Courts.—The city is included in two of the State judicial districts: the first district is co-extensive with the counties of New York and Bronx; the second district includes (among other territory) the counties of Kings, Queens and Richmond. These are thus a part of the jurisdiction of the Supreme Court of the State. In the first district there are 32 resident justices; in the second district there are 18. There is also a County Court for each county in the city; a city court, with 10 judges; a Court of General Sessions, with seven judges; a Court of Special Sessions, with 12 justices; a children's court, with five justices; 24 municipal courts; and 41 city magistrates. The appellate division of the State Supreme Court has its courthouse in the city; and there are head-

NEW YORK CITY



Grand Central Station, New York
Reed & Stem, Saint Paul, Architects; Warren & Wetmore, Associates

quarters here of two Federal district courts—the Southern of New York and the Eastern of New York; and here also is the seat of the Federal Circuit Court of Appeals of the second district. There is also a Surrogate's Court in each county included in the Greater City.

Finances and Banking.—The total assessed valuation of property within the city in 1923 was \$11,262,171,927—\$10,466,121,527 real and \$796,050,400 personal. This was distributed among the boroughs as follows:

	Real	Personal
Manhattan.....	\$5,950,822,305	\$543,640,100
Brooklyn.....	2,563,258,211	158,718,050
The Bronx.....	952,814,631	60,151,800
Queens.....	842,166,160	27,666,450
Richmond.....	157,060,200	5,874,000

In addition to this tangible wealth the city's tax commissioner listed in 1918 taxable franchises in the several boroughs as follows: In Manhattan, \$262,825,592; in Brooklyn, \$92,659,654; in the Bronx, \$32,097,927; in Queens, \$27,479,195; in Richmond, \$4,411,730—a total of \$439,474,098. The gross funded debt on Jan. 1, 1919 was \$1,506,595,699. The exempt funded debt was \$330,960,860 and the net sinking fund, amortization and redemption funds amounted to \$456,301,050, leaving the total constitutional funded debt, within the debt limit, \$719,293,759; as against the constitutional borrowing limit (10 per cent of the assessed valuation) of \$833,964,285. The 1923 budget adopted by the Board of Estimate, 31 Oct. 1922, totaled \$353,351,813. The debt in 1923 was \$1,067,082,137.

The chief sources of income are property taxes, special assessments, franchises, water rates, docks, ferries and subways. Valuable franchises granted to private companies do not in all cases return a proportionate income to the civic treasury. There are 44 national and 48 State banks, 54 savings banks and 35 trust companies in the city, some of them having several branch establishments. The New York Clearing House Association is composed of 44 banks and 15 trust companies, associated for the purpose of exchanging the checks and drafts they hold against each other. The clearing house is at 77 Cedar street, where it has been in operation since 1853. Banks not members of the association may clear through members. The clearing house transactions for the fiscal year ended 30 Sept. 1918 amounted to: Exchanges, \$174,524,179,929; balances adjusted, \$17,255,062,671; total transactions, \$191,779,241,700. The average daily transactions amounted to: Exchanges, \$575,987,390; balances, \$56,947,402; total \$632,934,791. For many years the leading savings bank was the Bowery Savings Bank, which in 1918 reports total deposits of \$104,422,370 in 142,200 accounts, and a surplus of \$16,771,270. But in recent years this bank has relinquished first place to the Emigrant Industrial Savings Bank, with total deposits of \$168,880,510 in 185,225 accounts, and a surplus of \$14,683,520. There are 11 life and 32 fire and marine insurance companies in the city, besides a number of companies engaged in casualty, credit, fidelity and surety and real estate title insurance. The best known of the city's financial institutions is the Stock Exchange, an association for the exchange of securities for currency or its representatives. The securities bought and sold at the New York Stock Exchange are certi-

cates of stocks and bonds issued under national, State or municipal authority, or by corporations doing business as common carriers, or in banking, mining, manufacturing or other industrial pursuits. In 1918 the par value of shares sold by the exchange was nearly 14 billions, and that of bonds sold \$2,093,257,500. The chief business of its members is buying and selling these stocks and bonds for outside clients, the charge being one-eighth of one per cent on the par value of every transaction. The Stock Exchange is limited to a membership of 1,200. Before 1868 seats on the New York Stock Exchange were not transferred by purchase and sale, but an initiation fee of \$3,000 was required from members. In 1868 the transfer system was instituted and the seats began to have a market valuation. All new members are now admitted through transfer, "seats" being worth from \$77,500 to \$100,000.

Education and Intellectual Associations.—The city has 557 elementary schools; 168 in Manhattan, 194 in Brooklyn, 64 in The Bronx, 102 in Queens and 34 in Richmond. It also has 24 high schools, 4 training schools for teachers, 2 truant schools and 4 vocational schools. The average attendance of pupils in the elementary schools in 1918 was 755,033; in the high schools, 70,366; in the vocational schools, 2,241; in the training schools, 1,029. The annual school appropriation for 1921 included \$60,209,528 for teachers' salaries, \$1,949,666 for supplies and \$1,550,933 for pensions. Besides evening schools, free lecture courses, recreation centres, summer vacation schools and playgrounds and special classes for foreign children are maintained; also rapid progress classes for those in advance of their grade; working paper classes for those who must have extra help to be entitled to working papers; while there are over 140 special classes for the education of mentally defective children. Prominent among the city's higher institutions of learning are the College of the City of New York, popularly known as City College, founded in 1848 as the Free Academy, and for many years on 23d street, now housed in splendid Gothic buildings erected at a cost of about \$4,000,000 on Harlem Heights between 136th and 138th streets and Amsterdam avenue. Free tuition is given by about 250 instructors to an average attendance of 7,000 students at an annual cost of about \$250,000. On Cathedral Heights at 116th street is Columbia University founded by royal charter from George II in 1754 under the name of King's College. This institution is also noted for its fine modern buildings and affiliated connections. The instructors number 1,162 and the average 1918 attendance of students in all departments was 17,604, including the summer school of 5,600, and membership in the extension courses of 4,500. On University Heights on the east bank of the Harlem River is New York University, founded in 1830, and for many years located on Washington Square and University Place, where the Law school is still located. Prominent among the university buildings is the classic Hall of Fame, the gift of Helen Gould, dedicated to the perpetuation of the names of famous Americans. In 1918 the average attendance was 7,778 students, with 493 instructors. At 69th street and Park avenue is Hunter College (named after its first principal, Dr. Thomas Hunter), formerly the

Normal College, founded in 1870 as a free city institution to train girls as teachers; the average attendance of students in 1918 was 1,386, and the number of instructors, 120. Noteworthy also are Fordham University, Manhattan College, the College of Saint Francis Xavier, the Union Theological Seminary, the General Theological Seminary of the Protestant Episcopal Church, and the College of Physicians and Surgeons, while a majority of the hospitals have training schools for nurses. Chief among many institutions of private endowment, is the Rockefeller Institute for Medical Research, endowed by John D. Rockefeller with \$4,000,000 for the advancement of the science of medicine by laboratory investigation, experiment, clinical observation and study. Important factors also in the city's educational development are 163 public and subscription libraries, including the New York Public Library (q.v.) with its 46 branches and the museum collections of many societies. Numerous also are the art and literary associations; chief among them the National Arts Club with 1,450 members; the Art Students League with 1,557 members; the School Art League of New York City with 626 members and 2,790 juniors; the Salmagundi Club of 800 members; the Fine Arts Federation of New York, an association of 15 art societies; the National Academy of Design; the University Club, with 3,800 members; the National Institute of Arts and Letters; the New York Historical Society; the American Geographical Society; the Hispanic Society of America and the Authors' League of America; while there are 30 dramatic and 61 musical clubs, 180 social clubs and as many theaters. Mention also should be made of the many social settlements, some attached to churches, others of a secular nature, found in different thickly settled sections of the city, studying and ministering to the needs of their neighborhoods in recreation, hygiene, education, industry and politics.

Churches.—New York is the see of the Roman Catholic and Russian Greek Catholic archbishops, and of a Protestant Episcopal bishop. In 1918 Greater New York had over 1,700 churches and religious societies. These were distributed as follows: Manhattan and The Bronx, 815; Brooklyn (called the "City of Churches"), 585; Queens, 212 and Richmond 92. As to sect, the Roman Catholic denomination has the largest number of churches—351; the Protestant Episcopal, 217; the Methodist Episcopal, 200; the Baptist, 139; the Presbyterian, 130, and the Jewish, 119.

The Disciples of Christ, Moravians, Universalists, Unitarians, Friends and Christian Scientists each have a number of fine churches. There are also many independent organizations representing every form of religious belief. The finest church building is the Roman Catholic cathedral in Fifth avenue. The New Protestant Episcopal Cathedral of Saint John the Divine, located on Morningside Heights, now partially completed and opened for worship, will be when finished the costliest church edifice in America. Of the others the most notable is Trinity Church, on Broadway at the head of Wall Street, which has the longest continuous history of any parish in the city. It was in 1697 that William and Mary granted a parcel of land "in or near to a street without the north gate of the city, commonly called Broad-

way," for use "as the parish church and churchyard of the parish of Trinity Church within our said city of New York." The church built on this grant was first occupied in 1698. Destroyed in the fire of 1776, the church was rebuilt 12 years later on the original site; but the second building was found to be unsafe in 1839, and in 1846 was replaced by the present structure. The church maintains eight chapels and aids 10 other mission churches in various parts of the city, and conducts industrial and training schools and classes and several guilds.

Charities.—All of the city's charitable institutions except those under the board of health and the association of the Bellevue and Allied hospitals, are administered by the department of charities superintended by a commissioner. Institutional relief is given but no money nor home supplies. The city gives in addition about \$4,000,000 to religious and privately managed hospitals and asylums that receive the city's poor. Largest among the charitable institutions of the city is the Charity Organization Society, which is supported by voluntary contributions and legacies and serves as a centre of inter-communication between various churches and charitable agencies, to avoid overlapping. There are 32 hospitals, refuges and asylums which receive State or municipal aid, and 170 hospitals and dispensaries supported by voluntary contributions and private endowment. Thirty-eight institutions and associations are conducted for the relief of the aged, and 140 for the relief of children. In the latter class mention should be made of the Children's Aid Society, organized in 1853, which has provided 75,000 boys and girls with homes and places of employment, and in its industrial schools given aid and instruction to over 115,000 children; the New York Foundling Hospital, which is controlled by the Sisters of Charity, sheltered during 1918, 4,960 inmates and 582 homeless mothers; and the Society for the Prevention of Cruelty to Children, by which an average of 9,000 complaints are yearly received and investigated. There are 26 organized agencies for the reformation of children, fallen women and intemperate men; these include the Catholic Protectors, where 4,500 children are taught trades and industrial employment, and the House of Refuge where 1,300 boys and girls received upon commitment of the city courts, are given a common school education and industrial instruction. Noteworthy among agencies for rendering special or temporary relief to the poor are the Grace Institute, endowed by William R. Grace in 1897 to furnish women and girls instruction in trades and occupations and which now has 900 pupils; the Legal Aid Society, which gives free legal aid and assistance to those unable to procure the same; the Prison Association of New York, which aids reformed convicts after discharge; the Provident Loan Society which loans on pledges of personal property at 1 per cent a month; the Baron de Hirsch Fund for the benefit of Hebrew immigrants; 15 church and college settlement houses, and the Sailors' Snug Harbor on Staten Island, where a home is provided for 900 aged and decrepit sailors. Mention must also be made of the Society for the Prevention of Cruelty to Animals, founded in 1864 by Henry Bergh, and the parent of similar organizations in many other States and cities.

History.—The first white men known to have visited Manhattan Island, the future site of New York City, were Giovanni da Verrazano, an Italian sailing in the French service, and Diego Gomez, a Portuguese sailing in the Spanish service, both of whom, while seeking a westerly way to the Indies in 1524, entered what is now the harbor of New York. Nothing, however, in the way of colonization came of their voyage. Eighty-five years later, in April 1609, Henry Hudson, an English adventurer in the service of the Dutch East India Company, sailed from Amsterdam as captain of the ship *Half Moon*, with a charge from his employers to seek a water route to the Indies by the north side of Nova Zembla. Ice early blocked his advance into the Arctic, and so, heading westward, a month's cruise brought him, in July, to the coast of Newfoundland. Thence he sailed southward to the James River, Virginia, and, again altering his course, still in pursuit of a new channel to India, came on 11 Sept. 1609 upon the river which bears his name. He anchored for a time at its mouth and then sailed up the stream until warned by shoaling water that he was at the head of navigation, near the present site of Albany; whereupon he turned his vessel southward, and early in October set out on his homeward voyage. Hudson's account of the stores of fine peltries he had seen in the possession of the Indians moved his employers to prompt action, and in 1609 the former mate of the *Half Moon* was sent across to trade with the savages and report further upon the country. Handsome profits attended this venture, and in 1613 the *Fortune* and the *Tiger*, commanded respectively by Hendrick Christaensen and Adrian Block, sailed for the Hudson River, being followed within a year by three other vessels from Amsterdam and Hoven. These carried back to Holland such generous cargoes of furs that their owners hastened to open regular communication with the Hudson River country and to establish posts at its head and at its mouth for the purchase and collection of skins while the vessels were on their voyages to and from Holland. The main post, called Fort Nassau, was located just below the site of Albany; but a smaller fort was built on Manhattan Island, its site being just south of the present Bowling Green. Captain Christaensen was appointed head man over both posts, and he and his half dozen comrades were, therefore, the first white settlers on Manhattan Island. Though Christaensen soon lost his life in a quarrel with the Indians, the trade he had helped to found grew and prospered, and soon the merchants who had first engaged in it joined with others in the formation of the United New Netherlands Company, to which, so far as the power lay with the States-General of Holland, was granted for three years from 1615 the monopoly of the fur trade with the newly-opened country. This monopoly was renewed for a year at a time until 1621, when the Dutch West India Company came into existence, with chartered rights to the exclusive trade of all the coasts of both Americas. The new corporation was, speaking in a broad way, a commercial federation, with branches established in the several cities of Holland. Each branch, though subject to the collective authority of its fellows, was clothed with distinct rights and

privileges of its own, and was assigned a specific territory, over which it exercised the right of government and of trade. Thus, the post on Manhattan Island, with its dependent territory, was assigned to the Amsterdam branch, which at once addressed itself to the development of what had now come to be known as the province of New Netherlands. Accordingly, in 1623, 30 families of settlers were sent out from Amsterdam, and a part of them put ashore on Manhattan Island. More colonists arrived in 1625, men who had come as homemakers and not as transient traders; and to confirm this promise of permanency Peter Minuit was appointed director-general of the colony, with power to organize a provisional government. He arrived at his post in May 1626, at the head of another band of colonists, and having bought Manhattan Island from its Indian owners for a consideration of \$24 he proceeded to christen the infant town New Amsterdam. Recalled from his directorship in 1632, Minuit was succeeded in turn by Wouter van Twiller, William Kieft and Peter Stuyvesant. A savage Indian war in Kieft's time well nigh extinguished the colony, but it made rapid recovery under Stuyvesant, who directed its affairs from 1647 to 1664, and by the year last named the hamlet on Manhattan Island had become a town of 1,000 souls, under the government, organized in 1652, of a schout, two burgomasters and five schepens, while thriving settlements had sprung up on both sides of the Hudson and on the lands about the bay.

The Dutch, however, did not long retain possession of New Netherlands. The English claimed the entire continent as having been discovered by Cabot, and whenever the English and the Dutch were at war New Amsterdam had always to fear the threatened attack of some English squadron. The dreaded blow finally fell in 1664, when Charles II resolved to seize New Netherlands by surprise. In pursuit of this purpose the king made to his brother James, Duke of York and Albany, a grant which included the whole of the Dutch possessions in America, and late in August 1664 a British squadron appeared before New Amsterdam and demanded its surrender. The coming of the English found the town ill-prepared for a siege, and though Stuyvesant wished to fight, even against heavy odds, he was not allowed to have his way. Articles of capitulation were quickly agreed upon, and on 8 September the flag of the West India Company fell from Fort Amsterdam to be replaced by that of England, and Col. Richard Nicolls took possession of the town and province in the name of the English king and for the use of the Duke of York.

New Amsterdam was speedily renamed New York, and in June 1665 the city government was reorganized, in accordance with English customs, by replacing the schout, burgomasters and schepens with a sheriff, aldermen and mayor. Once again, from 30 July 1673 until 10 Nov. 1674, the Dutch were in possession of the town and province; but the Treaty of Westminster finally transferred them from the States-General to England; and the permanent change of ownership was attended by a change of policy which made for the more rapid up-building of the town. One important act looking to this end bestowed on New York the sole

right to bolt and export flour. The Bolting Act remained in force from 1678 until 1694, and during that time it trebled the population of the town, and gave a prosperous permanency to its foreign commerce. According to the provisions of the act no person outside of the city could grind flour for market or pack breadstuffs in any form for sale. The result of this interdict was to throw the considerable and growing export trade in breadstuffs, mainly with the West Indies, wholly in the hands of the millers and merchants of New York, so that during the 16 years that the act remained operative the city revenues more than doubled and the total number of buildings in the town increased from 384 to 983, two-thirds of which depended in one way or another on the trade in flour, while the port's sailing craft grew from 11 to 85 sloops and ships.

It was while the Bolting Act was still in force that, on 22 April 1686, New York received the charter—known as the Dongan charter, because granted through the governor of that name—which still forms the basis of its civic rights. The governor, under this instrument, appointed the mayor and sheriff, but the city was allowed a large quantity of real estate, from some of which it draws a revenue to the present day, while the aldermen were elected by the freeholders of the six wards into which the town had been recently divided, and enacted by-laws for its government. The Dongan charter, amended by Queen Anne in 1708, was further enlarged by George II, in 1730, into the Montgomery charter, which, confirmed by the assembly of the province in 1732, made New York virtually a free city. The mayor until the Revolution was appointed by the governor in council, until 1821 by the governor of the State and four members of the council of appointment, and then for 13 years by the common council of the city. Since 1834 he has been chosen by the people.

The revolution by which, in April 1689, the crown of England passed from James II to his daughter and her husband, bred a popular uprising in New York, and control of affairs passed for the time being from the Crown officers to a committee of safety of 10 members, chosen by the citizens. This committee appointed Jacob Leisler, a leading merchant, captain of the fort, and invested him with the power of commander-in-chief until orders should arrive from the new sovereigns. This arrangement was opposed by the so-called Aristocratic party, whose leaders had been office holders under King James, but without effect, and the government of the town and province remained in the hands of Leisler until March 1691, when Col. Henry Sloughter, who had been appointed governor of the colony by William and Mary, arrived in New York. Leisler declined to surrender the fort unless assured immunity for his acts as governor. This was refused by Sloughter, who had fallen under the empire of the Aristocratic party; many of Leisler's followers deserted him, and he was thrown into prison. A little later, with his son-in-law, Jacob Milborne, and others of his adherents, he was brought to trial charged with treason and murder. All were found guilty by a prejudiced and hostile court, and Leisler and Milborne suffered death on the gallows. Their execution was little less than a judicial murder.

Leisler's son afterward secured an order for the restoration of his confiscated estate, and, in 1698, an act was passed by the Parliament of England which canceled the judgments of the court in New York and sustained Leisler's course as governor. Three years afterward the bodies of Leisler and Milborne, denied funeral honors at the time of execution, were taken from their temporary resting place, near the present site of the *Sun* building, and, after lying in state in the city hall, were with impressive ceremony reinterred in a burial ground which stood in what is now Exchange place. No man knows their present sepulture.

The political turmoils of the period did not retard the growth of New York, and the opening of the 18th century found the town's population increased to 5,000 souls,—Dutch and English nearly equal in numbers; a few French, Swedes and Jews, and about 800 negroes, nearly all of whom were slaves. Slave importation into New York began some time prior to 1628, and reached a climax about 1746, when a census of the town showed 2,400 slaves in a total of less than 12,000 population. Thereafter each year marked a lessening demand for slaves, though they continued to be bought and sold during the entire colonial period. One reason for the decline of slave-holding and slave-buying in New York was the dread of a servile insurrection, dread which led uprisings among the blacks to be punished with unsparing hand. When, in 1712, a party of negroes, forming a wild plot to slay all the whites, met at night in an orchard near Maiden Lane, and killed and wounded a dozen men before being put to flight, 21 of those captured were shot, hung or burned at the stake. Reprisals even more sweeping attended the "Great Negro Plot" of 1741, a panic compounded of fear, rage and suspicion, which has been likened to the witchcraft delusion at Salem village in 1692. This panic had its origin in a series of fires which in March 1741 alarmed the town, and fixed in the minds of many citizens the belief that they were the work of disaffected slaves.

A short time before the indentured servant girl of a low tavern-keeper on the North River had been arrested, together with her master and mistress and two negroes, for complicity in a robbery. When a proclamation appeared offering a reward with a full pardon to any conspirator who would tell what he knew about a plot for burning the town, she saw in it a chance to regain her freedom, and "confessed" that her master and mistress, along with sundry blacks and semi-criminal white, had matured such a plot as the first step in a projected uprising. It has ever since been doubted whether this plot was anything more than a figment of the imagination of a depraved and abandoned girl, but at the moment the creature's charges produced a reign of terror, and scores were jailed and put to death on little save her unsupported statements. Fourteen negroes were burned at the stake, 18 were hanged and 71 transported, while of the 20 whites thrown into prison four were condemned and put to death. Glutted with victims, the panic finally subsided in September 1741, leaving behind it one of the darkest pages in the history of the city. It would be unjust, however, to judge this affair by the standards of a later time. Fear and terror, fed by fraud, appear to have promoted



1 Cathedral of St. John the Divine

2 The Metropolitan Museum of Art

NEW YORK CITY



General U. S. Grant's Tomb, New York City, Overlooking the Hudson River

some awful mistakes, but those who committed them lived and acted under the hair-hung sword. The panic of 1741, moreover, was followed by a wholesome revulsion of popular feeling in favor of the negroes. They were admitted to the franchise within 10 years, and in 1758 the abolition of slavery in New York was practically accomplished by an act which declared that from that time forth all children born of slave parents should be free.

During the first part of the 18th century ocean industries were what mainly contributed to New York's growth and wealth. Kalm, the Swedish traveler, records that 211 vessels entered and 222 vessels cleared from this port in 1730, and the town's river, coast and sea trade grew steadily until the opening of the Revolution when about one-tenth of all the foreign commerce of the colonies were centred at New York. But with the arrival of the British army of occupation, 15 Sept. 1776, a seven years' blight settled over the town. During this period it lost more than half of its population and all of its commerce, and was twice visited by destructive fires. These laid a full fourth part of the town in ashes, nor was any attempt made to repair the devastation until after the British evacuation, 25 Nov. 1783. The war ended, however, the men of New York faced the future with stout hearts. "The town is ruined by the war, but its future greatness is unquestioned," wrote one of them; and in this hopeful spirit was begun the work of building anew—a work pushed with such resolute purpose that within eight years from the town's evacuation its population trebled and its commerce regained and passed its former limit. During this period also it was for a year and a half the capital of the Federal government, and in the Federal Hall in Wall street, on 30 April 1789, Washington was inaugurated first President of the United States.

New York ceased to be the Federal capital in August 1790, but this did not retard its growth, and in 1807, by which time it had reached a population of 60,000, robust faith in its future prompted the appointment of a commission to plot the city south of 155th street substantially as it exists to-day. The commissioners, however, had hardly begun their task, duly completed in 1811, when New York was made to suffer from the chain of events which led to and attended the second war with England. The act of embargo passed by Congress, in September 1807, dealt what seemed at the moment a mortal blow to the prosperity of the town; and John Lambert, the English traveler, writes that in April of the following year he found 500 vessels in its harbor lying up useless and rotting for want of employment, while the losses of the next six years bore more heavily upon New York than any other city. But with the conclusion of a treaty of peace in December 1814 the town's commerce revived on the instant, and the annual revenues of the port, which had fallen to but little more than \$500,000, shot up in 1815 to \$14,000,000.

The end of another two years brought the practical inception of an enterprise to which the modern city is largely indebted for its commercial supremacy,—the cutting of a waterway from the Hudson River to the Great Lakes. The Erie Canal, begun on 4 July 1817, and completed on 26 Oct. 1825, made New York

the gateway to the commerce of half a continent; and so profoundly did this union of the inland and the outland seas affect its growth that the year 1835 found it a city of 200,000 souls. A fire in December 1835, which caused a money loss of upward of \$20,000,000, and the financial panic of 1837, were temporary checks to this growth, but only temporary ones. Gas was introduced into the city in 1825; the first street railway was set afoot in 1831, and in 1851, with the completion of the first trunk line to the Great Lakes, was inaugurated the railway service which has long made New York the seaboard terminus of all east and west lines. This was the Erie, begun in 1836, and extending from Piermont on the Hudson to Dunkirk on Lake Erie. Two years later the second trunk line connecting New York and the West, the New York Central and Hudson River Railroad, was established by the consolidation of a number of shorter lines. Several railroads had been built meanwhile in New Jersey, connecting New York with Philadelphia and other points. These in the process of time became one corporation, as the United Railroads of New Jersey, only to be in turn absorbed by the Pennsylvania Railroad, which after 1854 connected Philadelphia with Pittsburgh, thereby not only perfecting New York's connection with the Middle and Southern States, but also sending from the heart of commerce an artery of traffic into the Middle Western States. The building of these and other lines called, however, for the investment of large sums of money, from which quick returns were expected, and this bred a spirit of speculation whose blighting influence spared no part of the nation. The banks of New York suspended payment from October until December, trade and industry came to a standstill, and there were 5,000 failures, with liabilities exceeding \$300,000,000. But confidence returned with the spring, and with it a resumption of railway construction, which, though temporarily retarded by the Civil War, has ever since tended in growing measure to strengthen New York's hold upon the business of the interior of the country. To-day 10 trunk lines terminate in New York, which is also the objective point of a major portion of the traffic of all the railroads running east and west.

New York's devotion to the Union during the Civil War found expression in many ways. A sixth of its able-bodied male citizens were in the field before the close of the first year of the struggle, while from the first the women of the city busied themselves with efforts to care for the soldiers in camp and hospital and for their widows and orphans. They led in the founding of the Sanitary and Christian commissions, and a single fair held in behalf of the former yielded more than \$1,000,000. A kindred organization ministered to the necessities of refugees from the South, and a Soldiers' Rest was established on the site of Madison Square Garden, where soldiers could find a temporary home while on their way to and from the front. But in no form did New York's devotion to the Union find more sufficing expression than in the labors of the Union League Club, which, founded in the closing days of 1862 on the basis of "absolute and unqualified loyalty to the government, and unwavering support of its effort for the suppression of the

rebellion," counted among its members every loyal citizen of note in the town; \$210,000,000 were subscribed by the bankers and capitalists of Manhattan to the loans made by the government between 1861 and 1865, and the major portion of this sum was furnished or secured by members of the Union League Club. There was but one blot on New York's story of splendid loyalty. Proof of the existence of a turbulent element in the population had been furnished in 1849 when some thousands of rioters, taking into their own hands a quarrel between Edwin Forrest and the English actor, William Charles Macready, sought to drive the latter from the stage of the Astor Place Opera House, but were held in check by the police, fired into by the militia and finally dispersed; and the same lawless spirit found expression in an outbreak yet more ferocious in July 1863. Congress had passed a draft law that unwisely exempted from its operation all who should pay into the Federal treasury the sum of \$300, and the discontent thus produced was systematically fomented in New York City by pot-house politicians, who in bar-rooms and on street corners declared the draft unconstitutional, and that it bore with peculiar oppressiveness on the poor man. Many vowed resistance, and, borrowing courage from the fact that the city, to beat back Lee's invasion of Pennsylvania, had been denuded of all but 300 troops, made plans to attack the drafting officers. No trouble occurred on the first day of the draft, 11 July, but on the third, 13 July, an organized mob attacked and wrecked the office of the provost-marshal at the corner of Third avenue and 46th street. Then the rioters, inspired by animosity toward the negro race, made a raid on a colored orphan asylum in Fifth avenue, between 43d and 44th streets; and though a handful of policemen aided the nurses in getting the children through a rear door to a place of safety, the building was burned to the ground. After this the mob attacked another enrolling office at 1190 Broadway, near 28th street, with the resultant firing and pillage of most of the shops in the neighborhood. A cry now went up to kill the police, and soon 5,000 rioters, so rapidly had the mob swelled in numbers, were marching down Broadway, bent upon the destruction of police headquarters in Mulberry street. Thomas C. Acton, president of the police board, informed of the rioters' purpose, detailed Sergeant Daniel Carpenter with 200 men to lie in wait for them. Carpenter marched his squad into Bleeker street and so to Broadway, at the same time sending detachments up the nearest parallel street east and west to strike the flanks of the oncoming mob. "Hit for their heads, men," were his orders. "Hit quick and hard, and take no prisoners." The fight that followed came soon to an end, and Broadway was cleared of rioters, save those that lay on the pavement with broken skulls. Routed at one point, however, the mob soon rallied at another, and a few hours later, under cover of darkness, a desperate attempt was made to sack and burn the office of the *Tribune* in Park row. Here again the police did heroic service, and a charge led by Inspector George W. Dilks at the head of 110 men drove the rioters from the field with heavy loss in killed and wounded. Riotous feints meantime had been made upon the Seventh avenue and Centre street arsenals and

upon the armory at the corner of Second avenue and 21st street; the house of George Opdyke, mayor of the city, invaded and some of his furniture destroyed, and an attack made against that of Henry J. Raymond, editor of the *Times*, which had strongly supported the draft. It was clear at the close of Monday that the police force of the city was too small to cope with the lawless spirit. The mayor accordingly called on the State and Federal authorities for aid, and all of the New York regiments at the front were ordered to repair to the city. While this order was in process of execution the mob continued its work of firing and looting houses and of maltreating and murdering unoffending negroes; but on the evening of Wednesday the returning regiments began to arrive in the city. With their coming, bayonets and bullets were substituted for policemen's clubs, and the rioters were attacked at every point with a resolute desire to do them harm. This wholesome policy, with a temporary suspension of the draft, quelled the rioting, and on Friday 17 July the mayor was able to announce the complete restoration of order. Two million dollars' worth of property had been destroyed and over 1,200 rioters slain.

New York during the last 50 years has witnessed the assembling of but one mob which the police could not handle without the assistance of the military. That was in July 1871, when the Orange lodges of the city undertook to parade on the anniversary of the battle of the Boyne. Announcement of their purpose evoked threats of violence from the Catholic Irish and fearing trouble, the governor of the State ordered five regiments of the National Guard to escort and protect the procession. Policemen were also detailed to surround and guard it. The point of departure was the corner of Eighth avenue and 29th street and at the appointed hour in the afternoon of 12 July the paraders began their line of march,—a detail of patrolmen in front, then a regiment and next the Orangemen, with a moving wall around them and two other regiments bringing up the rear. Before they had moved two blocks a volley of sticks and stones from sidewalks, house-tops and windows rained upon Orangemen, police and soldiery, many of whom were injured. Angered at this treatment, the members of one of the rear regiments, not waiting for orders, fired, some into the crowd and others at house-tops and windows. There was only one discharge, but 54 persons were slain. After this one deadly volley, police clubs and bayonets held some of the rioters at bay, while the greater number turned and ran as the reserve patrolmen along the line hastened to the scene. The remainder of the march passed without incident.

The political history of New York during the first half of the last century was a varied and turbulent one, but with a steady trend toward making the government democratic in all its branches. Until 1834, the mayor, as has been noted elsewhere, was chosen by the State council of appointment or by the common council of the city, which method of selection brought to the office such men as Edward Livingston, Dewitt Clinton and Philip Hone. After 1834, however, the mayor was elected by the citizens, to whom in the meantime had been granted an unrestricted suffrage. A dozen years later the judiciary was also made elective and thence-

forth most local officers were chosen in the same manner. During this period the Democratic party was the one most often in power, The Federalists, or their successors, the Whigs and Republicans now and then gained the upper hand; but in the long run the Democrats, under the leadership of Tammany Hall, a secret organization whose social and benevolent aims had been early put aside for political ones, always recovered their hold on the reins. The first mayor chosen by popular suffrage was a Democrat and so were most of his successors prior to the Civil War. A Republican in 1862 succeeded to the office, but Tammany Hall soon regained control of the municipal government, and for several years political corruption ran riot in the city. Tammany Hall's master spirit at that period was William M. Tweed (q.v.), an able, but coarse and unscrupulous man, who following 1863 organized the politicians of his own party and a number of the local Republican leaders of the baser sort into a gigantic conspiracy to plunder the city. The Tweed Ring, as it was called, attained its greatest power in 1869, when it was master of every department, not only of the city, but also of the State government. Its greatest scheme of robbery was the building of a new courthouse in City Hall Park. Work on this structure was begun under a stipulation that the cost should not exceed \$250,000, but before 1871 \$8,000,000 were expended on it, more than \$1,000,000 of this sum being traced to Tweed's pocket. The end came in 1871, when the *Times* exposed the operations of the ring. Then an aroused public sentiment compassed its defeat at the polls and this was followed by the prosecution and imprisonment of the chief offenders, Tweed himself dying in a felon's cell.

The material prosperity of the city has increased steadily in the last 50 years. A chief factor in the making of the New York of to-day was the construction of the elevated railway system, completed in 1880 through the efforts of Cyrus W. Field. This brought all parts of the island within easy distance of each other and the unbroken lines of city blocks which quickly followed in its wake wrought a complete transformation in the region in and about Harlem, formerly an isolated suburb reached only by horse-car or steamboat, but now as near the heart of trade as 14th or 42d street was in earlier years.

The territorial expansion of New York has the while more than kept pace with its material development. By an act of the legislature passed in 1873, the corporate limits were carried across the Harlem and a part of Westchester County, amounting to 13,000 acres, erected in city wards. A dozen years later a movement was set on foot to include in one municipality Manhattan Island, Brooklyn, part of Queens County, Staten Island or Richmond County and yet another portion of Westchester County; and in 1890 a commission of 11 members, headed by Andrew H. Green, was appointed to inquire into and report upon the expediency of the project. The labor of the commission took shape in a bill passed by the legislature in 1894, which provided for the submission of the question to a vote of the people of the cities, towns and villages included in the proposed consolida-

tion. The people gave their vote in November of the same year and only the residents of Mount Vernon and the town of Westchester failed to record their approval. Meanwhile, by act of the legislature, West Chester, East Chester, Pelham and Wakefield (or South Mount Vernon), were in June 1895 annexed to New York City, whereby another 20,000 acres were brought within the corporate limits and Westchester township's vote against consolidation rendered ineffective. This carried the city line to the limit in Westchester County recommended by Commissioner Green and his associates and in January 1896 a bill was passed by the legislature which made Kings County, a portion of Queens and all of Richmond integral parts of Greater New York. The same year a commission of nine members was appointed by the governor to frame a charter for the new municipality and report the same to the legislature; and its labors had issue in a bill which on 5 May 1897 received the signature of the governor. This measure, which took effect 1 Jan. 1898, divided the city into five boroughs—Manhattan, the Bronx, Brooklyn, Queens and Richmond,—embracing an area of a little less than 327 square miles, and counting a population in 1920 with an official count of 5,620,048. Thus, fulfilling its destiny, the village of 250 years ago has become the first city in the world. For, from the co-ordination of Greater New York in 1898 and the opening of the 20th century, no other centre of population has made the rapid strides in civic development, outlined in this article in the description of the vast and costly enterprises of intercommunicating river bridges, tunnels, railways, elevated and street railroads, the efficiency engineering of the harbor architects (see NEW YORK, HARBOR OF), the imposing new public and business buildings, the beautifying and extension of parks and parkways, and the varied municipal improvements and service which culminated 12 Oct. 1917 with the opening of the new Catskill aqueduct for the gigantic and unparalleled water-supply system of the metropolis.

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NEW YORK, College of the City of. See COLLEGE OF THE CITY OF NEW YORK.

NEW YORK, Harbor of. As already stated under New York City (q.v.), the necessities of the European War so greatly increased the commerce of this, the most important harbor on the Atlantic seaboard, that its accommodations and trade-handling facilities were overstrained. Serving as it does for the outlet of the enormous bulk of local manufactures, industries, trade and the greater portion of the exports and imports of, and passing through, the States of New York and New Jersey, the development of the port had long been recognized as the concern of all of both States. The legislatures and governors of New York and New Jersey by the creation of the "New York, New Jersey Port and Harbor Development Commission" in 1917 made effective a joint study of the Port of New York and its requirements. The old method of development with each of some 50 municipalities striving to solve the problems of the port in its own way or utterly disregarding the fact that it had any place or part in solving the problems of the port was failing utterly. With a converging network of trunk-line railroads, the communities had grown by leaps and bounds, and the Port of New York had long handled substantially half the foreign commerce of the country. But the trade of these communities, coming faster, almost, than it could be assimilated was accommodated in accordance with immediate needs, without any general direction. Haphazard facilities and methods had become institutions, as had makeshifts built around them to meet new contingencies. The result was patchwork. Obviously this prevented the best use being made of the natural advantages of the port. At the same time the port as a whole had long suffered the handicap of a differential freight rate in favor of other ports. Latterly, too, other ports had launched a campaign to get more of New York's business. The combination of circumstances had been effective, and New York's commerce had begun to slip away. While this slipping away was slow, there were unmistakable indications that the campaign of the other ports had begun.

The New York, New Jersey Port and Harbor Development Commission, created to study the needs of the port as a whole, was deeply impressed with its responsibility—that of devising a plan to meet the situation and to provide liberally for future trade. It assembled a large amount of data. The task of determining the volume, method of handling and cost thereof of all traffic coming to, originating in or passing through the port was the first phase of the investigation. To supervise and direct the execution of the final plan, the Commission prepared and urged upon the two legislatures early in 1918 the adoption of a supplementary and amendatory compact between the two States creating a permanent "Port of New York District" and "Port of New York Authority."

New York as a Port.— Succinctly summarized for comparative purposes it may be stated that New York is by far the greatest railroad, commercial and industrial center on the Atlantic seaboard. The population of the metropolitan district of New York is four times that of Philadelphia. The port has the finest harbor on the Atlantic Coast, with 780 miles of waterfront.

Three times as many railroad trunk lines come to New York as come to any other city on the Atlantic tidewater. More manufacturing industries are located in the New York district than in the combined cities of Philadelphia, Chicago, Cleveland and Saint Louis, and the value of the products of the New York industries is nearly as great as the combined value of the products of those of the other four cities. Approximately half of all the foreign commerce of the United States passes through the Port of New York. This is one side of the picture, and it might seem that New York's position is unassailable—that as much business as the port desires and can handle is bound to gravitate to it.

There is another side. New York suffers a severe handicap from the differential in railroad freight rates, whereby shippers to or through the Port of New York pay more on shipments than to or through such cities as Philadelphia and Baltimore. A determined campaign is being made to divert traffic from New York, mainly on the grounds of alleged congestion and high terminal costs at New York. The effects of these things are already visible. The tonnage of New York's foreign commerce, mounting steadily from 1911, reached a peak in the year ended 30 June 1914 and has since fallen steadily. The 1918 figures are 26 per cent below those for 1914 and lower than those for 1911 or any succeeding year.

New York's percentage of the total foreign commerce of the United States fell from 52.67 per cent in 1916 to 44.68 per cent in 1917 and 42.36 per cent in 1918, the latter percentage being lower than in any year since 1911 inclusive. Fewer loaded freight cars came to New York in 1918 than in any of the four preceding years. Despite the abnormal railroad traffic in 1918 in the country at large figures compiled by the Commission's statisticians for four of the principal New Jersey trunk lines show that in the first 10 months of 1918 they received 7 per cent fewer loaded cars than in the same months of the slack year 1914 and 20 per cent fewer than in those months in the heavy year 1916.

Far more important than the past is the future. Our country is building a great merchant fleet. The opportunity of the country is here, for the nation to reach out and get its share of the world's trade. It must do so. Other ports are assuming that it will do so, and are preparing to expand their facilities to handle the increased traffic. With five times the traffic of any other Atlantic port, New York's preparations must be vastly more elaborate, in the face of vastly greater complications arising from New York's very size and rapidity of growth. Evidently the time has passed when the needs of the Port of New York can be settled by the individual communities in the two States that constitute the Port—even by the great community of New York City. The legislatures of

NEW YORK CITY



"Liberty Enlightening the World," New York Harbor

New York and New Jersey recognized this in creating this Commission.

The ultimate aim of the Commission, therefore, is to establish a general plan of Port operation and development that will serve as a guide for 50 years; a plan flexible to meet future conditions, but fixed as to general principles; a plan supported by detailed estimates of costs and proof of its economic soundness, and accompanied by a tentative program which will meet the most urgent needs first.

Review of 1918 Report.—Facts as to the organization of the Commission are set forth in the preliminary joint report, dated 26 Jan. 1918, and transmitted to the legislatures of New York and New Jersey 18 Feb. 1918. This report recites how the Commissions of three members each, appointed in 1917 by the governors of New York and New Jersey respectively, organized a joint commission, the chairman being a member of the New York Commission and the vice-chairman a member of the New Jersey Commission—the purpose of the investigation, as set forth by the acts of the two legislatures, being to make an “investigation of the Port conditions at the Port of New York and to submit a comprehensive report recommending the proper policy that shall be pursued for the best interests of the entire Port of New York, and the legislation, State and Federal, that will be necessary to make such recommendations effective.”

The report of 1917 relates how the Joint Commission held meetings and conferences in 1917 with members of the Public Service Commission of New York, the Port and Terminal Facilities Committee of the Board of Estimate and Apportionment and the Commissioner of Docks of New York City, the New Jersey Board of Commerce and Navigation, the New York State Barge Canal Board, the presidents of the trunk-line railroads and various representatives of shipping, lighterage and warehouse business, together with engineering and legal experts of this and other ports.

It tells of inspections of the harbor, of studies of the West Side railroad terminal problem in Manhattan, of the organization at the Commission's suggestion of the War Board for the Port of New York, of other co-operation with the Federal government.

A decision of the Interstate Commerce Commission in the New York Harbor case is referred to, wherein that body states that “historically, geographically and commercially New York and the industrial districts in the northern part of the State of New Jersey constitute a single community,” and commends the creation of this Joint Commission.

The report bounds that single community by Yonkers and New Rochelle on the north, Great Neck and Far Rockaway on the east, Perth Amboy and Sandy Hook on the south, Paterson, Newark and New Brunswick on the west.

Necessity for Port Plan.—Emphasis is laid in the report on the necessity for a definite port policy and plan, with such comparison between the present methods of operation and whatever new methods may be recommended as will afford proof of the economic soundness of the plan and methods recommended.

Many studies and reports on phases of the

problem were made, and the Commission gave them careful consideration. At the same time it pointed out the great diversity of interests involved extending into two States and about 50 municipalities; that no comprehensive plan for the entire metropolitan district has ever been made; and that none of the studies and reports referred to had been supported by evidence, statistics or exact analysis of income, cost of operation and net return on the proposed investment in order to justify their economic soundness.

The Commission stated its purpose to ascertain the volume, route, classification and time of transit of all freight movements in the metropolitan district, together with the cost of handling this freight under normal conditions and with existing facilities. This, it stated would require detail consideration of many factors and a complete survey on the ground for an extended period of the principal lines of rail and water deliveries.

To arrive at the carrying charges of the present capital investment and of the new capital required for additional facilities, the Commission pointed out that an approximate appraisal of the value of existing facilities would be necessary. Such a valuation, it was noted, would have to be available sooner or later if the States should determine that the harbor waterfront was to be publicly owned.

In addition to the preparation of the engineering, operating and financial plans, the report contended that there must be prepared a legal plan for combining the present distributed Federal, State and local powers of administration and construction.

Extent of Investigation.—Finally, the report stated that it would take two years to complete the study, at an estimated cost of \$400,000. The specific recommendations of the Commission were “that the study contemplated in the legislation creating the Commission and outlined in this report be undertaken, and the report prepared, and to that end the two States of New York and New Jersey appropriate \$400,000 in equal payments covering a period of two years.”

The legislatures, recognizing the importance of studying and preparing a plan and policy for the Port of New York, appropriated \$100,000 each to cover half of the program. Both appropriations became available 1 July 1918.

In its pursuit of the investigation the Commission found no reason to revise the estimate of 1917 as to the scope of the work, its probable cost and its probable duration. The problem met in the detail execution of the analysis, the difficulties to be overcome, the inevitable delays, proved about as forecast.

Meanwhile the Commission worked out a definite program for the investigation, built up an engineering organization of about 70 persons, since funds therefor became available in July 1918, and accumulated a mass of important data bearing upon the present operating conditions at the Port.

Engineering Investigation.—On 30 April 1918, in the absence of Maj.-Gen. George W. Goethals, chief consulting engineer of the commission, the consulting engineer was placed in charge of the engineering work. About 1 June 1918, the Commission rented the 11th floor of

the building at 12-16 John street, New York, as its working engineer office. The engineering investigation resolved itself into three phases: (1) Study of existing conditions. (2) Analysis of the handling of commerce under existing conditions. (3) Planning of new methods and facilities.

Phases 1 and 2 were worked out together. Investigation of existing conditions divides the problem into four major headings—railroads, steamship, lighterage and trucking. In addition there are numerous incidental elements in the problem, some of them, such as the matter of markets and food distribution, being of the highest importance.

Organization of Work.—Originally the Commission intended to employ outside engineering organizations to conduct the investigations, so as to obtain as nearly as possible a simultaneous picture of all the operations of the port. But it was perceived that this would require a large number of men and entail great difficulty in instructing them. To get the railroad picture alone, for example, would have taken about 1,000 men. Hence the consulting engineer recommended that he be authorized to organize a force to do this work himself and his recommendation was accepted.

An experienced railroad man was obtained on leave of absence for the period of the investigation, and was put in charge of the main investigating force, with the title of railroad engineer. A force of 24 men was assembled quickly and divided into three squads of eight men each. On 23 July 1918 they began taking 24-hour or 12-hour observations of the railroad operations at all yards and pier stations. This force, which was subsequently increased, completed its railroad observations early in 1918. It was then divided up, the two sections starting the steamship and the trucking investigation simultaneously. An advantage of the continuing force was that it became increasingly familiar with the character of information needed and much time that would have been required for instructing four individual organizations was saved.

Specialists in their line meanwhile were employed for the incidental studies. For assembling auxiliary data, interpreting the information collected and preparing this and other reports a staff of accountants and statisticians assembled and developed the beginning of a drafting department to work out a general plan for the Port.

Four Major Investigations.—*Railroads.*—Twelve trunk line railroads were involved in the railroad investigation: the Central of New Jersey, the Lehigh Valley, the Erie, the Delaware, Lackawanna and Western; the Pennsylvania, the West Shore and the New York, Ontario and Western (the latter having traffic rights on the West Shore) on the New Jersey shore of the Hudson River, the Baltimore and Ohio on Staten Island, the New York Central on the west side of Manhattan; the New York New Haven and Hartford in the Bronx, the Long Island in Long Island City, and the Philadelphia and Reading, which has a coal terminal at Port Reading, north of Perth Amboy.

The railroad investigation involved the analysis of the break-up and waterfront yards of each of these railroads, together with a study

of the local terminals and piers for both general merchandise and special uses along most of the waterfronts of the North, East and Harlem Rivers; New York, Newark, Raritan and Jamaica Bays and the Long Island Sound.

Steamships.—The steamship investigation entailed the examination of steamship operations of all sorts along a great part of these waterfronts.

Lighterage.—The lighterage investigation involved the study of the local-waterways transportation system, more highly developed in New York Harbor than anywhere else in the world, between ship, car and local consumer or producer.

Trucking.—Trucking is employed mainly as the final or initial stage of transportation, as the case may be, for the local consumer or producer. But it is utilized also to a considerable extent in trans-shipment of goods through the port. A visit to the district of lower Manhattan shows that here perhaps is the soundest basis for the charges of congestion made against the Port of New York, and suggests the great importance of the trucking investigation.

Twenty-three Incidental Investigations.—One of the most important of the incidental investigations, and one deeply involved in the trucking investigation, was that of public markets and food distribution. Fourteen hundred carloads each day, it is estimated, are required to feed New York and vicinity. The present system of distribution ties up a large section of lower Manhattan's most valuable waterfront, besides filling the North River with car floats and the streets of lower New York with trucks.

Closely connected with this problem is one of the most acute problems of the port—that of the New York Central Railroad's freight line on the West Side of Manhattan. A third matter treated at some length is that of an exterior belt-line railroad in New Jersey.

Criticism has often been made of the mechanical equipment of New York harbor as compared with that of some of the European cities, and New York's equipment has been as often defended on the ground that European methods are not feasible here. Thorough analysis of New York's system is necessary and closely allied to this question are the special problems involved in the handling of building materials and grain. The operation of private terminals and of general merchandise warehouses also has an important bearing on the situation, as do the provisions, or lack of them, for the utilization by the port of the New York Barge Canal. The disposal of municipal wastes, in view of the fact that the waters of the metropolitan district are near the danger point from sewage and other pollution, must be given thorough consideration in the development of any plan which will tend to impede the disposal of such wastes, or bring population and industries that will add further pollution. All these and numerous other elements of the problem were studied by the engineers of the commission.

Erie Traffic Count.—The first railroad field investigation made was that of the Erie Railroad. As the Erie is typical of the New Jersey trunk lines, a brief outline of the investigation will be of interest here.

The Erie is a double-track low-grade line between New York and Chicago, with branches to Buffalo, Dunkirk and Cleveland on Lake Erie, to the anthracite coal field of Pennsylvania and to the bituminous fields of Pennsylvania and Ohio. It taps the Great Lakes ore traffic at Cleveland and runs through the heart of the steel district at Youngstown, Ohio. It has various other branches. In all it operates 2,400 miles of road.

Its terminal units at the Port of New York consist of a break-up and main classification yard at Croxton, on the New Jersey Meadows; an auxiliary classification yard at Little Ferry; waterfront yards with pier and other facilities at Jersey City, Weehawken and Undercliff; piers on the Manhattan waterfront at Duane and Houston streets, North River, and at Coenties Slip, East River; an interior freight station between West 28th and 29th streets and 11th and 12th avenues; a station in the Wallabout Market district, Brooklyn; traffic rights at the Harlem terminal of the Delaware, Lackawanna and Western Railroad at 135th street and Harlem River, and traffic rights in common with other railroads at other private and public terminals in the harbor.

As a preliminary the facilities and their functions at each of these terminal units were examined and recorded. It was noted, for example, that Croxton yard has a working capacity of 4,708 cars; that nearly all inbound freight comes to it and is classified according to local destination; that in reverse order outbound freight is assembled here and classified according to destination; that facilities exist for reclassifying less than carload freight and consolidating it in other cars according to destination; that there are facilities for icing cars and for repairing crippled cars and trackage for "hold" cars and for interchange with the Delaware, Lackawanna and Western Railroad.

The yard is a gravity yard with a classification "hump" in each direction. The operation of the yard has been studied in detail—the number of tracks and the capacities of each unit, the number of classifications made and the tracks used for each, the system in effect at the transfer platform.

In like manner preliminary scrutiny showed that the Jersey City yard is in effect two yards divided by the passenger-train layout, and each yard serving certain piers and other facilities. The uses, sizes and capacities of each of these facilities were determined. Similar information regarding every one of the Erie's terminal units was obtained.

Most of the traffic counts covered 24-hour periods and the men worked in three shifts of eight men each. At Croxton yard for each shift one inspector was stationed at the westerly end of the yard to count trains, engines and cars entering and leaving; a second was stationed for the same purpose at the easterly end; a third was assigned to the yardmaster's office to copy train lists; a fourth took his post at the inbound hump and a fifth at the outbound hump to keep account of classifications; a sixth and seventh were assigned respectively to the transfer platform and the icing platform, while the eighth, the squad leader, supervised the entire count and gave assistance where needed.

This count disclosed the total number of cars received inbound in a 24-hour period and their destination; the number of cars received from other railroads and their destination; the number of cars forwarded to each of the waterfront terminals and to other railroads; the number of outbound cars received and their origin; the number of outbound cars forwarded and their general destination; the number of cars passed over each hump; the number of cars loaded and a large number of incidental operations.

For the north Jersey City yards one inspector was stationed on the main classification engine, one at the yardmaster's office, one at the float bridges and one at each of the lighterage piers. Fewer cars pass through this yard, hence more detailed data were obtained. The inbound cars, for example, divided into 20 groups according to destination. The contents of cars iced were noted here as at Croxton. The south Jersey City yard was handled in a like manner. A separate eight-hour count was made at the milk platform. The traffic study at Duane street was made on a somewhat different basis from those at the railroad yards, inasmuch as trucking movements as well as car operations were taken into account. The census was an 11-hour operation requiring 24 men divided into two shifts of 12 men each.

This is one of the typical waterfront freight stations, where the cars are brought alongside the piers on car floats and unloaded and reloaded as at the ordinary inland freight station. The system causes a piling up of trucks waiting to load and unload and results in much loss of time to the owners. The traffic count covered not only the number of car-floats and cars received and forwarded, but also the number of trucks arriving and departing and much information about where they came from and where they went.

The foregoing merely outlines the method pursued in the railroad investigation and suggests the magnitude of the work and the mass of valuable information being obtained.

Terminal Costs.—Meanwhile the commission organized an auditing staff to go into the books of the carriers to determine the tonnages handled and the costs. Unit costs were derived for terminal operations on four of the trunk-line railroads. They were determined for 1918 on the basis of the actual 24-hour observations, and for 1914 on the basis of the companies' records, for the month of July 1914. It was felt that while it was desirable to know the latest costs obtainable and the costs of operations actually observed, it was equally desirable to know the costs under the more normal conditions prior to the World War. July 1914 was selected as the most suitable month for determining pre-war costs.

Classification of Tonnages.—A beginning was made toward a classification of all tonnages coming to or going from the Port of New York in a typical pre-war year. As far as possible, the tonnages were classified in three ways—by commodities, by point of origin or destination at the port and by general locality of origin or destination at the other end of the journey. The second classification will obviously show whether the shipment is to, from or through the Port of New York. Knowledge of what comes to and goes from the port,

whence it comes and where it goes, should help greatly in evolving the general plan.

Special Investigations.—The special investigations were grouped under 23 heads as follows: West Side Railroad, Manhattan; markets and food distribution; Exterior Belt Line, New Jersey; mechanical equipment of harbor; banking and commercial operations; tariff, charges, rates; stevedoring, longshoremen, pilotage; disposal of municipal waste; handling of building material; conditions at New York piers; Barge Canal terminals; canals and waterways; private terminals; warehouses; ferries; handling of fuel; handling of ice; handling of grain; express business; electric-power supply; water supply; trucking; channels and dredging.

Some of these special investigations involve much more work than others, and the studies are in various stages of completion. Three of the most important of them—those covering the West Side Railroad, Manhattan, the system of markets and food distribution and the exterior belt line in New Jersey—are as previously stated discussed at some length elsewhere in this report. Some of the others may be briefly outlined here.

Ice.—The handling of ice is somewhat allied to the food problem. An investigator for the commission has made a canvass of all of the ice-houses along the Hudson River from which New York gets most of its natural ice, of the artificial ice plants which contribute to the city's supply and of the New Jersey ice sources. Data are being assembled as to the amounts of ice harvested and manufactured, the methods of distribution and the costs.

Grain.—Grain is one of the commodities handled in large quantities at the Port—a commodity that requires special facilities both for local distribution and for exporting. The handling of grain has been studied at considerable length in the light of existing facilities, the facilities at competing ports and the general volume and trend of the grain movement.

Building Materials.—The delivery of building materials—sand, gravel, stone, lime, cement, brick, steel and lumber—in New York is hampered by a shortage of open wharves, especially on the West Side of Manhattan below 47th street and the East Side below 23d street. There has been no improvement in the methods of handling these materials in 30 years, and meanwhile the number of open piers available has been cut down from year to year. This has resulted in longer hauls and higher costs of delivery. An examination of the waterfront has been made to determine just what piers and bulkheads are being used now for the various materials and what others could be advantageously put to this use.

Trucking.—While trucking constitutes one of the primary subjects for investigation, certain phases of the subject, especially the question of trucking delays and costs, were given early attention and listed as a special investigation, because of the movement made last year to bring about store-door delivery of freight consigned to railroad pier stations in Manhattan.

The so-called Harlan plan for store-door delivery, put forth last summer by Hon. James S. Harlan, member of the interstate commerce commission, followed several other plans pro-

posed to remedy the existing evils of a multiplication of underloaded trucks on the piers and the congestion incident to the necessity of giving consignees notice of arrival of their goods. The commission's investigators looked up and recorded all of the plans and their evolution into the Harlan plan.

Three of the investigators also devoted several weeks to traffic counts at certain typical points, to time studies of individual trucks and routes and to interviews with truckmen and companies using trucks. One study of special interest was the operations for six days of a two-horse truck serving a certain drygoods store. Account was taken of loads carried, time of loading and unloading, time of transit and idle time. The result showed that the truck carried on the average only 28 per cent of a load, and that it made only 36 per cent of the distance possible, so that its efficiency, determined by the product of the two percentages, was only 10 per cent.

The investigators also made an extensive study of the elements in the cost of trucking operations.

Stevedoring.—Stevedoring was studied under two general heads—the equipment available at the port and the form and execution of stevedoring contracts. Under the former head data have been recorded as to the types of machinery utilized and their form of operation; under the latter the question of stevedoring rates and costs and the difficulties of the labor problem.

Barge Canal Terminals.—New York's new Barge Canal was put into operation in 1917, and it is desirable to know whether adequate provision in the way of terminals has been made to enable the Port of New York to make full use of the possibilities of this enlarged waterway. Study has been made both of such construction as has been completed and of plans not yet executed, and later on the commission expects to be able to offer plans for additional terminals.

Canals and Waterways.—Along with the study of the possibilities of the New York Barge Canal an examination was made of other waterways, existing or contemplated, for barges and for ships, which might be a factor in the operations of the port. This examination embraced several existing canals for small boats to the west and southwest of the port; the projected intracoastal ship canal system from Boston to Florida, of which the proposed New Jersey Ship Canal, an enlarged Chesapeake and Delaware Canal and the Cape Code Canal would be the most important to New York; the New Jersey Marginal Canal (New Jersey Inland Waterway) and several projected Long Island canals.

Channels and Dredging.—An investigation was made of the navigable depths of the various harbor waters, the controlling depths of channels, the obstructions to navigation. The dangerous reefs in the East River, the channel projects for Jamaica and Newark bays, the desirability of dredging the Harlem River are among the matters considered in this investigation.

Warehouses.—There are more than 600 freight warehouses and storehouses in New York and New Jersey within the metropolitan

district, exclusive of a large number of houses which handle household goods only and, therefore, are of no interest in this investigation. A questionnaire was sent out to the owners of all of these freight houses and in addition an investigator for the commission visited most of them and obtained supplementary information. Practically all of the questionnaires were filled out and returned.

Electric-Power Supply.—Electricity will undoubtedly be more and more a factor in the operation of the port. A record has been made of every electric-power plant in the district—its location, capacity, ownership, use and other characteristics. The histories and growth of the different companies have been examined and forecasts have been made of the probable supply of and demand for power in the future.

Water Supply.—Analogous to this is the investigation of the water supply of the port. Here again a record was made of locations, capacities, ownership, uses and other details of water-sheds, reservoirs, pumping stations, distribution systems and other elements that go to make up a waterworks system. The water supplies of the cities in New Jersey were covered and similar data collected for the area east of the Hudson.

Disposal of Wastes.—For a long time the navigable waters of the metropolitan district have been heavily burdened with sewage and industrial wastes. Some of this overburden, under present conditions, passes out to sea quickly, while some, in the land-locked North and East rivers, surges back and forth with the tides. Elaborate plans have been promulgated to cope with the situation, and it is obvious that waterway and waterfront changes which might affect the tidal conditions and which certainly would have important bearing on any disposal scheme of the magnitude required here must take into account this whole problem. This would be true if the port were not to continue to grow. The aim of the Commission is to devise ways and means to enhance its growth and so it becomes doubly necessary to provide for the disposal of the wastes of future population and industries. The question of whether harbor pollution should come under the jurisdiction of a joint port authority, if one be created, in the light of the Passaic Valley Sewerage Commission case, is discussed, and irrespective of how this question should be answered, it is obvious that this Commission must co-ordinate its general plan with the sewage-disposal problem. Of hardly less importance are the problems of the disposal of garbage and rubbish. Valuable waterfronts are used for dumps, and many scows are required to handle the port's refuse. The methods in use were, therefore, studied at some length.

Conditions at New York Piers.—Apart from the general steamship investigation, was the question of the uses of New York's piers. Early last November two investigators were assigned to this work, and in about five weeks they covered the railroad piers on the New York side of North River.

These men visited each of these piers and noted its size, equipment and use. They considered methods of operation in effect and recorded practices that interfered with efficiency.

Whether reassignment of piers according to some zoning system is feasible was one of

the objects of the survey. Soundings were, therefore, taken alongside the piers and a general examination was made as to whether they could be put to other uses. This survey was continued along the East River and other waterfrontage of the port.

Other Investigations.—Among the other special investigations, that of banking and commercial operations disclosed the general methods of financing New York's commerce, going into such questions as credits, exchanges and discounts and comparing them as they exist in New York with those prevalent at London and other foreign ports in order to determine what burdens are placed on New York's commerce by reason of financial operations abroad—what customs exist which interfere with New York's commerce.

The private terminal investigation covered such plants as that of the Bush Terminal Company, the New York Dock Company, the Brooklyn Eastern District Terminal Company and the Jay Street Terminal Company. The fuel investigation covered the handling of fuel both for local delivery and for the bunkering of ships. The investigation of tariffs and charges aims to determine the truth or falsity of the claim often heard of undue charges for the use of harbor facilities.

Thus are outlined some of the special investigations made. Some of the subjects had been given little consideration in previous studies of the port.

Tunnels and Other Projects.—**Vehicular Tunnel Under Hudson River.**—A project much in the public eye at present is the proposed vehicular tunnel under the Hudson River. The recent marine workers' strikes have brought forcibly to public attention the possibility of a complete cutting off of vehicular traffic between New York and New Jersey, even though in both of these strikes the Lackawanna ferries remained in operation, and though other ferry service was resumed after three or four days.

The need for a vehicular connection between the two States, and the question of whether a bridge or a tunnel should be built, have been under study for a number of years by a special joint commission created for the purpose. A vehicular tunnel will assuredly aid in the co-ordination of the port, and any plan evolved should be able to utilize the tunnel to good advantage.

Staten Island Tunnel.—Another fact the first of the recent strikes brought out is the ease with which Staten Island can be isolated. Its only rail connection with the mainland is the Baltimore and Ohio freight line to Saint George. There are six ferries, from Manhattan, South Brooklyn, Bayonne, Elizabethport, Carteret and Perth Amboy, respectively—only the first two, it will be perceived, giving direct connection to New York. The Manhattan ferry is the main dependence of the island, and during the first day of the strike its boats did not run. The consequent inability of thousands to reach Manhattan to fulfill their business engagements has revived the demand of the residents of the island for a tunnel connection. There are three main possibilities for such a tunnel connection. The first is the direct tunnel under the Upper Bay to Manhattan. This is the most direct but also the most expensive. The second is a tunnel under the

Narrows to Brooklyn, connecting with the transit systems in that borough. This would require a much shorter tunnel. The third involves a still shorter tunnel, under the Kill van Kull to Bayonne.

Brooklyn Marginal Railway.—For years there has been agitation for a marginal railway in Brooklyn. Special legislation has been passed to permit the construction and operation of such a railway from the New York Dock Company's terminal near Brooklyn Bridge to the Bush Terminal in South Brooklyn. Various obstacles, however, notably the unwillingness of the trunk-line railroads while under private operation to co-operate in the undertaking, have blocked it. Since the United States government took over the railroads the Railroad Administration, through its budget committee, has been studying the matter further. A plan has been submitted for a line from the Brooklyn Navy Yard up the East River and Newtown Creek to the Bushwick terminal of the Long Island Railroad.

Co-operation with Other Agencies.—Throughout the investigation the Commission sought to co-operate with and obtain the co-operation of other agencies. The Commission invited and had before it at many of its meetings the presidents of the trunk-line railroads, the heads of shipping interests, the heads of terminal companies and various other interests using the harbor. After the government had taken over the operation of the railroads and other industries the Commission was in close touch with the Railroad Administration, the Port and Harbor Facilities Commission of the United States Shipping Board and the Fuel Administration. The Commission early addressed a communication to the Secretary of War, the Secretary of the Navy, the Director General of Railroads and the chairman of the United States Shipping Board, requesting that before any construction work was done in the port the plans be submitted to the Commission for an expression of opinion as to whether they would interfere with the carrying out of a comprehensive port plan. The authorities in Washington readily agreed to this and there was scarcely a week when some project was not referred to the Commission by the authorities in Washington for an expression of opinion.

As a point of contact with the Commission the regional director of railroads appointed a committee consisting of the managers of all of the trunk lines entering New York, and the fullest co-operation has been extended in the way of permission to go upon the property of the railroads in the field and in the auditor's offices.

In like manner there was hearty co-operation between the board and the commissioner of docks of New York City. The commissioner readily perceived that the missions of the dock department and the Joint Commission were quite distinct—that of the former being to study and prescribe for the immediate needs of New York City, that of the latter to fit such new construction or changes in the mode of operation as are adopted into the ultimate plan, and offer objection only in case of seeming conflict with the ultimate requirements of the port as a whole. The commissioner, therefore, appeared before this Commission, submitted various plans and in many ways the cordial desire of mutual

service between commissioner and Commission was invaluable.

Compact Between New York and New Jersey for the Creation of a Port Authority.

—The investigation and studies made by the Commission soon convinced the Commission that, whatever physical plan might ultimately be worked out, it was essential that the two States be brought together in an agreement or compact fixing the basis and terms of co-operation, and providing for legal machinery through which this co-operation could be made effective. The Commission, therefore, requested its counsel to make a careful and exhaustive study of all the legal phases of the problem.

Such a study was made and brings together the precedents bearing upon the problem; discusses at length the history of the early commercial relations between New York and New Jersey; the boundary dispute; the treaty of 1834; the purpose and meaning of that treaty; the Federal power over interstate commerce and navigation; the powers of the two States, covering the title to shore-front property both in New Jersey and New York, the regulation of waterfront franchises, the various agencies—corporations, municipalities or other delegated powers—through which the States may act, the legal basis for interstate action and the treaty or compact-making power of the States; also the experiences in international law in dealing with such problems; the methods for the enforcement of an interstate treaty; State limitations upon borrowing capacity thereof, and other phases of the problem. This report is regarded by experts as the first compilation of authorities upon these phases of the problem of port development.

The legal problem is unique. As stated by counsel, "at the threshold we face the fact of a dual political sovereignty. The port lies in two States, each an independent sovereignty in its own land. The legal problem, therefore, can not so easily be stated or solved as it might be for New Orleans, Philadelphia, Boston or Baltimore. Again, traffic between two States across boundary waters is interstate commerce. Neither one State nor the other can wholly regulate the port."

If it is important to overcome the physical barriers that separate the two States it is of even greater importance to overcome the legal barriers. The Commission felt that the implicit obligation of the legislation under which it was created should be reduced to the form of a compact whose terms should be explicit and definite—a compact by which the States should co-operate through a common agency in the development of port facilities. It was convinced that there were no constitutional or legal difficulties in the way of such a compact and that it should supplement the existing compact between New York and New Jersey made in 1834.

Acting under instructions of the Commission, accordingly, counsel for the Commission prepared a tentative draft of such a supplemental compact. A copy of the draft was sent to all members of the Legislatures of both States, to the mayor and other members of the board of estimate and apportionment of New York City, to other municipal officials within the metropolitan district, to civic and commercial bodies and to the press. The first public

consideration of this draft was given at a meeting held at the New York Chamber of Commerce, 19 December, when Governor Whitman and Governor Edge took occasion to pledge their support to the proposed compact between the two States. The main features of the proposition almost at once secured general popular approval. The metropolitan press was almost unanimously for it.

At the request of Governor Edge the State Bar Association of New Jersey appointed a special committee to consider the proposed draft. The committee approved of its legality. Committees of the various bodies endorsing the plan made careful study of the details, and valuable suggestions and criticisms were received by the Commission and its counsel. Public hearings were held at Newark and New York City on 18 and 22 Jan. 1919, respectively.

On 29 January, a conference was held at Albany, when the draft of the compact was presented and discussed, and it was agreed that a legislative bi-State Commission should be appointed, which should co-operate with the Commission in the revision of the compact so that it might be presented in complementary form to the Legislatures of both States.

On 15 February, through the courtesy of the New York Chamber of Commerce, the Commission met at the chamber and considered the proposed compact.

The conference adjourned to 1 March after appointing to revise and redraft the proposed compact a sub-committee consisting of the Attorney-Generals of both States, the majority and minority leaders of both Houses of both States, and the corporation counsels of New York and Jersey City.

The sub-committee met on 21 February and considered all the criticisms and suggestions that had been made, and instructed counsel for the Commission to revise the draft and present it for further consideration to the sub-committee prior to the meeting of 1 March.

At the adjourned meeting of the bi-State Commission held on 1 March at the Chamber of Commerce, Governor Smith, Speaker Sweet and Senator Walters requested an adjournment of the conference until the administrative officials of the City of New York might be given an opportunity to consider the proposed draft and express their views thereon. The conference, accordingly, adjourned subject to the call of the chair as soon as the New York legislative section of the conference was ready to report.

The matter was set down for a public hearing by the Board of Estimate and Apportionment on 26 March.

On 4 April the Board of Estimate and Apportionment adopted a resolution in which the board expressed itself as being "fully impressed with the necessity for co-operation between the two States to develop the Port of New York," and "ready to immediately consider and carefully study any comprehensive plan having that for its object"; but the board believed that the "presentation and adoption of such comprehensive plan should precede the making of the proposed treaty granting such vast power for all time to the Port Authority in the Port District to be created thereby."

The board recommended that the Commission be continued in existence so as to permit it,

as a result of the studies it had already made and was still making, to present such comprehensive physical plan for examination and study, together with a comprehensive statement of the ways and means to carry such plan into effect. It is also stated that "the active and earnest co-operation of New Jersey is invited by the board in any movement tending to improve and develop the Port of New York in all its parts and to the fullest extent, including matters relative to river and harbor pollution, which now constitutes a grave menace to the harbor of New York, and the abatement of the nuisance arising from the poisonous fumes generated in the factories or plants situated on the New Jersey shore opposite Riverside Drive, which nuisance is most injurious to the health and detrimental to the property of the people residing in that locality."

Main Criticisms of Compact.—The main criticisms of the form of the compact developed by the public discussion before the Board of Estimate and Apportionment, with the arguments pro and con, are thus summarized.

Constitution of Port Authority.—It seemed to be the opinion of the members of the Board of Estimate and Apportionment that the New York section of the Port Authority should be made up of the Board of Estimate and Apportionment as a whole, or that at least two of its members should be members of the board. In support of this proposition the argument is that since the interests of New York City are so large and extensive and the consequences to the city's development so direct and immediate, the city should have virtual control of the New York section of the Port Authority. It is argued also that the principle of home rule applies to an agency having so much to do with the future development of the States.

Against the proposition, it is held that the future development of the port will require a continuing body acquiring its knowledge by experience and not subject at any time to being made the football of politics; that such a continuing authority exists at all other important ports; that without it there will be no adequate consideration given to the great problems of the port, and that the history of all administrations in the past shows that the members of the Board of Estimate and Apportionment are too busy with other matters to give time and attention necessary to port problems. It is pointed out, furthermore, that the port is not only a city matter but a State matter; and the State's credit may be required for its development.

The opinion of the Commission has been heretofore that the matter of selecting membership in the Port Authority was properly a subject for legislation and should not be embraced in the treaty. Article IV provides that the New York members are to be chosen by the State of New York and the New Jersey members by the State of New Jersey "in the manner and for the term fixed by the Legislatures of each State."

Veto Power of the Governors.—It is provided that each State reserves the right hereafter to authorize the vetoing by its governor of any action of the Port Authority. It was argued before the Board of Estimate and Apportionment that this would give either governor power to hold up any improvement, no

matter how desirable, and though concurred in by the Port Authority. It is the opinion of the Commission that this section may well receive further consideration on the part of the bi-State Legislative Commission.

Harbor Pollution.—It is provided that until otherwise determined by the Legislatures the term "rule or regulation for the improvement of the conduct of navigation and commerce within the district," shall not include matter relating to harbor or river pollution. It seems to be the opinion of the members of the Board of Estimate and Apportionment that this reservation should not be made. In this connection attention is called to the fact that there is pending in the United States Supreme Court a suit of the State of New York against the State of New Jersey and the Passaic Valley Sewerage Commission to restrain the construction and operation of the trunk-line sewer to be built for the purpose of conducting the discharge of sewage to a point in New York Bay. The original bill in this suit was filed 7 Oct. 1908, and by a recent order of the United States Supreme Court the case was reopened for the purpose of taking additional testimony; and it has been stated both in New York and New Jersey that the inclusion in the proposed compact of matters of harbor pollution might embarrass the United States Supreme Court in the decision of the pending litigation. In 1903 the New York Legislature appointed a commission to investigate certain threatened pollutions of waters in New York Bay. This Commission made its first report on 31 March 1905, and its second report 30 April 1906. In its report of 31 March 1905, it emphasized in the following language the needs of the metropolitan district as a whole and the desirability of Joint State action: "It has been suggested, therefore, that a metropolitan sewerage district should be established, to include all sections in both New York State and New Jersey which now or in future may sewer into the bay and its tributaries. This district, when authorized by joint State and Federal legislation, should be under the direction and control of a permanent interstate commission, with plenary power to control the discharge of all sewers hereafter constructed, as well as the task of evolving a comprehensive plan for ultimately rendering the present chaotic and systemless method of sewage disposal sanitary and suitable for all future requirements.

"There seems to be no possibility of a comprehensive treatment of this great question through the action of various and constantly changing local authorities, acting independently. Manhattan may continue, as at present, to follow no system whatever, simply emptying a new sewer into North or East River at any place where grades permit, even though a recreation pier or public bath may be already established at the same point. Brooklyn may, and probably will, carry its sewage into the sea, and thus ruin the bathing beaches within its limits, and pollute the great oyster beds therein, and Westchester County for 40 miles from the city may contribute a large amount of sewage, while the State of New Jersey, with its constantly increasing population, will add to its present outflow from year to year.

"The necessity also exists for a central authority to not only direct, but also initiate, these

great public works, upon which depend the beauty and healthfulness of the approximately 450 miles of shore within the metropolitan district.

"Immediate action should be commenced to secure such an interstate commission, for the existing conditions must steadily approach the point where the public will demand relief.

"In this country there is at present but one locality at all analogous to New York in this respect, viz., Boston, where a great metropolitan district empties its sewage into the harbor, but the difference in governing conditions is radical, as but one State is in control, while for New York harbor two great commonwealths would have to join forces.

"England permitted the pollution of the Thames for centuries, but at last was compelled to purify its waters at a cost far exceeding the expense of preventing such contamination had the demands of competent judges been complied with a hundred years ago.

"If New York and New Jersey should now initiate the plan above outlined the mistakes of other great municipalities could be happily avoided."

In support of the policy urged by the Commission it obtained from Attorney-General John Cuneen an opinion upon the question "whether in the event this commission finds it desirable to recommend for future consideration the establishment of a metropolitan sewerage district, covering parts of the two States of New York and New Jersey, the Legislatures of the two States have authority to establish such a district and appoint a commission having adequate powers of administration," the Attorney-General answering the question as follows: "I am of the opinion that the States of New York and New Jersey may, if they see fit, construct a metropolitan sewerage district, covering parts of the territory of the two States, and giving jurisdiction thereover to the courts of one or the other of said two States, as to all matters pertaining to the proper sewerage of said district. Such concurrent acts of the States of New York and New Jersey should, however, in my judgment, be approved and ratified by an act of Congress, for the reasons hereinbefore set forth, namely, that the Federal Government has supreme control over the navigable waters of the Hudson River and New York Bay, and its approval should, therefore, be had to the joint action of the contiguous States."

Notwithstanding the very wise suggestion on the part of the New York Bay Pollution Commission, no attempt has been made since 1906 to bring the States together upon a compact which would cover this important matter and create the central authority recommended by the commission of 1903.

The Port and Harbor Commission was not charged primarily with the duty of considering the matter of harbor pollution, but it has no hesitancy in adopting and agreeing with the conclusion quoted from the report by the New York Bay Pollution Commission. If it were not for the pendency of the litigation in the United States Supreme Court, it would urge the wisdom of now adopting, after 14 years' delay, the recommendations of the New York Bay Pollution Commission.

Veto Power for New York City.—At various

points in the discussion before the Board of Estimate and Apportionment and in the argument made by its corporation counsel, it was urged that the action of the Port Authority in the making of rules and regulations, as well as in the carrying forward of constructive plans, should always be subject to the consent of the Board of Estimate and Apportionment of New York City. Such a provision, in the judgment of the Commission, would tie the hands of the Port Authority and preclude it from going forward with its work.

The Commission realizes that there are many phases of port development in which the assent of the authorities of the City of New York should be obtained, and that this is equally true of other municipalities in other parts of the proposed district. The Commission is of the opinion that this should be worked out in the legislation to accompany the physical plan, and should not form a part of the treaty.

Flexibility in the Comprehensive Plan.—It was urged that the provision in the proposed compact, "that no change in the plan for the comprehensive development of the port after it has been adopted by the Legislatures of the two States shall be made except by and with the approval of the Legislatures of both States," would preclude necessary changes in the physical plan that would develop as time went on. It is only fair to state that the Commission does not aim to present a comprehensive physical plan so inflexible as to preclude any change. Such a plan, when presented, will undoubtedly distinguish between what may be called "main features" or "fixed points" and other features which will be treated as matters of detail, subject to change in accordance with provisions of the legislation accompanying the adoption of the plan.

Reversion of Property to the City.—It was explained to the members of the Board of Estimate and Apportionment that in the case of any improvement made by the Port Authority by contract with the city in which the consent of the city was essential, for the crossing or closing of streets, or in which a franchise grant from the city was essential, the city would doubtless require that the property when paid for should revert to it. Members of the Board of Estimate and Apportionment seemed to think that there should be a definite provision in the treaty to cover such a situation. Since, however, the project could not be consummated without the consent of the city, it seems reasonable to assume that any enlightened administration would make such a provision a condition of the grant or franchise.

The Commission is reluctant to insert in the treaty anything except those features absolutely essential. It would seem to be sound judgment that all matters requiring flexibility should be left to legislation following the treaty rather than be embodied in the treaty itself.

With the exception of certain minor changes that have been suggested, the foregoing present all of the subjects that have been made the basis of public discussion before the Board of Estimate and Apportionment. In the opinion of the Commission they present no insuperable difficulties or obstacles which cannot be overcome in any open-minded conference purposing to effectuate the compact.

Conclusion.—The problems of the port of

New York are more serious than is generally realized, even at the port itself. To the population of the port they are serious, because if anything less than the most efficient system obtainable is in use this fact must be reflected in prices; and because if any other port can offer a more efficient system it is likely to draw trade from New York. To all New York State and all New Jersey they are serious, because New York is the gateway to and from the interior. If there is congestion at the gateway the interior suffers. The interior trader bears his share of the extra terminal costs. He perhaps suffers a still greater loss through delays, which make his shipments undependable and put him at a disadvantage with his competitor who escapes these delays.

To the nation itself the problems are equally serious. Foreign trade has established New York as its focal point, and at this time, when we have a wonderful opportunity to serve the world and ourselves by expanding our foreign trade, it is of the utmost importance that New York be ready—ready to take half of the increase in trade as she now receives substantially half of the total trade. If large preparations are being made or planned at other ports, they must be vastly larger at New York.

The Commission, bearing all of the foregoing in mind, believes that the greatest benefit to the communities of the Port of New York, to the States of New York and New Jersey at large and to the entire country will come from a scientific development of the whole port, and is earnestly seeking to evolve a plan for such a development. Its findings to date can be summarized as follows:

A co-ordinated plan that will be a guide for 50 years can be evolved only after the picture and analysis of present conditions has been completed.

Unquestionably the most important physical problem of the port is that of providing for a better and more economical movement of inbound and outbound freight over the trunk lines now terminating on the New Jersey and Staten Island waterfront. Its solution can be found only when the details of the present conditions are known. Three problems that are in a way part of this general problem, but are urgent in themselves, are being given special study. They are the West Side railroad situation in Manhattan; the food distribution system of the port, which is inseparably related to the West Side problem, and the exterior belt line in New Jersey. Another major problem which must await the complete analysis is that of providing adequate steamship terminals properly related to the railroads.

Execution of any plan will require the direction of a permanent authority with broad powers. The Commission has, therefore, urged the adoption of the compact discussed in the preceding section of this report. If this cannot be consummated this year 1919 the Commission confidently hopes joint action will be taken at the next sessions of the Legislatures to create a "Port of New York District" and a "Port of New York Authority."

In order that the commission may complete its work, it recommended that the States of New York and New Jersey each appropriate \$100,000, the second and final installment of the amount determined upon a year ago as neces-

sary to cover the expenses of the investigation. By direction of Governor Edge and Hon. J. Henry Walters, the bi-State conference reconvened at the call of the chairman on 5 April and the conference unanimously adopted the following resolution:

Resolved: That to the end that a compact between the two States may be submitted to the next Legislature of each State, amended in the light of suggestions made and to be made, the present conference be continued and the legislative sub-committee of each State be instructed and directed to confer with the New York, New Jersey Port and Harbor Development Commission and its counsel and present at an adjourned meeting of this conference, to be held at such time as the sub-committee is ready to report, a revision of the present revised draft of the proposed compact between the States which shall take account of all suggestions that have thus far been made or may hereafter be made; and be it further

Resolved: That it is the sense of this conference that pending the consummation of such compact and the working out of a comprehensive plan for the development of the port, all projects for terminal facilities within the Port of New York shall be submitted to the New York, New Jersey Port and Harbor Development Commission for consideration and advice, to the end that so far as practicable all such projects shall be in harmony with such comprehensive plan when ultimately adopted; and be it further

Resolved: That the New York, New Jersey Port and Harbor Development Commission continue its work; and each State make the necessary appropriation therefor; and that the Legislatures of each State continue the present bi-State Legislative Commission.

Consult 'New York, New Jersey Port and Harbor Development Commission,' Legislative Document No. 103 (Albany 1919).

NEW YORK, University of the State of. For the history, government, administration and various departments of this important institution, see *UNIVERSITY OF THE STATE OF NEW YORK*. As one of the greatest of American State institutions it exists not only for the extension of education, for the benefit of the schools and other cultural institutions of the State, and for the private citizen, but originated primarily in the desire to promote efficiency in the principles and organization of State government. Its headquarters is the New York State Education Building located on Washington avenue, facing the Capitol, Albany, and justly described as "perhaps the most splendid and commodious building devoted wholly to public education to be found anywhere in the world." It has a length of 590 feet, an entire depth of 125 feet, and with the stack wing, an extreme depth of 285 feet. Its beautiful colonnade of exterior lofty Corinthian columns 60 feet high, furnishes a particularly impressive and striking architectural effect. The first floor of the building is used chiefly for the general offices of the State Education Department governing the varied activities of the University. On the same floor are the chief administrative workrooms of the great State Library, the order, catalog and shelf sections. The second floor gives access to the five principal reading rooms, or the group of five special libraries, law, legislative reference and public documents, medicine, periodicals and the spacious and lofty principal reference room. On the third floor are the Educational Extension Division, the Library for the Blind and the Library School. The Library School, the first of its kind, was established in 1887 to supply the demand for trained librarians. The two-year course leads to the degree of bachelor of library science and (1919) nearly 1,000 graduates had passed through the school. On the fifth floor is the State Museum, important from a geological and

paleontological viewpoint, revealing the geography, history, agricultural and mineral resources, the commerce and manufactures of the State. The books of the library are housed in a series of stackrooms conveniently situated with reference to the five reading rooms. The main stack designed to accommodate close to 1,500,000 volumes, is directly under the principal reading room floor. Five of the stack floors are the full size of the reading room. At the east and west sides of the two upper stack floors extend workrooms 165 feet long by 25 feet broad. Corridor stacks between the law and legislative reference rooms and between the medical and periodical rooms provide shelving for 300,000 volumes in addition to the books shelved in the alcoves of these special libraries. Special stacks on the third floor accommodate 100,000 volumes for the traveling libraries and the collection of books for the blind.

Famous names are connected with the history of the library. De Witt Clinton purchased its earliest collection. For over 75 years (since 1844) the Regents of the University of the State of New York have fostered and guided its development and Melvil Dewey (q.v.) made it a dynamic force throughout the world. The library from 1889 occupied portions of the third and fourth floors of the west end of the new Capitol, later spreading to the fifth and sixth floors. In 1906 the legislature made provision for a separate building for the New York State Education Department, including the State Library, but before the building was completed the fire of 29 March 1911 swept away practically its entire collection. The catastrophe was probably the greatest in modern library annals. Half a million of books, 300,000 manuscripts, the costly apparatus of administration—all forming a collection ranking with the first half dozen in the western hemisphere and among the first 20 in the world, were swept away in a few hours. The library is rebuilding its collections with remarkable rapidity and has resumed its place in the educational life of the State with undiminished efficiency.

The multiplying activities of the institution are best studied in the publications of the State Library described and listed in 'Handbook 6, part 2,' of the State Education Department. Copies are sent free to any persons interested. Besides its annual report the Library has published five series of bulletins. The legislation series includes, besides occasional monographs and lists, three annual bulletins which index and review the laws of the various States and digest topically the governors' messages. The history series relates to early New York State history, including reprints or calendars of valuable manuscripts. The bibliography series comprises classified lists of books on various subjects, or relating to individuals or places. This series includes the annual list of best books of each year, which is sent on request to any library. The Library School series embodies lists, outlines, problems and monographs on subjects relating to library economy or the courses of instruction given in the New York State Library School. These bulletins appear also in the bound annual reports of the Library.

New York Libraries is a quarterly magazine devoted to library affairs and interlibrary relations in New York State. It is sent without

cost to all libraries and members of library boards in the State, making application. To others it is sent postpaid for 25 cents a year or 10 cents for a single copy.

NEW YORK, NEW JERSEY PORT AND HARBOR DEVELOPMENT COMMISSION. See NEW YORK, HARBOR OF.

NEW YORK ACADEMY OF SCIENCES, The, was originally incorporated in 1818 under the name "The Lyceum of Natural History in the City of New York." The title was changed in 1876. There are four classes of members in the Association: active, fellows, corresponding and honorary. By special act of the legislature in 1902 it was empowered to collect funds and erect a building for scientific purposes. There are sections on astronomy, physics, biology, anthropology, chemistry, mineralogy, geology and psychology. Annals, memoirs and many pamphlets are published under the auspices of the Society. The academy's library and headquarters are at present located in the Museum of Natural History.

NEW YORK BARGE CANAL. See BARGE CANAL, THE NEW YORK STATE.

NEW YORK CENTRAL RAILROAD COMPANY, The, the incorporate name of one of the great transportation systems of the United States. Having its beginning in 1826 as the Mohawk and Hudson Railroad, with less than 20 miles of track and an equipment of but a single train, this remarkable system, popularly known as the "Four Track Road," has resulted in the consolidation of over 100 small railroads. The early history of the expansion of the system is detailed below. Here it is incumbent to state in some detail the arrangements resulting in the present corporate title. On 22 Dec. 1914 the New York Central Railroad Company was incorporated under the laws of New York, Ohio, Illinois, Indiana and Pennsylvania and under the laws of Michigan on 23 Dec. 1914. The company was formed by consolidation of the New York Central and Hudson River Railroad Company; the Lake Shore and Michigan Southern Railway Company; Geneva, Corning and Southern Railroad Company; the Terminal Railway of Buffalo; the Dunkirk, Allegheny Valley and Pittsburgh Railroad Company; the Chicago, Indiana and Southern Railroad Company; the Detroit and Chicago Railroad Company; the Detroit, Monroe and Toledo Railroad Company; the Kalamazoo and White Pigeon Railroad Company; the Northern Central Michigan Railroad Company and the Swan Creek Railroad Company of Toledo, under agreement for consolidation, dated 29 April 1914. In 1915 the new company merged the Jamestown, Franklin and Clearfield Railway, the Cleveland Short Line Railway, the Sturgis, Goshen and Saint Louis Railway, and the Elkhart and Western Railway. In July 1916, the company sold its controlling interest in the New York, Chicago and Saint Louis Railroad to Cleveland capitalists for \$8,500,000. All shares of the capital stock of any of the consolidating companies which at the time of consolidation were held by any of said consolidating companies were canceled under the agreement for consolidation and the remaining outstanding shares of the capital

stock were to be converted into shares of the consolidated corporation.

The directly operated mileage of the New York Central Railroad Company embraces the main line from New York to Chicago (953.47 miles), and various branches in New York, Ohio, Indiana, Illinois, Michigan, etc. (about 2,749.28 miles); proprietary and leased lines (about 1,527.02 miles); trackage rights (455.66 miles), making a total of 5,685.43 miles. Moreover, the Boston and Albany Railroad (393.02 miles) is leased but separately operated. Other controlled lines separately operated constitute 6,588 miles; making a total in the New York Central system as of 1 Jan. 1919 (less duplications) of 12,413 miles.

This mileage is classified as follows:

Lines owned: New York to Chicago, 953 miles; branches, 2,750 miles. Proprietary and leased lines: Detroit, Toledo and Milwaukee Railroad, 47 miles; Battle Creek and Sturgis, seven miles; West Shore Railroad, 479 miles; Troy and Greenbush, six miles; New York and Harlem, 136 miles; New Jersey Junction Railroad, five miles; Boston and Albany Railroad, 393 miles; Beech Creek Railroad, 164 miles; Beech Creek Extension, 135 miles; Wallkill Valley, 32 miles; Mahoning Coal Railroad, 71 miles; Detroit, Hillsdale and Southwestern Railroad, 65 miles; Lake Erie, Alliance and Wheeling Railroad, 88 miles; Fort Wayne and Jackson Railroad, 98 miles; Erie and Kalamazoo Railroad, 22 miles; Kalamazoo, Allegany and Grand Rapids Railroad, 58 miles; Ottawa and New York Railroad, 57 miles; Saint Lawrence and Adirondack, 56 miles; trackage, 456 miles.

The controlled separately operated lines comprise the Michigan Central system, the Cleveland, Cincinnati, Chicago and Saint Louis system, the Lake Erie and Western, the Cincinnati Northern, the Pittsburgh and Lake Erie, the Chicago, Kalamazoo and Saginaw, the Toledo and Ohio Central, the Kanawha and Michigan, the Zanesville and Western, the Indiana Harbor Belt and the Toronto, Hamilton and Buffalo railroads.

Corporate History.—The growth and development of the New York Central extending over the period from 1826 to the present is typical of American commercial progress. The genesis of the great corporation was the Mohawk and Hudson Railroad, chartered in 1826 and opened 9 Aug. 1831. It was the first railroad built in the State of New York. The name was changed 19 April 1847 to the Albany and Schenectady Railroad Company. Together with nine other small railroads the Mohawk and Hudson was merged into a corporation, organized under a special law, 2 April 1853, called the New York Central Railroad Company.

The Central.—The 10 roads comprising the New York Central were: (1) the Albany and Schenectady; (2) the Schenectady and Troy, chartered in 1836, and opened in 1842; (3) the Utica and Schenectady, chartered in 1833, and opened in 1836; (4) the Mohawk Valley, organized in 1852; (5) the Syracuse and Utica, chartered in 1836, and opened in 1839; (6) the Syracuse and Utica Direct, chartered in 1853; (7) the Rochester and Syracuse, a consolidation of the Auburn and Rochester (1836), and the Auburn and Syracuse (1834); (8) the Buffalo and Rochester, a consolidation of the

Tonawanda Railroad (1832) and the Attica and Buffalo (1836); (9) the Rochester, Lockport and Niagara Falls Railroad, organized in 1850; (10) the Buffalo and Lockport, chartered in 1852, and opened in 1854. This consolidation gave the New York Central a continuous line of railway from Albany to Buffalo. The following roads were subsequently leased and merged into the consolidation: Rochester and Lake Ontario (1855); Buffalo and Niagara Falls (1855); the Lewiston (1855), and the Saratoga and Hudson River (1867).

The Hudson River.—The Hudson River Railroad Company was chartered 12 May 1846. It leased the Troy and Greenbush Railroad, which was chartered in 1845, and in October 1851 opened the new Hudson River line through its entire length from New York City to East Albany. At this stage of the development there were the two consolidated systems, the Hudson River (New York to Albany), and the Central (Albany to Buffalo).

The Consolidation.—On 1 Nov. 1869, the New York Central and Hudson River Railroad Company was organized by the consolidation of the New York Central Railroad Company and the Hudson River Railroad Company. This gave a direct line from New York City to Buffalo. The new company added the following extensive roads to its system: (1) the New York and Harlem, chartered in 1831, and extending from 42d street, New York to Chatham, included a lease of the New York and Mahopac Railroad from Goldens Bridge to Lake Mahopac. (2) The Spuyten Duyvil and Port Morris Railroad, six miles long, chartered in 1869. (3) The Geneva and Lyons Railroad, from Geneva to Lyons, distance 14 miles. (4) The Syracuse Junction Railroad, a local system. (5) The Buffalo Junction Railroad, between East Buffalo and North Buffalo. (6) The Troy Union Railroad, chartered as a terminal line in 1851, and originally owned by the city of Troy. (7) The two Hudson River bridges, owned by the Hudson River Bridge Company, and crossing the Hudson at Albany and East Albany. (8) The Dunkirk, Allegheny Valley and Pittsburgh Railroad leased until 1937. (9) The West Shore Railroad. (10) The New Jersey Junction Railroad. (11) The Beech Creek Railroad. (12) The Rome, Watertown and Ogdensburg. (13) The Mohawk and Malone Railway. (14) The Carthage and Adirondack Railway. (15) The Gouverneur and Oswegatchie Railroad. (16) The New York and Putnam Railroad. (17) The Pine Creek Railway. (18) The Syracuse, Geneva and Corning Railway. (19) The Fall Brook Railway. (20) The Wallkill Valley Railroad. (21) The Boston and Albany Railroad, leased to the New York Central Company from 1 July 1900 for 99 years. (22) Detroit, Hillsdale and Southwestern, leased to Lake Shore and Michigan Southern in perpetuity from 1881; lease assumed by the New York Central. (23) Lake Shore and Michigan Southern. (24) Ottawa and New York Railway. (25) Saint Lawrence and Adirondack Railway. (26) Fulton Chain Railway. (27) Raquette Lake Railway. (28) The Cleveland, Cincinnati, Chicago and Saint Louis and subsidiary roads. (29) Lake Erie and Western. (30) Michigan Central. (31) Pittsburgh and

Lake Erie. (32) Toledo and Ohio Central. (33) Part control of Indiana Harbor Belt Railroad. (34) Part control of Toronto, Hamilton and Buffalo Railway. (35) Part control of the Rutland Railroad Company.

Traffic Statistics.—Average mileage operated year ending 31 Dec. 1917, 5,685.43; freight train miles, 26,619,955; passenger train miles, 27,735,074; milk train miles, 1,101,692; other passenger train miles, 3,811,968; mixed train miles, 94,748; special train miles, 18,614. The revenue freight moved in the same year totalled 110,237,661 tons, or 3,990,291 revenue tons, one mile per mile of road; the average haul per revenue ton was 204.49 miles. Passengers carried aggregated 57,288,436, or 2,546,427,088 passengers carried one mile. On the same date the equipment in service included 1,644 freight locomotives, 717 passenger locomotives, 754 for switching service, 73 electric locomotives and 18 other engines, a total of 3,206 engines. The total number of freight cars was 137,835; passenger train cars, 2,973; company service cars, 7,964, eight tugs, dredges, scows, etc., 10 ferry boats, 21 steel tugs; seven lighters, 37 hoisting barges, 174 grain boats, barges, etc., and 62 car floats.

The corporate income of the New York Central Railroad Company for the year ended 31 Dec. 1918, amounted to \$69,270,920. Of this amount the sum of \$55,802,630 was compensation accrued for use of the properties by the Federal Railroad Administration. The net income of the company was \$17,917,121 and the surplus for the year carried to profit and loss was \$5,321,948. In the same period the number of stockholders increased by 1,591, the total number at the end of the year being 28,693, of whom 28,395 were in the United States and 298 abroad. The par value held by those in the United States was \$247,543,855 and by those abroad \$2,053,500, the average holdings being 87 and 69 shares, respectively. In 1915 the numbers reported were 22,270 in the United States and 2,772 abroad, the general average holding being, approximately, 100 shares, while now it is 87 shares.

During the year ended 31 Dec. 1918, the net corporate income of the Cleveland, Cincinnati, Chicago and Saint Louis Railway Company was \$3,120,363. Gross income of the company was \$10,772,277, of which amount the sum of \$9,938,597 was compensation accrued for the possession of the properties under federal control. Surplus for the year carried to profit and loss amounted to \$2,493,013.

The Michigan Central Railroad Company earned \$8,955,107 during the same period. Of this amount the sum of \$8,052,127 was compensation accrued for the use of the properties under federal control. The net corporate income was \$547,857, and a deficit for the year carried to profit and loss amounted to \$201,598. The balance to credit of profit and loss 31 Dec. 1918, was \$18,448,755. The net income of the Pittsburgh and Lake Erie Railroad Company for the year ended 31 Dec. 1918, amounted to \$5,058,111. The compensation accrued for the possession of the properties by the Federal Railroad Administration amounted to \$8,980,219. The gross income was \$9,544,051, and the surplus for the year carried to profit and loss \$1,459,551. The balance to the credit and loss 31 Dec. 1918, was \$23,427,615.

NEW YORK COURTS. See COURT.**NEW YORK HISTORICAL SOCIETY,**

The, an association organized 20 Nov. 1804 for the collection and preservation of historical matter relating to the United States in general and the State of New York in particular. The collections of the Society are rare and valuable. In the department of antiquities is the Abbott collection of Egyptian antiques, which is considered one of the finest in the world. The art gallery, which contains nearly 1,000 paintings and 200 portraits, includes the Bryan gallery of old masters, the Durr collection, New York Gallery of Fine Arts, the works of the American Art Union and Audubon's original water-colors for his natural history. The library has a valuable collection of books, maps, manuscripts and engravings. From 1857 to 1903 the collection was housed in the Society's building at 170 Second avenue, New York. In November 1903 a new home for the Society at 77th street and Central Park West was dedicated and the historical treasures owned by the Society are now housed in the new building. Among the organizers were Anthony Bleeker, DeWitt Clinton and Peter G. Stuyvesant.

NEW YORK PUBLIC LIBRARY, was established 23 May 1895 by a consolidation of the Astor, Lenox and Tilden libraries. Legally this was an amalgamation of three corporations known as the Tilden Trust, the Trustees of the Astor Library and the Trustees of the Lenox Library. From these institutions 22 trustees were selected from the 33 governing members of the former associations, and to these were added ex officio the mayor, comptroller and the president of the board of aldermen of the city, to serve as members of the new corporation. The official title of the corporation is The New York Public Library, Astor, Lenox and Tilden Foundations. Vacancies occurring in the board are filled by vote of the remaining members. The agreement of consolidation provided for the establishment and maintenance of a free public library and reading-room in the city of New York, with such branches as might be deemed advisable for the continued promotion of the objects and purposes of these several corporations. The Astor Library (266,147 volumes) was founded in 1849 by John Jacob Astor, and his endowment was increased, and land and buildings added, by the beneficence of various members of the Astor family, to a value of \$941,000 at the time of the merging. The Lenox Library (86,000 volumes) was founded by James Lenox, who gave land on Fifth avenue, between 70th and 71st streets, large funds and valuable collections of Bibles, manuscripts and Americana. It received subsequently large endowments from his sister, Miss Henrietta Lenox, from Mrs. R. L. Stuart and others, the total endowment amounting to \$505,000. The Tilden Trust (20,000 volumes), incorporated in 1887, was created by the will of Samuel J. Tilden, made in 1884, which gave his entire residuary estate to trustees to establish and maintain a free library and reading-room. A long contest in the courts resulted, before the termination of the suit, in an agreement of compromise by which the Tilden Trust became possessed of over \$2,000,000.

In 1901 the New York Free Circulating Library with 11 branches and 160,000 books was

added by consolidation, and in the same year the Saint Agnes Free Library and the Washington Heights Free Library joined the combination. In 1903 were added the New York Free Circulating Library for the Blind and the Aguilar Free Library with four branches; and in 1904 the Harlem Free Library, the University Settlement Library, the Webster Free Library and the five branches of the Catholic Free Circulating Library. In 1901 Mr. Andrew Carnegie gave to the city a total of \$5,200,000 for library buildings and equipments and with the portion of the gift allotted to the New York Public Library 37 branch libraries were housed as a part of its activities.

The trustees of the New York Public Library soon after the consolidation in 1885 determined to pursue a liberal policy and to create a great library system not only for the use of scholars, but for the people. The best permanent site for the future great library was considered to be in Bryant Park, on Fifth avenue, between 40th and 42d streets, on the site of the city reservoir, which had become obsolete and was practically unused. On 25 March 1896 the trustees made a formal address to the mayor asking aid from the city in securing the site of the reservoir, and in May 1896 the legislature passed a law authorizing the removal of the reservoir and the lease of the land to the library. On 19 May 1897, another act was passed providing for the construction by the city of a library building on the reservoir site, and for its lease to the library, which act was amended in 1900, removing the limit of cost. On 10 November Carrère and Hastings were selected as architects for the new building, and on 1 December the plans were approved by the city. After delays, owing to the failure to appropriate funds for the work, the removal of the reservoir was begun on 6 June 1899 and the new building was opened to the public on 23 May 1911. Exclusive of the books and collections which it contains, it had been erected and furnished at an expense of about \$9,000,000, on ground valued at about \$8,000,000.

The new library building was not intended to be a great monumental building which would look as well from one point of view as another and which would be fundamentally an example of pure architectural form, but rather an example of dignified and elegant city street architecture. It is described by the architects as "modern Renaissance, more or less of the Louis XVI period, with such modifications as the conditions and needs of our age have suggested." The façade on Fifth avenue has poise and character and seems to issue to the people "an invitation to enter rather than a command." The total quantity of constructive marble in the building is about 375,000 cubic feet, quarry measure. It came mostly from the quarries of Vermont. The general plan is rectangular, 390 feet long on the Fifth avenue front, and 270 feet in depth. It is built around two inner courts and has four floors besides the cellar. The sides and front are comparatively low, the top floor being lighted by windows and skylights; while the centre and rear parts rise much higher and are lighted entirely by windows. The "stack" under the main reading-room is of steel, seven decks in height, with 63.3 miles of shelving—a capacity of 2,500,000

volumes. In addition to this, the special reading-rooms have a shelf capacity of 500,000 volumes. The main reading-room floor has an area of half an acre and there are seats for 768 readers. On its open shelves are 25,000 selected volumes covering every department of human knowledge.

Of the great libraries of the world, the New York Public Library is fourth in size, possessing in 1915 a total of 2,459,996 books and pamphlets. It is notably strong in famous old manuscripts and rare editions; illuminated and Oriental manuscripts; works on American history and genealogy; the history of printing; books belonging in the Oriental, Hebrew and Slavonic departments, and works on the history and illustration of ancient and modern art in all its phases.

The books, manuscripts and maps owned by the library at the close of the year 1918 were valued at \$3,155,354.15, and the paintings, statuary and other works of art at \$266,245.

The library is conducted in two divisions; as a free reference library and a free circulating library; the latter division having 46 branches in various parts of the boroughs of Manhattan, the Bronx and Richmond. (The boroughs of Brooklyn and Queens have each its own separate library organization). The number of books in the reference department on 31 Dec. 1918 totaled 1,091,703, and the number of pamphlets 319,263. The circulating department had 1,187,139 volumes. During 1918 the number of volumes consulted in the reference-rooms, called for by signed slip, was 2,063,265. No record is kept of the volumes taken from the open shelves in any of the reading-rooms. The number of persons entering the library building in 1918 was 2,528,657. The number of readers registering by name in the special reading-rooms was 964,587. The readers in the newspaper-room do not register.

In the library building, besides the great reading-room there are 18 special reading-rooms, devoted to the following named departments: Americana (with 46,000 volumes); genealogy (30,000 volumes); music (22,000 volumes and pieces); art (25,000 volumes); prints (20,000 volumes); Jewish literature (24,000 volumes); Oriental literature (20,000 volumes and pamphlets); Slavonic literature (23,000 volumes and periodicals); science (35,000 volumes); economics and public documents (400,000 books and pamphlets); patents; technology (65,000 volumes); current periodicals (400); newspapers (60 dailies and 25 foreign); maps; manuscripts; library for the blind (8,000 raised letter volumes and 5,500 music scores); and the children's reading-room (12,000). There is also a library school giving a two years' course, with, in 1918, 48 pupils. The library has a complete printing office and bindery. The former supplied in 1918 388,613 printed catalogue cards and 8,956,897 pieces of printed stationery. The bindery bound 34,678 volumes and handled over 14,000 pieces of miscellaneous work.

In the circulating department the number of books issued from all the branches for home reading in 1918 was 9,627,505, of which total 3,955,113 were children's books. The Central Branch, located in the library building, issued 616,372 volumes in the year, an average of 1,700 books per day, and 130 for each working hour.

The aggregate attendance for the year in the reading-rooms connected with the branch libraries was 3,630,074.

The extension division of the library covers 6 sub-branches and 411 agencies in outlying districts, community centres, schools, business offices, factories, fire and police stations, hospitals, prisons, etc. This service is continually being extended, the agencies being expanded into sub-branches, and the latter into full-fledged branches as the library needs of the locality may develop. The yearly circulation of books controlled by this department numbers 195,330 volumes.

The library is managed by a director and staff of 1,224 assistants (in 1915). Of these, 534 were in the reference department and 679 in the circulating department. The reference library and the Central Branch of the circulating department are maintained entirely by the income from the library's endowment funds and without financial aid by the city. The library issues annually a 'Handbook,' and publishes weekly the *Staff News* for information of the personnel.

NEW YORK STATE UNIVERSITY.

See UNIVERSITY OF THE STATE OF NEW YORK, THE.

NEW YORK UNIVERSITY, established in 1830 in New York City. The first steps toward the founding of the university were taken in December 1829, when nine prominent citizens of New York met to discuss the project of establishing an institution of higher learning in the city. Through their efforts the co-operation of various literary and scientific institutions was obtained, a standing committee was organized and \$100,000 subscription raised, most of which was contributed in comparatively small sums. In 1830 the university council was elected by the subscribers and the university incorporated in 1831. In 1832 the collegiate department was opened for instruction. The ideals of the university were from the first most liberal; the address of the standing committee issued in 1830 stated three fundamental principles which have been consistently adhered to: (1) "The object of the University shall be to extend the benefits of education in greater abundance and variety and at a cheaper rate than at present they are enjoyed"; (2) "Persons of every religious denomination shall be eligible to all offices" that the university may never be under sectarian control; (3) Those attending the university shall pursue studies according to their own preference "having an unlimited choice of the branches taught in the institution."

The present organization of the university includes nine schools, besides the Summer School, Extramural Division and the Woman's Law Class. These schools are the College of Arts and Pure Science (founded 1832), the School of Applied Science (1862); the Graduate School (1886); the University Law School (1835); the University and Bellevue Hospital Medical College (founded as the University Medical College in 1841); the School of Pedagogy (1890); the New York State Veterinary College (established at New York University 1899); the School of Commerce, Accounts and Finance (1900); the Washington Square College (1913). The university senate comprises the deans of the Union Theological Seminary, the

General Theological Seminary and the Drew, New Brunswick, Catholic and Jewish theological seminaries. The work of the University College, which had always been largely elective, was in 1894 arranged for the group system; since then the arrangement of groups has been altered, but the principle has been most satisfactory; the groups include the classical, the classical scientific, the Semitic language and literature, political science, philosophy, natural science, exact science and medical preparatory. The work of the School of Applied Science is arranged on the same principle; the courses include civil, mechanical and chemical engineering. The School of Pedagogy was the first university school to put professional instruction in pedagogy on the same plane with the professional university instruction in law and medicine; it was also the first school to establish degrees in course in pedagogy. The Medical College in 1898 was consolidated with the Bellevue Hospital Medical College under its present name; in 1896 this college began requiring a four years' course for all students; this action was in advance of State requirements, as the State law making a four years' course obligatory was not passed till the next year. No university in the Eastern States has grown relatively so fast as New York University; within 20 years (1902) the number of students has more than trebled and the value of its property more than quadrupled. The period of its greatest growth has been since 1891, when a site for a new campus was purchased on University Heights, containing about 23 acres. The University College and the School of Applied Science were moved there in 1894, the summer school is located there and the scientific work of the graduate school is also done there; the other departments, with the exception of the medical and veterinary, are at Washington Square. Since that time the curriculum has been enlarged, two new schools besides the summer school have been organized and the number of students steadily increased. The university organization has also been completed and the various schools closely affiliated under the government of the university senate. This senate consists of the chancellor, the deans of the various schools, one professor from each of the schools and advisory members.

Among the buildings on University Heights the most notable is the library building. An adjoining colonnade, with museum below, is known as the Hall of Fame (q.v.). The library emphasizes the seminar rooms, of which there are 18, each with its stackroom adjoining; the greater number of the books are in these seminar stacks; in 1923 there were 189,000 volumes. The total value of the university plant in 1922 was approximately \$5,436,723. The students in 1922-23 numbered 12,910, the professors and lecturers and instructors 708.

NEW ZEALAND, an autonomous state in the Pacific Ocean, 1,200 miles east of Australia, consisting of two principal islands known as North Island and South or Middle Island, besides Stewart Island south of Middle Island, and several small outlying islands. The group lies between lat. 34° 20' to 47° 30' S.; long. 166° to 178° E. The length of the group, north to south, is about 1,000 miles; the maximum breadth 180 miles; it has a coast line of

3,000 miles; and an aggregate area of 104,751 square miles. North Island comprises 44,130 square miles, Middle Island 58,120 square miles, Stewart Island 662 square miles, total 103,581 square miles, the rest being divided among Cook and other islands in the Pacific Ocean, since 1901 officially attached to the colony. New Zealand is divided into nine provincial districts, of which four—Auckland, Taranaki, Wellington and Hawke's Bay, are in North Island, and five—Nelson, Marlborough, Canterbury, Otago and Westland, in South Island. The areas and population of these provincial districts are as follows:

PROVINCIAL DISTRICT	Area, square miles	Population, 1916		
		Males	Females	Total
Auckland.....	25,364	155,298	153,468	308,766
Taranaki.....	3,732	28,775	27,150	55,925
Hawke's Bay.....	4,241	27,194	27,073	54,267
Wellington.....	10,807	119,572	112,542	232,114
Marlborough.....	4,225	8,506	8,102	16,608
Nelson.....	10,875	22,415	20,836	43,251
Westland.....	4,881	8,088	7,414	15,502
Canterbury.....	13,858	88,085	93,784	181,869
Otago:				
Otago Portion.....	13,957	63,546	67,972	131,518
Southland Portion..	11,355	30,296	29,333	59,629
Totals.....		551,775	547,674	1,099,449

The population of North Island in the same year was 651,072; South Island, including Stewart Island and Chatham Island, 448,337. The total population was 1,162,293, including 49,776 Maoris and 12,797 inhabitants of Cook and other islands politically connected with New Zealand. Of the population 506,988 lived in rural districts and 592,461 in cities.

Topography.—New Zealand is one of the loneliest of civilized countries of any importance. The shortest sea voyage between its ports and those of Australia is a run of 1,200 miles. It is separated from the coast of Chile by 4,000 miles of open ocean, while north and south empty sea wastes stretch to the Antarctic and Polynesia, respectively. The archipelago itself, when the voyager at length reaches it, stands boldly up, showing, as a rule, steep shores backed up by a hilly or mountainous interior. The three main islands have a coast line of about 3,000 miles. Long curving beaches of sand or shingle, backed by cliffs or sand-dunes, often extend for many leagues. But even where the hills do not thrust their sides or spurs into the surf, they are so seldom far away, and on the east coast are usually so clearly visible through the bright atmosphere, that the first impression left by New Zealand is of a chain of half-submerged highlands, broken, precipitous and picturesque. When, as on the mid-east coast of the South Island, or on the west of the North Island, the shores themselves are low-lying and commonplace, the striking background catches the eye and redeems the landscape. It is, however, where the mountains meet the ocean, or where long sea-arms wind in among the ranges, that the coastal scenery is found, the fame of which has gone abroad. In many of the sounds of the southwest a combination of grandeur and soft loveliness is seen, exceeding in sublimity the sea coast be-

tween Alaska and Vancouver and in richness and color leaving the Norwegian fiords behind. Among inlets other than these, Cloudy Bay and Blind Bay in the South Island and the Hauraki Gulf, the Bay of Islands, Wangaroa and Hokianga are, perhaps, the more noted. Wellington, the capital, stands on a noble harbor, Port Nicholson. For commerce, the harbors of the colony are often less convenient than might have been looked for in a group so narrow and deeply indented. The southwestern sounds aforesaid give access only to uninhabitable Alps. From Martin's Bay northward there is not a single port on the western coasts which is not hampered by a bar. Kawhia, the best of them, lies out of the way of settlement. Even on the east coast, Lyttelton, Port Chalmers and Napier, the third, fourth and sixth ports of the colony, have had to be improved at great cost, and the same is the case of Bluff Harbor, the port of departure at the south end of the country, and with Westport and Greymouth, where most and the best coal is shipped. The truth is that many of the deep, sheltered gulfs are not just where traders would wish to have them. Fortunately, Wellington and Auckland are exceptions and these have become the two chief ports of New Zealand.

The official area of New Zealand is 104,751 square miles. This includes not only the smaller coastal islands of New Zealand proper, but outlying groups like the Chathams (q.v.) to the east, the Auckland (q.v.) to the south and a number of Polynesian islets (the chief of which are the Cook Islands (q.v.) and Niue, which politically belong to the colony. Of the whole area, the North and South islands cover all but about 2,000 square miles. In size as in configuration and climate, New Zealand may be more fairly likened to Italy and Sicily than to the British Islands. Long mountain ranges form a backbone, stretching — save for the gap made by Cook's Straits — from Puysegur Point at the extreme southwest of the South Island to the East Cape and the Bay of Plenty in the North Island. Between lat. 43° and 46° the summits rise into the region of eternal snow. Several of them reach heights of between 10,000 and 12,000 feet and Aorangi (Mount Cook), the highest peak in the islands, attains 12,349 feet. Here are glaciers, which on the western slopes descend and penetrate the evergreen pine and beech forests, while on the eastern side their size surprises geologists and mountain climbers. Some of the figures showing their extent are these:

NAME	Area of glacier	Length of glacier	Greatest width	Average width
	Acres	Miles ch.	Miles ch.	Miles ch.
Tasman....	13,664	18 0	2 14	1 15
Murchison...	5,800	10 70	1 5	0 66
Godley.....	5,312	8 0	1 55	1 3
Mueller....	3,200	8 0	9 61	0 50
Hooker.....	2,416	7 25	0 54	0 41

Among these ranges lie seven large and many small lakes. They vary greatly in beauty, but Wakatipu, Manapouri and the western arms of Te Anau challenge comparison with the lakes of Switzerland.

North of the 43d parallel the mountains, though somewhat less in height, are no longer

a backbone merely. They extend right across the island and the seaward flank of one fine double range, the Kaikouras, towers above the eastern coast. The broken and difficult surface of the northern end of the South Island has had a marked effect on the course of settlement and politics. Southward from the Kaikouras population is growing fairly dense along the eastern and southeastern coast as far as the district served by Bluff Harbor. In this stretch is found the largest flat plain — Canterbury — in the islands and many roomy valleys, flats and manageable slopes. The open, grassy character of the land made rapid occupation easy. Two-fifths of the population of the colony are to be found between the points last named, within 40 miles of the coast. To the north, however, settlement is still thin and patchy; the southern railroads stop 80 miles short of Cook's Straits; the southern provinces communicate with Wellington by a line of steamships from Lyttelton, halfway down the South Island. As if to separate the bulk of the North Islanders still more from the majority of the Southerners, nature has made the butt end of the North Island, for 30 miles behind Wellington, poor, wind-beaten and hilly. Only after leaving this unattractive knuckle-end do we come to fertile expanses on both sides and in a central hill-encircled plain, the Wairarapa. Except in the east round Napier, on Hawke's Bay, very little of this attractive country is a dead level. Rolling downs, steep hills of moderate height, narrow, rich river-valleys, mark it everywhere. Great tracts of it are, or were, clothed with thick forest, the rest mainly with tall bracken. Generally the note within 40 miles of the coasts is fertility. A green, moist, warm land more suited, as a rule, for pasture, spreads along the west coast as far north as the mouth of the river Waikato and on the east to the mouth of the Rangitaiki, on the Bay of Plenty. The centre of the island is a plateau of from 1,200 to 2,000 feet in height, lying round Lake Taupo and dominated by volcanic cones, of which several are active and others have exploded within man's memory. Ngauruhoe (7,550) and Ruapehu (9,008) are the most restless of these. The most beautiful rises, not on the plateau, but out of the plains by the western shore. It is the solitary, symmetrical Egmont and is 8,250 feet high. A line drawn through Ruapehu northwestward to White Island, in the Bay of Plenty, passes through a tract of about 650 square miles incessantly disturbed by volcanic activity. Warm or boiling springs, geysers, pools of boiling mud, fumeroles, solfataras, colored lakelets are numerous. Cold lakes and waterfalls add to the picturesqueness and the healing powers of the thermal waters and complete the attractions of a much-visited district.

In and near this volcanic territory the soil is mingled with pumice and is not suitable for grass, though trees and long-rooted plants may do well there. South of Lake Taupo and east of the great volcanoes, a patch of true desert is encountered. Bordering on the comparatively barren pumice area is found both to the east and west the fertile country already referred to. Here the usual formation is that locally called *papa*. This is a calcareous stratum resembling soft limestone and the fertility of even the most broken hilly surfaces of the *papa*

DOMINION OF NEW ZEALAND

SCALE OF STATUTE MILES
0 50 100 150 200

Principal Railways
The map is colored to show Provincial Districts

NORTH ISLAND

SOUTH ISLAND

STEWART ISLAND

WELLINGTON

CHRISTCHURCH

DUNEDIN

AUCKLAND

HAIRY HILLS

COOK STRAIT

TASMAN SEA

PAKARANUI

ST. JOHN'S

ST. GEORGE'S

ST. PETER'S

ST. PAUL'S

ST. ANDREW'S

ST. DUNSTON'S

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districts was attested by the fine trees and tall bracken which usually covered them. These are now giving way to the cultivated grasses of the settlers.

The deep, richly clothed gorges cut by the rivers of these districts supply the most romantic river scenery of the islands, notably in the valleys of the Wanganui and the Mokau.

North of lat. 38° the island narrows into a long peninsula, indented again and again, and well nigh cut in twain where the Waitemata (the harbor of Auckland) almost meets the Manukau. In this northern division the climate of the east coast differs little from that of the west, for there is no central spine; save on the hills, frost is rare; north of the 38th parallel, indeed, the mangrove fringes the shores and palms, olives, oranges, guavas and the cane-break flourish. Here is the home of the giant Kauri pine and here are the swamps and hillsides from which is dug the fossil resin, the kauri gum of commerce. The ocean is too near at hand and too cool for the northern peninsula to be oppressively hot, and, were its soil everywhere fertile, it might be more thickly settled than any other province. Unluckily its strips and spots of rich alluvium are surrounded by larger tracts of stiff clay-marl, only productive after intense and skilful cultivation.

In New Zealand it is the western coast which is the wetter, milder, more luxuriant clothed side. On the eastern, large tracts were found by the whites, quite treeless and clothed with coarse tussock grass. Here pastoral settlement made a beginning, spreading rapidly into the central ranges, to be checked in the South Island by the forests of the saturated west. In the North Island the climatic distinction is less marked and there the grazier flourishes in the west, after the native vegetation has been burned away.

Rivers.—Most of the very numerous rivers show the characteristics of mountain torrents, the rapidity and the cold, pure water running low in summer and disturbed by sudden turbid floods. It says much for the rainfall that very few streams run dry at any time. The volume of water in many is remarkable, notably in the chief river of the South Island, the Clutha, which, despite its strength, is but 154 miles long. In the north, the Waikato is the longest stream in the colony, and that, and four or five others (in the Auckland and Wellington provinces), are navigable by small steamers. Generally the rivers hinder rather than help traffic, though their swiftness and number make them very valuable in furnishing power for machinery.

Climate.—The yearly rainfall varies from 26 inches on the littoral of Canterbury, to 170 inches among the sounds of the southwest. Throughout the settled districts the average is about 35 inches on the eastern and 60 inches on the western side. The brisk sea winds keep the sky normally clear and the amount of sunshine registered is large, except in the southwest and immediately inland of Mount Egmont. In a country stretching through 13 degrees of latitude the climate naturally is very varied, but generally is very healthful. In the northern peninsula of North Island the conditions are semi-tropical, while in the high lands of Otago

and Southland the frosts in winter are very severe and the summer bracing and temperate. In Wellington, which may be taken as the centre of the country, the temperature scarcely ever falls more than one or two degrees below freezing point; while in Auckland, the most northerly of the large cities, the heat is tempered by sea breezes and never reaches the intensity which makes life in summer so trying in the great Australian cities. Rapid changes of temperature are caused by sudden shiftings of wind and are somewhat trying to new arrivals in the country.

Geology and Mineralogy.—To the geologist the two large islands are a continuity, and form the remnant of a continent which once extended eastward and was probably connected with South America. A great leading range of Palæozoic rocks stretches through both islands, branching out in the south to enclose the extensive schistose area of central Otago. Upper Mesozoic formations have also enormous development; and in the North Island their outcrops are distinguishable through the volcanic deposits which cover a good part of the surface. In this island are also extensive areas of hydrothermal agency, marking the expiring activity of volcanic outbursts. So late as 1886 there was a violent eruption of Mount Tarawera in the Hot Lake district, during which the celebrated Pink and White Terraces of world-wide fame as natural wonders disappeared; it was previously supposed to be an extinct volcano; Mount Tongariro and Ngauruhoe, in the heart of the island, also are still active. Sedimentary rocks, chiefly of gray sandstone, are often seen, both among the ridges of the interior, and on the coast, where they frequently form precipitous cliffs, but the far greater part of the rocks are crystalline. Among a great variety of fossils the most notable are those of a gigantic bird, the moa (*Dinornis giganteus*), which survived down to recent times. New Zealand is extremely rich in mineral deposits, and gold mining forms one of its staple industries. Gold was first discovered in 1853, and the total value of the output to the end of 1916 was \$429,238,375. The great gold producing regions are the Thames district of Auckland, the west coast of the South Island and the interior of Otago. During the last few years the method of raising gold by dredging the beds of rivers has developed to a remarkable extent. The extensive coal measures are also a source of wealth. Among many varieties the best is the bituminous coal of the west coast of the South Island, which is equal in quality to that found in any part of the world. The output has been steadily increasing, and for 1916 amounted to 2,257,135 tons valued at \$6,455,145. Copper, chrome ore, manganese ore, sulphur and other minerals have been worked with varying success. Working miners make good wages, and there is a good deal of independent prospecting. Mining schools have been established in different parts of the colony, and the study of mineralogy is pursued with considerable zeal.

Flora, Fauna, etc.—Among vegetable productions the most characteristic are the ferns (130 different species), which forms almost the only vegetation over immense districts. Some of them are more than 40 feet high, and remarkable for the elegance of their forms. The

flax plant furnishes an article of export. A number of the forest trees furnish valuable timber, among them the rare kauri or damar pine. Flowering plants are remarkably scarce, save in the Alps, and there are no indigenous fruits.

In animals New Zealand is singularly deficient, only a sort of dog, now extinct like the moa, a rat and two species of bats being indigenous. Rabbits have been introduced and have multiplied so as to become a perfect pest; pigs now run wild, as well as cats. Pheasants, partridges, quails and red and fallow deer have been successfully introduced, also the brown and rainbow trout. All the common European quadrupeds appear to be easily acclimated. Pigeons and parrots are the most common native birds. Among others are the apteryx (a wingless bird), the huia, the tui, or parson-bird, and the owl-parrot. The chief reptiles are a few lizards. The coast waters teem with fish, and seals are still numerous in some parts.

Population.—The population is now about 1,162,293, or over 11 to the square mile. It is still very scanty in the western half of the South Island; in the interior of the North Island between lat. 40° and 38°; in the great shoulder between Hawke's Bay and the Bay of Plenty; and in the far north of the Auckland Peninsula. Elsewhere it is steadily spreading

100 females were enumerated in 1916. The increase by excess of births over deaths is satisfactory. This is mainly due to the extraordinarily low death-rate which, contrary to predictions, does not rise, and remains the lowest of any civilized country. In 1916 the death-rate stood at 9.64 in the thousand, as compared with a birth-rate of 25.94. The excess rate in favor of life takes a high place in the tables of international vital statistics. During the 12 years 1880-92, the birth-rate fell rapidly from 40.78 to 27.83. The fall then grew much slower, though it continued until 1899, when the rate stood at 25.12. Since then it has gradually recovered. The proportion of children to each marriage is now about 3.14 as against 5.01 in 1885. The marriage-rate was 7.47 in 1916. The percentage of illegitimate births was 4.01. There can be no doubt that the decline in the birth-rate was almost entirely due to the deliberate limitation of families by potential parents. It is believed that the Maori tribes mustered about 65,000 at the time of annexation. Their decrease since has been mainly due to the prevalence among them of tuberculosis and venereal diseases.

The movement of the white population in three recent years is given in the following table:

YEARS	Total births	Illegitimate births	Deaths	Marriages	Excess of births over deaths	Immigrants	Emigrants	Excess of immigration over emigration
1914.....	28,338	1,302	10,148	9,280	18,190	37,646	*32,506	5,140
1915.....	27,850	1,152	9,965	10,028	17,885	25,551	*22,476	3,075
1916.....	28,509	1,146	10,596	8,213	19,913	21,799	*21,163	636

* Exclusive of expeditionary force.

over the land up to a height of about 1,500 feet above sea-level. The advance, however, has never been rapid. The warlike native tribes, from whom land has had to be acquired by tedious purchase, have not been the only obstacle. To the difficulties of the stiff clay-marl and pumice soils must be added the denseness of the forest, the oft-recurring hill and mountain barriers and the innumerable ravines and swift torrents, making roads and bridges very costly. Furthermore, a small archipelago placed in the southern ocean to be a lonely outpost of civilization does not attract any full stream of immigrants from Europe. So 21 years after annexation the white population had reached but 99,021. In 1881 it had attained to 489,923. In 1891 it was but 626,658. The colored population of 49,776 was stationary for many years but a slight increase has been observed recently. The Maori and Polynesians do not as a rule increase. The Chinese, who in 1881 numbered 5,000, have been reduced to 2,500 by exclusion laws—modified copies of those of the United States. The official census of March 1901 returned a population of 815,862 persons, or, excluding Maori and Polynesians, 772,719. The latter number had risen by 15 Oct. 1916 to 1,099,449, an increase of 7.3 per cent per annum from 1901. Of this population 551,775 were males and 547,674 were females. An excess of males over females is also found among the Maori, while among the Chinese less than

Between 1870 and 1885 the gain by immigration was relatively large; but in the seven years, 1885-91, the colony actually lost 20,000 people, mainly to Australia. There has been a gain since 1892, coming mostly from Australia, and the remainder from Great Britain. The government encourages certain classes of emigrants, notably farmers, farm laborers, domestic servants and navvies, by paying part of their passage money. Exclusion laws have been passed to shut out criminals, prostitutes, lunatics, aged paupers and the diseased or crippled. With a view to restricting Asiatic immigration the New Zealand Parliament in 1907 passed an act which requires that any Chinese proposing to land in the dominion shall be able to read a printed passage of not less than 100 words of the English language. Persons of other than European descent are classified in the immigration returns as "race aliens" and have to pass an education test before admission. In addition to the landing tax of £100 on Chinese the government has the right to subject non-British incomers to a language test. Apart from those relating to Chinese and disease it cannot be said that all the restrictive regulations are stringently enforced. The colony relies mainly on its distance from large centres, the cost of the voyage to it and the smallness of its quiet towns. It offers few attractions to active criminals, and is too remote for paupers.

The proportion of females to every 100 males

NEW ZEALAND — NATIVE TYPES



Maori King and Queen — Waitaka Tribe



1 View of Auckland, from Ponsonby

2 Art Gallery, Public Library, and Municipal Buildings, Auckland

in New Zealand was 70.52 per cent in 1871; 88.26 in 1891; 90.33 in 1901 and 99.2 per cent in 1916.

In 1911 the total Protestants numbered 808,801; Roman Catholics, 140,523; Jews, 2,128; Pagans, 1,501 and 35,905 who objected to state their religion.

Of the white foreigners, by birth or descent, a considerable majority are of Teutonic or Scandinavian blood. New Zealand in recent years has received increasing numbers of Irish settlers. These now equal in number those of Scottish descent. The increasing democratization and the break up of industrial feudalism in New Zealand is in no small measure due to these settlers imbued with Republican sentiments from their earliest years.

Chief Towns.—New Zealand is a decentralized country. Its main centres of population are the four towns of Auckland, Christchurch, Dunedin and Wellington. Of these Auckland is the largest as it is the most beautiful, while Wellington, the political capital, is overhauling its rival. No other first-rate harbor is found on the North Island within 500 miles of the capital. It is the financial and banking centre of the islands and the rapid expansion of its sea-trade suggests that it may yet challenge Auckland's leadership. Auckland taps the grazing and dairying valley of the Waikato, the quartz goldfields of the Thames, Coromandel and Waihi, and conducts a trade with the South Seas as well as with Australia. Christchurch is the market-town of the chief agricultural district, and is something of a manufacturing as well as an educational centre:

POPULATION OF CHIEF CITIES.

Auckland.....	133,172
Wellington.....	95,235
Christchurch.....	92,733
Dunedin.....	68,716
Wanganui.....	19,517
Invercargill.....	17,862
Napier.....	15,131
Palmerston North.....	14,006
Timaru.....	13,716
Gesborne.....	12,660
Nelson.....	9,962
New Plymouth.....	9,795

Christchurch lies inland, about five miles from its seaport, Lyttelton. The other three towns are seaports though most of the shipping trade of Dunedin is done by Port Chalmers, seven miles from the city, and outside its ring of suburbs.

Wellington, close packed between steep hills and sea-shore, is already complaining of congestion, high rents and the lack of garden-space.

The other towns are roomy and comfortable enough, with well-planted, neatly-kept suburbs and spacious recreation grounds. There are no sky-scrapers and no slums. Wood is still the chief material in dwelling-houses, and the ratio of inhabitants to each house is 4.82.

Industries—Agriculture.—The founders of New Zealand looked forward to making it an agricultural settlement and it remains mainly devoted to grazing and mining. The deliberate state encouragement of small as against very large holdings of land has not substituted tillage for grazing. The small farmer is a dairyman more often than not, or he owns a few hundred sheep and develops mixed farming. Two-thirds of the surface of New Zealand are suitable for agriculture and grazing. About 17,000,000 acres are still under forest. The total area under crop (including 14,734,989 acres in sown grasses and 84,649 in fallow) in 1917 was 16,841,575 acres. The total area of land under occupation in the same year was 29,404,291 acres. The area of Crown lands surveyed and open for settlement on 1 April 1917 was 967,566 acres. In South Island are a great number of the larger freehold estates. The size and number of occupied holdings according to recent statistics are as follows:

SIZE OF HOLDINGS	Number of holdings	Acres
1-10 acres.....	15,454	69,390
11-50 ".....	12,748	358,726
51-100 ".....	9,122	708,228
101-200 ".....	12,159	1,812,196
201-320 ".....	7,972	2,054,197
321-640 ".....	9,572	4,355,985
641-1,000 ".....	3,895	3,149,598
1,001-5,000 ".....	5,284	10,366,504
5,001-10,000 ".....	517	3,593,266
10,001-20,000 ".....	277	3,880,927
20,001-50,000 ".....	165	5,126,470
50,001 and over.....	64	5,785,986
Total.....	77,229	41,262,193

There are about 128,000 persons, including 30,000 females, engaged in agricultural, pastoral and dairying pursuits. The acreage and produce of the principal crops are as follows (see table below):

It was the fall in the price of cereals followed by the discovery of the use of refrigeration applied to the transport of food products which turned New Zealand farmers from cereals to meat, butter and cheese. They found that cultivated grasses,—cocksfoot, timothy, clover, rye-grass—would grow admirably in the islands, carrying and fattening far more stock than the native pastures. They began the process of laying down land in cultivated

YEAR	Wheat			Oats			Barley		
	Acreage	Yield in 1,000 of bushels	Average yield per acre	Acreage	Yield in 1,000 of bushels	Average yield per acre	Acreage	Yield in 1,000 of bushels	Average yield per acre
1913.....	189,869	5,180	27.28	386,786	13,584	35.12	37,486	1,378	36.75
1914.....	166,774	5,232	31.37	361,741	14,741	40.75	32,022	1,206	37.65
1915.....	229,600	6,644	28.94	287,561	11,436	39.77	18,347	597	32.53
1916.....	329,207	7,108	21.59	212,688	7,653	35.98	30,204	820	27.15
1917.....	219,121	5,055	23.07	178,397	5,470	30.66	29,570	738	24.96
1918.....	293,870	6,315	22.40	196,270	5,910	30.21	.....	.....	.....

grasses, with which 14,734,989 acres are now clothed. The export of frozen meat dates from 1882, when 1,707,328 pounds were sent to London. The rapidity of its growth may easily be shown:

MEAT EXPORT.

Year.	Lbs.
1885.....	33,204,976
1890.....	100,934,756
1900.....	206,621,072
1908.....	237,473,936
1916.....	372,517,040

Butter and cheese began to be sent across the sea in 1889, and has been exported regularly since, mainly to the British Isles. The increase in the case of butter has been large and continuous:

EXPORT OF BUTTER.

Year	Cwts.
1900.....	163,871
1908.....	229,971
1912.....	378,117
1916.....	358,632

Cheese has advanced in 30 years from 26,558 hundredweight to 949,416 hundredweight in 1916.

One of the two products much of which goes to the United States is the fibre of the native flax, the New Zealand hemp of commerce. The export of this has increased of late years. The value of the export in 1916 was \$3,154,080.

Minerals.—So far, the only three minerals exploited in a large way have been gold, coal and kauri gum. Good bituminous coal, also brown coal and pitch coal, is found in many districts, notably on the west coast of the South Island, in Otago and Southland, and in the valleys of the Waikato and Mokau. The bituminous coal of the west coast is equal to any in the world and is used by the British navy in the Eastern seas. In the domestic market, the local mines hold their own well and the total output increases steadily as the figures below show:

Year	Tons
1885.....	511,063
1895.....	726,654
1905.....	1,585,756
1916.....	2,257,135

The total value of the gold produced since the year 1853 up to the end of 1914 was \$414,769,550. The greater part of this is now extracted from quartz. In many mines the cyanide process of extraction or separation is used. About one-fifth of the gold is obtained by dredging, chiefly in the river beds of the South Island. In all about 10,500 persons are engaged in gold mining. Gold production in 1915 reached 422,825 ounces valued at \$8,472,765; in 1916, 296,620 ounces were recovered, valued at \$5,996,060.

The yield of silver amounted to 957,541 ounces in 1915 valued at \$477,915, and to \$787,053 ounces in 1916 with a value of \$425,555.

The average value of the kauri-gum export is roundly \$2,500 a year although a decline was noticeable in 1915 and 1916. In the latter year the value was \$1,696,715. Though it is a monopoly, the price fluctuates considerably. Almost all of it is sent to London or the United States, where it is chiefly used in the preparation of varnish.

Iron ore has not yet been turned to commercial account. In May 1906 a petroleum spring was tapped near New Plymouth from which oil flowed at the rate of 100 barrels a day. In 1915 194 tons of tungsten-ore, valued at \$138,920, were produced; in 1916 this was increased to 266 tons valued at \$245,350.

Trade.—In proportion to population the external trade is large. This is the more remarkable as there is virtually no transit trade. The imports are for local consumption only; exports represent local production. Up to 1886 imports exceeded exports; since that year the position has been reversed.

YEAR	Total imports	Total exports
1912.....	\$104,872,870	\$108,852,905
1913.....	111,441,510	114,933,610
1914.....	109,280,480	131,305,235
1915.....	108,644,170	158,744,560
1916.....	131,696,415	166,434,685

The total for 1916 included specie, duty-free imports and those subject to duty. The principal imports and exports for that year were:

IMPORTS		EXPORTS	
Article	Value	Article	Value
Apparel.....	\$14,391,615	Wool.....	\$61,930,370
Iron, steel, machinery, etc.....	18,883,435	Gold.....	5,996,060
Sugar.....	4,933,830	Agricultural produce.....	918,985
Tea.....	1,931,580	Frozen meat.....	36,356,580
Spirits, wine, beer.....	4,367,340	Kauri gum.....	1,699,410
Tobacco and cigars.....	3,589,110	Tallow.....	3,926,695
Coal.....	947,630	Hides, skins and pelts.....	8,333,520
Bags and sacks.....	1,175,695	Butter and cheese.....	30,733,015
Fruit.....	2,292,085	Preserved meats.....	1,247,595
Oils.....	5,009,620	Coal.....	1,632,765
Paper, books, stationery.....	5,589,815	Timber.....	1,907,440
Manures.....	1,712,900	British and foreign produce.....	1,525,750
Specie.....	6,469,400	Specie.....	29,400
Total, including items not specified above.....	\$131,696,415		\$166,434,685

COUNTRIES	IMPORTS FROM		EXPORTS TO	
	1915	1916	1915	1916
Great Britain.....	\$55,705,335	\$69,347,275	\$126,945,150	\$134,349,940
Australia.....	17,772,675	20,010,855	12,743,025	10,957,725
Fiji.....	5,644,795	5,268,770	659,105	582,480
India and Ceylon.....	4,683,195	4,694,950	292,030	265,575
Canada.....	3,989,080	3,786,430	4,629,115	3,459,930
United States.....	13,001,240	19,849,625	10,032,535	12,469,935
Germany.....	38,950	21,435	20	25
France.....	661,005	566,760	10,800	1,516,440
Belgium.....	17,755	21,650	687,320	5
Japan.....	1,521,610	2,814,870	2,601,830	550,225
Others.....	5,608,530	5,313,795	143,675	2,282,405
Totals.....	\$108,644,170	\$131,696,415	\$158,744,605	\$166,434,685

The trade is chiefly with Great Britain, Australia and the United States.

The distribution of trade with different countries covering the years 1915 and 1916 appears in table top of page.

It will be seen that the United States almost monopolize such foreign trade as there is. A Preferential Trade Act passed in 1904 imposed special duties of from 20 to 50 per cent on many foreign imports in the hope of transferring trade to Great Britain, but the effect of the law, though appreciable, is not yet large.

Manufactures.—The chief manufactures are meat-freezing, butter and cheese-making, grain milling, tanning and wool-scouring, engineering, saw-milling, clothing, boot and shoe-making, printing, flax milling. The number of establishments—omitting all government workshops—are officially given as 2,459 in 1896, and 4,670 in 1916. The total approximate value of the land, buildings, machinery and plant used in the year first named was \$28,980,000. The sum rose to \$109,757,880 in 1916. The returns, however especially of the first named year, are incomplete. The same criticism applies to the official estimates of the number of hands employed in factories and workshops. The official figures in by-gone years were taken on a different system to the present. It is probably very nearly correct to say that 30,000 hands were employed in factories and workshops of all sizes, State and private, in 1891, against 33,000 in 1895; 55,000 in 1900 and 57,823 in 1916. The total value of production in 1916, excluding the value of the output of the government railway workshops and government printing offices, and also those industries of which there were less than four plants or workshops in operation, was \$227,270,920. In the same year there were registered 4,670 manufactories employing 57,823 persons, and with an invested capital aggregating \$109,757,880. The principal industries, with the value of their products, are as follows:

VALUE OF INDUSTRIAL PRODUCTS (from 'Census of Manufactures, 1916').

NATURE OF INDUSTRIAL ESTABLISHMENTS	Value of output
Meat freezing and preserving.....	\$63,067,855
Ham and bacon curing.....	2,624,645
Butter and cheese factories.....	37,624,520
Grain mills.....	9,929,570
Biscuit factories.....	2,228,735
Fruit preserving and jam-making.....	764,440
Sugar boiling and confectionery.....	847,390

	Value of output.
Breweries.....	\$3,177,440
Malthouses.....	860,715
Aerated water.....	1,284,785
Soap and candleworks.....	1,385,265
Rendering-plants and manure works.....	2,119,940
Sawmills, and sash and door factories.....	9,492,630
Grass-seed-dressing establishments.....	769,630
Gasworks.....	4,022,070
Electric-light supply works.....	1,529,375
Lime and cement.....	1,323,335
Brick, tile and pottery.....	1,169,520
Tinned ware and sheet metal works.....	1,501,935
Iron and brass foundries, boiler works, etc.....	624,355
Jewelry.....	490,395
Cooperage and packing case works.....	965,450
Woodware and turnery factories.....	1,218,260
Engineering.....	4,417,480
Electrical engineering.....	128,725
Range-making works.....	418,880
Printing and bookbinding.....	8,489,155
Agricultural machinery.....	1,331,280
Coach building.....	2,439,120
Motor and cycle works.....	947,410
Saddlery and harness.....	1,297,535
Tanning, fellmongering and wool-scouring.....	13,776,415
Ship and boat-building yards.....	654,350
Sails, tents, and oilskins.....	489,950
Furniture and cabinet-making.....	2,892,800
Woolen mills.....	3,588,190
Tailoring.....	4,144,200
Dressmaking and millinery.....	2,842,360
Chemical works.....	635,050
Boot and shoe factories.....	4,007,860
Hosiery.....	314,140
Clothing and waterproof factories.....	4,540,585
Rope and twine.....	807,235
Bags and sacks (fibrous).....	464,505
Flax mills.....	2,353,870
Paper bags and boxes.....	234,720

Railways.—As late as 1870 there were but 46 miles of railway open for traffic. This had grown to 2,989 miles in 1917, of which all but 29 miles were owned and worked by the government. The number of passengers carried on the State lines in 1916–17 was 14,173,115; weight of goods carried, 6,239,173 tons; total revenue for year, \$24,004,050; expenditure, \$14,634,320; net revenue, \$9,369,730. The total expenditure on construction of all government lines, open and unopen, to 31 March 1917, was \$190,935,865. Owing to the physical divisions, broken surface and small population of the colony, the railway system is difficult to manage cheaply. Public opinion demands safety, comfort, low freight charges and good pay and short hours for employees. All these *desiderata* are obtained.

Posts and Telegraphs.—The receipts of the Post and Telegraph Department for the year ended 31 March 1917 were \$9,046,585, with

working expenses for the same period aggregating \$6,854,050. The department had in its employ on the above date 10,194 persons. The government owns and operates the telegraph system, which has 13,896 miles of line and 50,320 miles of wire. In the year ended 31 March 1917, 10,875,120 messages were sent, of which 10,734,168 were private and press dispatches. The telegraph and telephone revenue for the year named above was \$4,222,620. In 1916-17 the Post-office Department handled 242,121,361 letters, 8,133,697 post cards, 48,868,537 books, 41,807,999 newspapers, 6,085,103 parcels, issued 669,355 and paid 567,184 money orders.

Shipping.—There were registered in 1916 190 sailing vessels of 21,853 net tons and 390 steam vessels of 70,442 tons, making a grand total of 580 vessels of 92,295 net tons. Soon after the outbreak of the European War in 1914 many vessels of the New Zealand Register were transferred to the London Register in order to advantage of the War Insurance rates of the Imperial government. In 1916 574 vessels aggregating 1,448,517 tons entered New Zealand ports and 590 vessels aggregating 1,491,593 tons cleared from the same ports.

Government Undertakings and Labor Legislation.—As landlord, railway, telegraph and telephone operator and constructor of public works, the state is a considerable employer of labor. But though the government does most of the business of land transfer, and conducts that of life, accident and fire insurance, is the chief trustee of intestate estates, and works coal mines, it does not systematically compete with private enterprise. It does, however, regulate and supervise industry to an extent unsurpassed in any other democratic and civilized country. The Department of Agriculture disseminates information, inspects flocks and herds, slaughter-houses and dairy factories; examines, grades and brands food products and certain other exports. Its work is believed to be honestly and efficiently done. The Department of Labor inspects all factories, workshops and retail shops, however small, and controls servants' registry offices, even fixing the scale of fees that these last may charge. A Shop Hours Act restricts the business hours of retail shops and the working hours of merchants' clerks.

A Workmen's Compensation Act outruns in liberality the English law upon which it is based. But the most remarkable statute dealing with the relations of employers and workpeople is the Industrial Arbitration Law, passed in 1894, amended in 1908 and again in 1914, for the purpose of superseding strikes and lockouts by the arbitration of State tribunals empowered to give decisions legally binding. Under this elaborate enactment compulsory awards may be given or agreements voluntarily entered into and registered, dealing with all industries where wage-earners are organized in unions. The act is constantly invoked and is accepted by both capital and labor, though with occasional complaints. Its practical results have been so far the disappearance of labor conflicts, the stamping out of sweating, a general improvement of the conditions of labor, coupled with a tendency to refuse to grant a large and sudden increase of pay.

Side by side with the Labor Laws an Old Age Pensions Act, passed in 1898 and amended

in 1905, and consolidated and amended in 1913, provides for the poor of both sexes, after the age of 65, a pension not exceeding \$130 a year. An applicant for a pension must be of good character, have lived 25 years in New Zealand, and have an income of less than \$300 a year. The joint income of a married couple in receipt of pensions must not exceed \$500. The pension diminishes by \$5 a year on each pound of private income above \$170 a year possessed by an applicant. Nor does it seem to have yet diminished national thrift.

In 1917 there were 19,697 pensions, representing an annual payment of \$2,402,795, the average pension being \$122. A widow's pension is also in force. In 1917 2,024 widows were in receipt of pensions which aggregated \$196,930.

Land and Land Taxing.—One of the avowed objects of the Democratic and Progressive political party formed in 1877 was to restrict the growth and reduce the extent of large landed estates, and multiply small farms and holdings. This rather than Land Nationalization was, and is, their policy. Before the year mentioned, land monopoly, allowed to grow almost unchecked, had locked up great areas of fertile land in almost unpopulated pastoral properties. As late as 1891, considerably more than half the Crown lands which had so far been alienated were shown to be held in this manner: 584 owners possessed 10,400,000 acres. The pastoral leases of the Crown were on a similar scale; for 13 leaseholders occupied 2,541,000 acres. A law advocated by Sir John McKenzie limited acquisitions of Crown land in freehold to one square mile of agricultural land. After 1891, the same statesman caused much of the public land to be leased at a quitrent for 999 years instead of being sold, reduced the average area of the pastoral leases, and in 1894 carried a law authorizing the State to compulsorily expropriate private owners at a price to be determined by arbitration. Under the terms of the law the state repurchased millions of acres. Of the properties so purchased, all but very few were bought by friendly treaty.

By a law of 1907 a lease of 66 years was substituted for the longer lease in the case of Crown lands and for 33 years in the case of settlement lands, with privilege of renewal for successive terms. The yearly rental is fixed at 5 per cent the cost price of the land. The freehold may not be purchased outright. The so-called settlement lands are rented at 4½ per cent. The transfer of lands is effected by means of local or district land boards.

The graduated land tax imposed in 1891 had for one of its objects the subdivision of the larger estates. In place of the tax hitherto levied—a property tax of one penny in the pound on the capital value,—landowners had thenceforth to pay the penny on the unimproved value only of their estates. All building, improvements and livestock were exempted. Small holdings were exempted up to the value of \$2,500. The tax, therefore, fell lightly on small or moderate-sized farms. On estates the unimproved value of which reached or exceeded \$25,000, a special tax was levied, graduated so as to press with severity on the greater properties. This tax mounts by eight steps from one-sixteenth of a penny on \$25,000, to a maxi-

sum of threepence in the pound on land holdings valued at \$1,050,000. For land tax purposes, mortgages are deducted when assessments are made; a penny in the pound is levied on them but the money lender, not the landowner, pays it. The effect of the deductions and exemptions allowed under the land tax is to relieve nearly four-fifths of the landowners of the country from the impost altogether.

Income and Other Taxes.—All incomes over \$1,500 a year, not derived from land, are subject to income tax. On incomes between \$1,500 and \$6,500 a year the tax is sixpence in the pound; above \$6,500 sixpence on the first \$5,000 and one shilling on the excess. Companies pay one shilling in the pound on all profits. Foreign companies pay only on profits made in New Zealand. The following table for the year 1917 shows how small a share of the total public revenue is drawn from direct taxes:

CHIEF SOURCES OF REVENUE

Customs.....	\$19,248,375
Railways.....	24,181,375
Stamps.....	17,572,965
Land tax.....	3,565,590
Income tax.....	21,310,630
Beer duty, marine, miscellaneous, etc.....	4,289,010
	\$90,167,945

In 1917 there were 30,230 income taxpayers and 35,859 land taxpayers.

Public Finance.—Public finance, important in all countries, has had an especially direct influence on the history of New Zealand, where it has molded and been affected by local circumstances and a policy of state-socialism. From the first the government has been a borrower, and has gradually run up a debt, mainly external, and in 1917 reaching \$649,180,525. It may be convenient to divide the financial story into four periods. In the first of these, the 30 years between 1840 and 1870, borrowing was mainly the result of exceptional necessities—pressing needs for funds to buy out the New Zealand Company, to buy lands for settlement from the aboriginal tribes and to pay the cost of wars with these owners of the soil. A few public works, including one considerable railway, were begun locally and taken over by the central authority.

After 30 years the country with less than a quarter of a million whites owed \$35,000,000. Then, incited by a bold and very able financier, Sir Julius Vogel, the citizens resolved to undertake the opening up of the islands on the lines of the development of a large unoccupied estate. Railways, telegraphs, roads and bridges were to be pushed on; more land was to be bought from the natives; immigrants were to be imported in large batches. To this end the treasury was to borrow money in London.

Millions were borrowed and spent and, in the main, well spent. By 1881 the white population rose to 501,000. But in 1879 a financial crisis due to falling prices, bad banking and a wild land speculation had smitten the country, and ended the second of the four periods. The resulting depression did not begin to pass away until 1895 and during the intervening years confidence in the policy of state borrowing and development weakened.

In 1895 the commercial cloud began to lift.

Prices of raw products were rallying. The settlement of the waste lands was increasing production. The effects of refrigeration in stimulating the export of butter, cheese and still more frozen meat was putting money into the farmers' pockets. The Progressive party determined to borrow, not only to continue public works, but to break up monopoly by land resumption and to cheapen money by lending money on mortgage to the middling and smaller farmers. In August 1895, then, a loan of \$7,500,000 was raised in London. And during subsequent years borrowing has gone on at an accelerated pace. To-day we have the spectacle of a heavily indebted government which nevertheless easily raises a large and growing revenue paid by a prosperous community without serious complaint or hardship. Trade and production advance rapidly, the wealth of the people has grown and a fiscal policy which might seem oppressive to the mass of consumers is lightly borne by a democracy which might lightly abolish it.

The explanation is, perhaps, to be found in the beneficial character of the purposes upon which the borrowed money has for many years been spent. It has not been wasted in wars or upon the up-keep of a court or any army. The country is certainly spending freely but the aims of the outlay are defensible, being expended on public works, purchase of native lands, farm loans, land improvements, etc.

In 1917 the principal sources of revenue, exclusive of sales and rents of land, were as follows: customs, \$19,248,375; railways, \$24,181,375; stamps, \$17,572,965; land tax, \$3,565,590; income tax, \$21,310,630; beer, marine and miscellaneous duties and fees, \$4,289,010; making a total revenue of \$90,167,945. In the same year the rents received from leasing pastoral runs, etc., amounted to \$1,508,790. Expenditures in 1917 aggregated \$70,293,850, comprising \$20,073,960 for public debt charges, \$7,625,530 for education, \$6,842,450 for posts and telegraphs and \$3,597,975 for constabulary and defense. From 1870 to 31 March 1917 the total expenditure out of the Public Works Fund amounted to \$334,842,340. The average taxation per head of the population, excluding Maoris, reached \$47 in 1917.

Banks and Savings Banks.—The government has a substantial interest in the Bank of New Zealand, the chief chartered joint-stock bank. The government holds a large sum in preference shares of the institution and has guaranteed its debenture stock. In return the government appoints the auditor, four out of the six bank directors and a president with a veto. The bank, which was in desperate straits when, in 1893, the Treasury intervened to rescue it, is now prospering, and its ordinary shares which, in 1894, could not be given away, are now quoted at a high price. The two wholly New Zealand banking institutions have a paid-up capital of \$12,500,000, while the Bank of New Zealand has \$2,649,940 of 4 per cent guaranteed stock. In December 1917 the value of notes in circulation was \$32,323,470. Gold has almost disappeared from circulation. A public trustee dispenses with the private trust company; land registration offices offer loans on real estate, thus competing with private banks. Savings are also attracted to the gov-

ernmental insurance plan and building and loan associations flourish.

The six banks of issue which transact the ordinary banking business are branches of Australian houses, except two which are New Zealand companies.

YEAR	Deposits	Assets	Liabilities
1857.....	£343,316	£419,860	£432,404
1880.....	8,538,935	14,220,275	9,550,177
1900.....	15,570,610	17,314,535	16,964,582
1904.....	19,074,960	20,893,096	20,643,359
1908.....	21,821,753	29,098,567	23,311,903
1916.....	37,757,917	37,015,486	41,977,619

Most of the savings bank deposits are made in the public post office savings bank, which has 786 offices and held \$140,078,370 to credit of its 619,972 depositors in 1916. The five private savings banks hold on deposit about \$8,950,000 for 75,000 depositors.

The government money-lending on mortgage to farmers and others is managed by the advance to settlers office established in 1894. The legislation has been amended at different times and is now embodied in the State Advances Act of 1913, which authorizes the borrowing of moneys for the purpose of lending to settlers, workers and local authorities. Each year there may be borrowed for advances to settlers \$7,500,000, to workers \$3,750,000 and to local authorities \$5,000,000. From the inception of the scheme in 1894, 61,097 applications for loans aggregating \$124,567,465 have been received. The Advances Board authorized loans of \$86,794,150 to 46,954 applicants, the total actual payments to 31 March 1917 being \$84,725,050, of which \$44,545,980 has been repaid in respect of principal. Consult 'New Zealand Official Year Book,' issues of 1914 et seq. Most of the money has been loaned on rural freehold. The rate of interest charged is 5 per cent *plus* 1 per cent sinking fund applied to pay off the principal. The debt is thus automatically extinguished by 73 half-yearly payments. The legal and other charges of the office are very low. Up to the present time the office has suffered no losses, and there are virtually no arrears of interest owing to it, while it has already accumulated a reserve fund of \$250,000.

Bibliography.—'The Financial Statement of the Colonial Treasurer,' New Zealand (Parliament paper); 'The New Zealand Official Year Book'; 'Reports of the Ministers of Lands and Agriculture'; 'Report of the Department of Labor'; 'Reports of the Minister of Railway'; 'Reports of the Minister of Public Works'; the writings of Siegfried, Reeves and Irvine and Alpers.

Education and the Educational System.—The first generation of settlers labored persistently to set up local schools. It was not, however, until 1877 that a national scheme of education available for all children alike, white and Maori, was established by the General Assembly. On the whole the measure of success gained by the friends of education has been high. New Zealanders may point to a university, to many secondary schools and to a really complete and efficient system of primary teaching. With the 20th century a creditable

advance has been made in manual and technical class-work. The training of teachers, too, receives fair attention. Industrial schools for criminal, destitute and neglected children have been successful in preventing the growth of any "larrikin" class. The government maintains a school for deaf-mutes, and an institute for the blind has been founded by private generosity. The bulk of the money for education is taken from the general taxes, though substantial rents are drawn from land reserves. The state spent \$7,625,530 for education in 1917. In the university and in secondary schools fees are charged. In the primary schools instruction is free in the six standards of the regular course; special and higher subjects are charged for. The primary system is secular, and attendance at some school is compulsory between the ages of seven and 14. The school attended may, however, be a private one, or a child may receive tuition at home. How seldom this privilege is abused is shown by the figures dealing with illiteracy among the population.

The average attendance at the primary public schools in the year 1916 was 163,156, and the number on the school-rolls at the end of the year 185,884. The percentage of attendance throughout the year was the very creditable proportion of 89.1. During the same year no less than 5,132 Maori or half-caste children attended school, a high number when it is remembered that the whole colored population amounts to but 49,776. The private primary schools, of which two-thirds belong to the Roman Catholic Church, instruct 23,635 pupils. In round numbers 214,651 New Zealand children get elementary schooling. This means in the government schools a good deal more than the three R's. It includes history, geography, vocal music, drawing and elementary science. Boys are drilled and girls taught needlework. Military instruction is given to several thousand cadets. No religious teaching of any kind may be given within school hours, though the attachment of the great bulk of the people to Christianity is shown by the muster-roll of the Sunday schools.

There are 2,355 elementary public schools occupying 5,781 teachers.

The proportion of women teachers is much lower than in the United States. About half the colored school children go to special village schools provided for the Maori race. The others attend the ordinary public schools where they consort on equal terms with white children.

The Minister of Education is the head of a central department, entrusted with the general supervision, financing and protection of the national system and the direct management of the Maori schools, industrial schools and the schools for deaf-mutes. The ordinary public elementary schools are administered by provincial boards of education elected by school committees of parents and guardians. Of these committees there were 1,300 in existence in 1917. The boards and committees appoint teachers in conjunction.

The industrial school children number 3,284. Of these about one-third live in the government reformatory schools; about one-third are boarded out; about another third are handed over to the authorities of Roman Catholic schools carried on under government inspection.

tion. A peculiarity of the New Zealand industrial school system is that the state remains *in loco parentis* to all its pupils until they are 21 years of age.

Secondary schools are of two divisions—60 district high schools controlled by the boards of education, with 2,115 pupils in 1917, and 37 endowed schools (sometimes clerical), managed by governors of their own, but inspected by the Department of Education. Altogether 7,052 children were in receipt of secondary education in 1917 and more than two-thirds of them receive it free. Technical high schools had 2,105 pupils in 1916.

The University of New Zealand is an examining, not a teaching body. It is controlled by a senate of 24 members. Four local colleges affiliated to it do teaching work, but students may obtain degrees without keeping terms at any of these. None of the colleges are residential. In 1916 2,108 undergraduates were keeping term. The number of degrees granted since the foundation of the university in 1870 was about 4,100 at the end of 1916. Degrees are granted to women and men indifferently. Until lately, a feeling of ultra-respect for English scholarship and example has been noteworthy in the college methods, and the university confined its degrees to the five broad departments of arts, science, medicine, law and music. In 1904, however, further powers were by statute given it to confer the degrees of bachelor, master and doctor of (a) veterinary science, (b) dental surgery, (c) engineering (mechanical, electrical, civil, mining, metallurgical, naval architecture), (d) agriculture, (e) public health, (f) commerce.

In response to local demands the central department has expended funds in equipping and maintaining classes for manual and technical instruction, and even go to the length of erecting special school buildings. Sometimes the education authorities control them, sometimes they are the outcome of voluntary association. Several schools of mining (notably one at Otago University College) attract about 300 students in all. Canterbury College supports a school of engineering attended by 200 students, and a college and farm for teaching agriculture with resident students.

Bibliography.—‘The New Zealand Official Year Book’ (annual); ‘Reports of the Minister of Education’ (Parliament papers); ‘The Calendar of the University of New Zealand.’

Government and History.—The constitution bears a general likeness to that in force in the colonies of Cape Colony, Newfoundland and Natal. It is in the main founded on an act of the British Parliament of the year 1852, but the form then drawn up has been more than once amended by the citizens. The governor (governor-general since June 1917), is appointed by the king in council, and usually holds office for five years. He receives \$25,000 a year and \$10,000 additional allowances, and is vested with legislative power together with the General Assembly. He summons, prorogues and may, however, dissolve Parliament or refuse to do so. In practice, his master is the Secretary for the Colonies in the British Cabinet, who may recall him. All acts of the legislature require the governor's assent, which he

may withhold pending a reference to his superiors in London. Acts relating to currency, foreign immigration, ocean-going trade and constitutional amendments are so referred. The governor-general is commander-in-chief of the forces in New Zealand.

The Parliament, the General Assembly, is bicameral, consisting of a Legislative Council and a House of Representatives. The members of the first-named have hitherto been appointed by the governor for terms of seven years. Two of them are Maori chiefs. Formerly the Legislative Council was supposed to represent property and conservatism. Now, however, it is little more than a somewhat less energetic replica of the popular chamber, whose will it seldom thwarts. At present the Legislative Council consists of 24 members, who receive \$1,000 per annum. Those appointed before 17 Sept. 1891 are life members, those later hold office for seven years only. Provision has been made for an elective legislative council, the first election to be held at the same time as the first general election of members of the House of Representatives, after 1 Jan. 1920. Twenty-four members are to be elected at the first election and 40 at subsequent elections. Three Maori chiefs may be appointed by the governor-general.

The House of Representatives consists of 80 members, including four Maori chiefs. All are returned by single-member constituencies for the term of three years. The elections of the white members are all held on the same day. All adults,—of both sexes—who have resided a year in the colony and one month in an electoral district may register and vote for one candidate. Any duly qualified male elector may himself become a candidate. Members are paid \$1,500 a year, subject to deduction for absence without leave while the House is sitting. Their procedure is based upon that of the House of Commons, but the length of speeches is restricted by a time-limit, though there is no ‘closure’ of debates. The Maori members address the House in their own language, using an interpreter.

Twelve salaried ministers comprise the Executive Council. They may hold office as long as they possess the confidence of the House of Representatives, and in practice all important legislation is initiated by them. Roughly speaking, the English two-party system has been copied and for many years a Progressive and a Conservative party have disputed the ground. Party machinery, however, is neither elaborate nor all-powerful. The funds that sustain it are small and electioneering is cheap and singularly free from corruption. The secrecy of the ballot is absolute. The expenses of many successful candidates do not exceed \$250 apiece. By order in council of 9 Sept. 1907, and by Proclamation, the Colony of New Zealand was designated the Dominion of New Zealand on and from 26 Sept. 1907. The form of government at present obtaining was established by statute 15 and 16 Victoria, chapter 72, passed in 1852. The colony was divided into six provinces, later increased to 10, but afterwards reduced to nine. This provincial system was abolished in 1875 and governing power was transferred from the provincial officers to the governor and local boards. The proportion of voters to population is extraordinary as the fol-

following table—which deals with white electors only—shows:

Date of general election	Estimated total adult persons	Number on rolls	Proportion of adult persons registered as electors	Number of persons who voted	Proportion of persons on rolls who voted
1893.....	310,010	302,997	94.98	220,082	*75.25
1896.....	356,658	339,230	95.11	258,254	76.13
1899.....	386,146	373,744	96.79	279,330	*77.59
1902.....	429,385	415,789	96.83	318,859	76.69
1908.....	539,950	537,003	99.64	428,648	79.82

* Excluding figures for three electorates in which there was no contest.

† Including 4,974 informal votes.

At the elections of 1914 616,043 (335,697 men and 280,346 women) electors on the rolls, who returned 76 European members to the House of Representatives. At the same election 18,621 natives returned four Maori members to the same house.

Women obtained the franchise in 1893, and, as will be seen from the subjoined figures, make use of it almost as freely as men; though they are still ineligible as candidates. An experience of over a quarter of a century has shown, by general admission, that female suffrage has done no social or political harm whatever but has resulted in much general good to the whole community. On the whole, beyond listening to speeches and recording their votes, they take less open and active part in politics than was anticipated. They do comparatively little platform speaking. Certainly their vote has not changed the balance of parties. They have, however, strengthened the anti-liquor movement and have stimulated sympathetic reforms touching children and their own sex:

THE WORKING OF WOMEN'S FRANCHISE.

Date of general election	Estimated total adult females	Number of women on rolls	Proportion of adult females registered as electors	Number who voted	Proportion of females on rolls who voted
1893.....	139,471	109,461	78.48	90,290	*85.18
1896.....	159,656	142,305	89.13	108,783	76.44
1899.....	171,373	163,215	95.24	119,550	*75.70
1902.....	195,783	185,944	94.97	138,565	74.52
1905.....	212,876	212,876	100.00	174,615	82.06
1908.....	243,504	242,930	99.76	190,114	78.26
1914.....	290,000	280,346	97.10	.....	.....

* Excluding figures for three electorates in which there was no contest.

† Including informal.

Local Government.—Local government is marked by a subdivision of functions resulting in a large number of directly or indirectly elected boards and councils.

In addition to the boards and committees of education, and to hospital and charitable aid boards dealing with sickness and indigence, the country contains local units, such as boroughs, town districts, counties, road districts, harbor boards, drainage districts.

The local franchise is not quite so simply and sweepingly democratic as the parliamentary. In the municipalities mere residence does

indeed confer the right to vote, but not on any question relating to loans or rates. The revenue of the local bodies comes mainly from rates, license-fees, harbor-dues and rents from land-reserves and in 1916 amounted to over \$11,000,000 from rates and \$27,000,000 from other sources. The larger municipalities are beginning to bestir themselves in providing locomotion, lighting, water and other improvements. Generally localities have shown themselves less enterprising than the central government in social and industrial experiments.

Charities and Corrections.—For relief purposes New Zealand is divided into districts, with elective boards in charge of the administration of public hospitals and charities. The state subsidizes charity bequests at the rate of 50 per cent; voluntary contributions at the rate of 120 per cent, and contributions by local authorities according to a sliding scale, ranging from 60 to 120 per cent, according to the value of ratable property in such local district. In 1916 the total expenditure on charitable aid aggregated \$623,090. In the same year 4,379 persons were accommodated in benevolent and orphan asylums, of whom 2,677 were remaining at such institutions at the end of the year. The state maintained 3,284 children (1,970 boys and 1,314 girls) wholly or partly in industrial schools and other establishments. Every person, not an alien or an Asiatic, who has attained 65 years of age and has resided in New Zealand for 25 years, and is of good character, is entitled to a pension of \$130 per year. A widows' pension is also paid to over 2,000 qualified under the terms of the act.

Within the state are eight Supreme Court judges and 31 stipendiary magistrates. There are several justices of the peace and magistrates' courts. On 31 Dec. 1916 the prisons contained 890 prisoners and during the year ending that day 34,196 Europeans were summarily convicted and there were 373 convictions of Europeans before the Supreme Courts.

History.—The islands were discovered by a Dutch sea-captain, from Batavia, Abel Jansen Tasman, who chanced upon them in 1642, but did not land. Captain Cook was the next recorded comer. He visited the group in 1769 and thrice subsequently, sailing round both islands, mapping them out and describing the shores and the natives. Thereafter came French navigators, American whalers, South Sea traders, beachcombers, runaway convicts from Australia, and, at last, in 1814, missionaries from New South Wales headed by Samuel Marsden. But, although Australia lay under the British flag, the English government refused or hesitated for about 60 years after Cook's voyage of discovery to annex New Zealand. Partly this was due to ignorance of its value, partly to disinclination to interfere with its warlike and intelligent natives whose numbers had been greatly overestimated by Cook, and whose ferocity and cannibalism made them a name of fear wherever the tales of south Pacific mariners were repeated. See MAORIS.

The Maori of New Zealand are a branch of the Polynesian race found in Hawaii, Samoa and other Pacific groups eastward of Fiji. They are well-built, brown-skinned, pleasant-looking, courteous in bearing and speech. They probably reached New Zealand in the 14th cen-

ture, sailing in double-canoes. When discovered by Europeans they were divided into a number of small tribes, often at war, and as late as 1770 were neolithic men, using weapons and tools of polished stone and knowing neither pottery nor metal-working. Their artistic qualities found expression in wood-carving, weaving and dyeing. They did not even employ bows-and-arrows, and in war fought chiefly hand-to-hand with spears and clubs. On the other hand their stockade-building was skilful and their larger huts evinced some advance toward architecture. They were expert gardeners and, in the absence of quadrupeds, clung to the sea-coast, the river-sides, and to lakes and forests where they could find fish and birds in abundance. Their tribal system was based on modified communism. Chiefs and priests controlled them, sustained by the terrors of tabu. Their mythology, many of their legends and some of their folklore show much poetry and imaginative power. Why they never became numerous is not very clear. Probably their tribal wars, infanticide and sexual immorality helped to keep them down. Probably also their tropical origin unfitted them to cope with the cold winds and frosts of a temperate climate.

Almost coincidently with the coming of the missionaries, the Maori began to obtain muskets and gunpowder for use in inter-tribal struggles, with the result that about one-fourth of them were exterminated in 20 years. Then the fighting died down, and between 1830 and 1840 large numbers were converted to Christianity. Unfortunately white land-grabbers began bargaining for tracts of country, making preposterous claims. Finally two colonizing companies, French and English respectively, resolved to plant settlers in the islands. The English company organized by Gibbon Wakefield was the first in the field, its emigrants reaching Wellington in January 1840. Their departure from England forced the hand of the British authorities who despatched a man-of-war, under Captain Hobson, to annex the country. Hobson hoisted the Union Jack on 22 Jan. 1840, and, at Waitangi, concluded a treaty with the natives by which their lands were guaranteed them and they accepted British rule. He chose Auckland as his seat of government. Meanwhile Gibbon Wakefield's company planted settlers at Wellington, Nelson, Wanganui, and New Plymouth in the region adjacent to Cook's Straits, only to find their land-purchases disallowed by the British officials. Ruin overtook them; disputes broke out with the natives, and in the far north at the Bay of Islands the English officials blundered into a war which proved the fine fighting qualities of the Maori. A strong governor, Sir George Grey, restored order, conciliated the Maori, bought land and enabled settlement to make headway. Gibbon Wakefield, undaunted by his first difficulties, founded the settlements of Otago (1846) and Canterbury (1850) in the southeast where there was no native opposition. In 1853 England gave the colonists self-government and in 1856 the first executive responsible to the local Parliament took the reins.

For the next 20 years the working of the constitution was complicated by the existence of local provincial councils with large powers

in each of the scattered settlements. Their jealousies and conflicts with the central authority were only brought to an end by their abolition in November 1876. They represented a peculiarity in the organism of the country which is even now noticeable. Settled from many points, the country has, even now, no one preponderating city. The jealousies and rivalries of a score of districts still worry governments and amuse travelers from other lands.

Within five years of the grant of responsible executives the colonists found themselves at war with the natives—first with one league of tribes, then with another. English troops, to the number of 10,000, were brought in; but the Maori were not always worsted: the fighting dragged on intermittently for 11 years, to be finally ended by the colonial militia and friendly natives, after the British red-coats had been withdrawn. The colonists found themselves left with a war debt of more than \$12,500,000, while from 1860 to 1871 the North Island made little progress. Taught by this hard lesson, they allowed an able minister, Sir Donald McLean, to pursue a conciliatory policy. Parliamentary representation was given to the Maori, and schools to their children; their land titles were scrupulously respected; while roads were pushed through the interior and rifles kept out of it. Serious disturbances were gradually made impossible.

Meanwhile the South Island was making rapid progress. Early in the 50's enterprising Australian sheep-owners discovered that the eastern moiety made excellent grazing country, and it was soon parceled out into "runs" or ranches. Then, in 1861, alluvial gold in abundance was found at Tuapeka, in Otago, and soon afterward in Westland. Diggers rushed in by tens of thousands. Agriculture began to spread, and by 1875,—aided by the introduction of the reaper and binder and other farm machines and tools from the United States,—it showed a promise of expansion which has hardly yet been redeemed. After 1872 the North Island began to move forward, encouraged by peace and the making of railways, roads and bridges. The burning off of the fern and clearing of the forest began to make way for sheep and cattle.

Up to 1877 public affairs were controlled by the employing, landowning and professional classes and by a few large financial institutions. The franchise was limited. Even the smaller farmers were overshadowed if not overawed. The native wars, the provincial divisions, the all-absorbing work of pioneering delayed the formation of any definite party of democracy. The expenditure of millions of borrowed money on public works also absorbed attention after 1871. In 1877, however, the inevitable development came about, hastened by the appearance of a leader of eloquence and prestige in Sir George Grey, formerly governor. Supported by two lieutenants of greater practical parliamentary talent than himself, Robert Stout and John Ballance, Grey succeeded in forcing on manhood suffrage and triennial parliaments, while his party recast the public education system, making it national, free, secular and compulsory.

Industrial depression which overtook the colony during Grey's premiership in 1879 discredited progressive politics for a while. The

farmers, dreading a land-tax, rallied round the more conservative leadership of Sir John Hall and Sir Harry Atkinson. For the next 11 years the story of New Zealand is largely a tale of efforts to find industries more profitable than the growing of wool and wheat—efforts which had their outcome first in frozen meat factories, later on in co-operative dairies. Coal mines were opened with success and two valuable natural monopolies—hemp (*phormium tenax*) and kauri gum—were exploited. The Parliament cut down public expenditure and reduced borrowing for some years. Labor, now armed with voting power, felt the pinch of depression. Wages fell, the unemployed clamored, tramps abounded. Trade unions began to organize, and socialistic writings to be studied. The small farmers and their sons cried out upon land monopoly and high rates of interest. In 1890 a labor conflict, the maritime strike, showed the trade unions,—who were badly beaten therein,—the desirability of making Parliament their battle-ground and of allying themselves with Ballance and the Democrats. At the elections of December 1890 the allied forces swept the polls, and the Liberal or Progressive party, then returned to power, continued to govern the country without a break for almost a generation.

The subsequent years have been marked by a series of bold political and social experiments. These have been latterly so far justified that since 1895 New Zealand has regained and enjoyed a remarkable degree of prosperity, while to a large extent its inhabitants seem reconciled to most of the novel enactments. Ballance died in 1893, but his successor, Richard Seddon, a man of robust temper, extraordinary energy and great natural shrewdness, gained a popularity and influence which seemed quite undiminished at the time of his sudden death in June 1906.

During the Boer War in South Africa public attention was to some extent diverted from local politics, for New Zealanders hotly espoused the mother country's cause and despatched 6,000 mounted riflemen, volunteers, to fight therein. But otherwise colonists have divided their attention not unequally between politics and prosperity. No leader of striking power had come forward to challenge the Progressives, whose majority in Parliament had risen to about three to one at the moment of Seddon's death. The dominant party, however, has experienced a sensible internal change. Labor has less influence, and the farmers more, than was thought to be the case between 1890 and 1896.

Elementary military training for boys between 12 and 18 was made compulsory in 1910. Compulsory training on stated dates is the rule for those between 18 and 21. In the Great War of 1914-18, New Zealand benefited by this preparation. Before the end of August 1914 a New Zealand force, in conjunction with vessels of the British and Australian navies, took possession of German Samoa. An expeditionary force of infantry, mounted infantry and artillery, with all necessary details was also dispatched to take part in the war in Europe. After training in Egypt, during which a portion of the force took part in the first fight for the Suez Canal, the New Zealand troops assisted in the landing and subsequent fighting on Galli-

poli, being eventually transferred to the western front. Until the close of 1916 the reinforcements were maintained entirely by voluntary enlistment. It was then deemed advisable to provide for compulsory military service, which was done by the Military Service Act of 1 Aug. 1916, by the terms of which men between 20 and 46 years of age were obligated to render military service. For details of this act consult 'New Zealand Year Book' (1917). Over 75,000 were called to the colors in the ensuing year.

The combination of small landholders and labor classes which for nearly a generation kept the Laborites in the saddle appears to be breaking up, especially since 1912. The landholders are becoming conservative as they acquire greater wealth and appear inclined to throw over those who helped them win it. The labor classes are also dissatisfied, believing that their efforts to better their condition are rendered futile by the compulsory arbitration system now in force. The machinery of the latter appears to have passed to the possession of the great manufacturers, who now loudly proclaim their faith in arbitration which in days gone by they fought as only dogs at bay can fight.

Few New Zealand men have made any name for themselves outside the narrow limits of their own shores. Gibbon Wakefield, the founder of the colony, played a conspicuous part in shaping England's colonial policy between 1830 and 1856. He finally settled in New Zealand and was a member of the first House of Representatives, but owing to failing health never distinguished himself in the young community. Sir George Grey (1812-98) spent nearly 40 years in New Zealand and left a lasting mark on its institutions. A man of literary tastes, he compiled a valuable collection of Maori legends. His services in South Australia and South Africa and the curious contrasts of his career in New Zealand—where he played in turn the parts of absolute ruler and leader of the people—made this eloquent, brave and refined figure the most interesting in the story of New Zealand. In marked contrast to him stands out the more boisterous but strong, bold and successful personality of Richard Seddon (1844-1906), a Lancashire mechanic, who entered New Zealand politics in 1879, became Minister of Public Works in 1891, and grasped the Premiership in 1893. Seddon will be remembered in New Zealand, not only for the notable experimental legislation passed during his long term of office and the general prosperity enjoyed, but as the personification of restless energy, bluff, popular geniality and a devotion to political business control and management, which undoubtedly wore him out and killed him.

Amongst other New Zealand public men the names of Atkinson, Fox, McKenzie, McLean, Ballance and Stout are the most prominent. Fox, who was more than once Premier, wrote a good history of the fighting with the native tribes in the years 1826-66. Alfred Domett, another Premier, was the literary friend called "Waring" by Robert Browning, and himself wrote a narrative poem 'Ranolf and Amohia,' of no mean merit. The best book in prose yet written by a New Zealander is, beyond question, the 'Old New Zealand' of F. E. Maning,

a delightful and accurate study of life among the Maori tribes before annexation.

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NEW ZEALAND FLAX. See FIBRE.

NEWARK, nū'ark, Del., town in Newcastle County, on the Philadelphia, Baltimore and Washington, and the Baltimore and Ohio railroads, about 11 miles south of Wilmington. It is in a section of the State noted for its productiveness. The chief manufactures are paper, machinery, fibre, acids and canned goods. There is considerable trade in the manufactured articles, fruit and vegetables. It is the seat of the State College, opened in 1833. The town owns and operates the electric-light plant and the waterworks. Pop. 2,800.

NEWARK, N. J., city, county-seat of Essex County, metropolis of the State, in lat. 40° 41' N., long. 74° 10' W.; on the Passaic River and Newark Bay, eight miles by rail from New York City and within the direct zone of the business influence and activities of the nation's metropolis. In 1920 it ranked 11th in manufacturing and 15th in population among the cities of the United States. It has an area of 23.40 square miles, of which 6.48 square miles were until recently meadow land lying in the southern and southeastern section. The wharf frontage on the river and bay is 10½ miles; the width of the channel is 300 feet; depth at mean low water, 20 feet and at high water, 25 feet.

Port Newark Terminal.—In 1908 the city undertook the reclamation of its meadow land, but it was not until 1914, after the creation of the municipal department of docks and meadows, that substantial results began to appear. The area of the meadow development zone was 1,150 acres, and in a little over a year an area had been reclaimed aggregating 294 acres, of which 124 acres were reserved for new streets, freight yards, stations and dock frontage, and 170 acres were set apart for leasing for manufacturing and commercial purposes. The authorized bond issues for the development, up to 1 Oct. 1915, totaled \$2,250,006, and the disbursements and balances due on contracts, \$2,013,608. After the United States had been forced into the World War, this section was deemed of such vital importance to the National government that the latter bought and leased large portions of the reclaimed area, and in 1917 established there a great submarine-boat construction plant and an extensive reservation for the needs of the quartermaster's department of the army. These and other national acquisitions early in 1918 transformed a large part of the former useless salt meadow land into a bustling suburb and gave the city an additional industrial population of over 100,000.

Manufactures.—The city has the distinction of ranking first in the Union in the value of its manufactures and the diversity of its industries, according to its per capita population. It has 252 distinct lines of industry, 50 lines turning out values from one to \$30,000,000 annually. It is the largest fine jewelry manufacturing centre in the United States; produces the largest variety of leather for shoes, carriages and upholsterings; is the home of the mother-of-pearl button and novelty industry; produced the first malleable iron in America; built the first locomotive engine to travel up grade; made the first patent leather in the country and gave celluloid and its products to the world. In 1915 the city had 2,294 manufacturing establishments using power and employing over 10 persons, with an invested capital of \$225,640,600, employing 82,439 operatives; using material valued at \$130,299,000 and having an output valued at \$250,654,527. The leading industries, according to the value of the finished products exceeding \$5,000,000 were smelting and refining of metals, \$35,000,000; leather, tanned, curried and finished, \$20,118,000; foundry and machine shop products, \$15,403,000; malt liquors, \$12,072,000; jewelry, \$11,215,000; electrical machinery and apparatus, \$8,920,000; paints, oils and varnishes, \$7,761,000, and chemicals, \$6,077,000.

Transportation and Commerce.—The following trunk line railroads connect the city with all parts of the country: Pennsylvania, Lackawanna, Lehigh Valley, Erie and Reading (Central of New Jersey). Electric railways comprise the Hudson and Manhattan Tubes systems, and trolley lines extend to all important points in the State. Daily trunk line passenger trains to and from the city average 882; freight trains, 101; annual railway tonnage received, 2,366,350; shipped, 1,157,876; cars of merchandise freight received and shipped annually, 335,467; passenger stations, 14; freight delivery yards, 23; daily electric railway trains to and from New York, 233; time between the two cities, 18 minutes. The large number of local trains which connect with the New York ferries and the cities on the Hudson give Newark the advantage of the ocean steamer traffic. The Passaic River entering the Newark Bay furnishes the city a most important direct water route to the ocean.

Buildings and Municipal Improvements.—The number of public buildings in the city is 141; value of municipal property, \$73,468,507; principal public buildings: United States Government Building, Essex County Courthouse (cost \$1,750,000), City Hall (\$1,500,000), Free Public Library (\$350,000) and the public schools. The city is widely noted for the excellence of its water supply, having its source in the Pequannock River and delivered on the gravity system. The daily capacity of the watershed is 50,000,000 gallons and the average daily consumption, 46,500,000 gallons. There are eight storage and distributing reservoirs, with a storage capacity of 9,825,700,000 gallons. Newark has 260 miles of paved and 62 miles of unpaved streets; 309.19 miles of sewers; 5,575 gas and electric street lights; 20 city parks with gross area of about 20 acres; 5 county parks within the city of about 642 acres; city parkways of eight and one-half acres and a seashore camp of 11½ acres at Avon-by-the-Sea for deserving children during summer seasons. The police department, with 794 men, cost annually \$1,083,200 and the fire department, with 472 men, costs annually \$720,080. Recent municipal improvements also include Port Newark Terminal, previously noted.

Churches and Charitable Institutions.—Newark has a total of 181 churches divided denominationally as follows: Presbyterian, 34; Roman Catholic, 32; Baptist, 25; Methodist Episcopal, 18; Protestant Episcopal, 17; Jewish, 11; Lutheran, 10; Reformed Dutch, 8; Congregational, 3; Science, 2; Universalist, 1; miscellaneous bodies, 23. Its benevolent activities are promoted by 62 charitable organizations and in institutional work there are 12 hospitals, 5 orphan asylums and a large number of specialized centres.

Social Welfare.—There are over 700 regularly organized societies engaged in all manner of social service, besides a very large number of patriotic units rendering most efficient service for the Newark soldiers and sailors in the World War. Strictly social clubs exceed 100 in number; building and loan associations, 256; improvement associations, 13, and savings and loan associations, 9.

Educational Interests.—Public school property has an estimated value of over \$10-

720,000. There are 67 public schools of the different grades, with over 2,000 teachers and 73,000 pupils; cost of maintenance (1916), \$3,219,288; 52 private and parish schools with an estimated enrolment of 25,000; 4 public high schools, 8 business colleges, 2 academies and 7 technical, drawing, law, industrial and normal schools. The Free Public Library cost for building, equipment, etc., \$1,064,000, has over 245,000 volumes, circulates annually some 1,125,000 volumes and is maintained at an annual gross cost of approximately \$150,500. An attractive Art Museum is maintained in the library building and in the library proper popular exhibitions are frequently given. Other libraries are the Prudential Insurance Company's Law and Medical Library and the library of the Lawyers' Club. The New Jersey Historical Society has a collection of books, manuscripts, paintings and other articles of great historical value. In 1918 the United States Shipping Board organized a school of marine engineering here, and in 1919 the principal technical school was raised to the dignity of the Co-Industrial College of Technology.

Banking and Insurance.—Under the National Banking Act of 1913, Newark is included in Federal Reserve District No. 2, of which New York City is the central reserve city. In 1917 there were 9 national banks, 11 trust companies, 5 savings institutions and 13 savings departments in national banks and trust companies. National banks had combined resources of \$76,954,256 and deposits of \$57,683,620; trust companies, resources of \$50,915,242 and deposits of \$39,463,402; savings banks, resources of \$50,568,925 and deposits of \$47,244,972. Building and loan associations had assets of \$63,978,185, receipts of \$36,980,243 and shareholders, 94,254. Two of the largest life insurance companies in the United States, the Prudential and the Mutual Benefit, have their home in Newark. Together they reported assets of \$636,582,170, income \$159,714,502, disbursements \$104,252,855. There were five fire insurance companies with \$3,950,000 combined capital, \$23,769,711 assets, \$12,300,924 income, \$10,789,234 disbursements and \$5,025,491 fire losses paid in 1916.

Vital Statistics.—In 1917 there were reported 43,769 dwellings and 18,298 factories and commercial buildings in the city. The very large type of apartment houses dotted the city thickly in all of its strictly residential sections and was even encroaching on bustling business thoroughfares. In 1918 the city faced a serious housing problem because of the great influx of workmen at Port Newark Terminal and also at many of the large industrial plants on account of the unprecedented demands of the World War. The number of births (1916) was 11,446; rate per 1,000, 29.7; death rate per 1,000, 16.5.

Finances.—The assessed valuation of all taxable real estate and personal property in 1916 was \$420,311,342; value of all municipal property, \$73,468,507; total bonded debt, \$42,961,200; aggregate of sinking funds applicable to bonded debt, \$11,650,082; total net debt, city and water, \$31,311,118; tax rate per \$1,000 of valuation, 24.50.

History.—Immediately following the English conquest of the New Netherlands, in 1664, a part of the Dutch possessions in North Amer-

NEWARK, N. J.



1 Court House

2 City Hall

NEWARK, N. J.



1 Post Office



2 Corner of Broad and Market Streets. Business District

ica, being practically what is now the State of New Jersey, was granted to Lord John Berkeley and Sir George Carteret. The settlement of northeastern New Jersey was immediately begun under a liberal form of government, a site near the mouth of the Passaic River proving attractive to certain Congregationalists, then settled in the colony of Connecticut. In May 1666, the New Englanders removed "their families, their beloved pastor, their church records and communion service, their deacons and their household goods" to the site of the future city of Newark. By 1685, Newark, in which the Congregationalists had settled, was a compact town of 500 inhabitants. The system of local government was like that of many early New England villages, being the limitation of political and religious activity, through the agency of the town meeting to those who professed Congregationalism.

The strong element of conservatism, characteristic of the settlement of Newark, remained unchanged until long after the opening of the 19th century. Religion and education were warmly supported, and for several years the College of New Jersey, now Princeton University, was located at Newark. The tidal waters of the Passaic River gave easy access to New York, the country-side supplying provisions and wood to the inhabitants of Manhattan Island. Newark was also engaged in a coastwise trade. To a degree the young community was somewhat isolated owing to the difficulty of road-building over the marshes and the ridge of rocks separating Newark from Paulus Hook, now Jersey City.

In the Revolutionary struggle Newark took an active part. As early as June 1774, her inhabitants protested against the Port Bill, and offered to become parties to a plan of union to redress grievances. In November of the same year inhabitants of Newark, as members of the Essex County grand jury, patriotically answered the charge of the loyalist chief justice; while in January 1775, the royal newspapers were boycotted by many of the inhabitants of the town. In the spring of that year some of the inhabitants declared that they were willing to risk their lives and fortunes for American liberty. The "gentlemen traders of this town" were recommended not to supply provisions to Canada and other loyal portions of North America. In March 1776, the Newark committee regulated the price of West India products, and traders were notified that defiance of regulation would cause the storekeeper to be declared an enemy to his country.

Newark was early identified with the efforts made to secure internal improvements, even before the second war with England. Turnpikes were extended in every direction, bringing the town in close communication with the north-western portion of the State, from which section Newark has largely drawn men who have become locally prominent. During the early years of the 19th century the first bank organized in New Jersey (1804) was established in Newark, while one of the chain of banks having the word "state" in their titles (1812) was located in this city. In 1824 the city was declared by legislative enactment to be the terminal of the Morris and Essex Canal, which was soon constructed, and united the waters of New

York Bay with those of the upper Delaware. During the early 30's the New Jersey Railroad was built between Jersey City and New Brunswick, which with Camden and Amboy connections placed Newark on the direct route between New York and Philadelphia. Following the construction of these lines, now a part of the Pennsylvania Railroad system, came railroads now forming parts of the Lackawanna and the Central Railroad of New Jersey systems, and more recently the extension of the Hudson and Manhattan tube service to the city. For five months in 1916 (May 1-Oct. 1) the city was in gala attire, celebrating the 250th anniversary of its founding. In 1917 the city adopted the commission form of government under five commissioners between whom in a like number of groups all former municipal departments were divided. In 1919 the United States Post Office Department selected a tract in the Forest Hill section of the city for a landing field for its aerial mail service. Pop. (1810) 8,008; (1830) 10,953; (1850) 38,894; (1860) 71,941; (1870) 105,050; (1880) 136,508; (1890) 181,830; (1900) 246,070; (1910) 347,460; (1920, Federal census) 414,524. Consult City records; Atkins, 'The History of Newark, N. J.'; 'Records of the Town of Newark, 1666-1836'; Dodd, H. P., 'Newark of Former Days and Newark of To-day' (1907); Urquhart, Frank J., 'A Short History of Newark' (1910, 1916); Newark Public Library. 'The Newarker' (5 vols., 1911-16); Dana, John Cotton, 'The Study of a City in the Schools of that City' (1911).

GEORGE J. HAGAR,
New Jersey Historical Society.

NEWARK, N. Y., village in Wayne County, on the Barge Canal, and on the West Shore, the New York Central and Pennsylvania railroads, about 176 miles west by north of Albany, and 30 miles east by south of Rochester. It was settled in 1820 by people from Rensselaer County in the eastern part of the State. It was incorporated as a village in 1825. It is in a fertile agricultural region, but the village has considerable manufacturing interests, including tinware works, paper box factories, a glass factory, canning and preserving factory and other establishments. Newark has a large trade in farm and dairy products, fruit and its manufactured articles. Its educational institutions are the Union Free School and Academy, the public elementary schools and the free public library. There are several churches and a number of church and literary charitable and educational societies. The State Custodial Asylum for Feeble-Minded Women is located here. The population consists of nearly all native-born Americans, over one-half of whom are of Dutch, German and Irish descent. The water-works are village property. Pop. 6,964.

NEWARK, Ohio, city, county-seat of Licking County, at the junction of three branches of the Licking River and on the Ohio Canal and the Baltimore and Ohio and the Pennsylvania railroads, about 30 miles east by north of Columbus, and within 14 miles of the centre of the State. It was settled in 1802 by a colony from the eastern part of the United States. Nearby are two large mounds which belong to the works of the "Mound Builders." It is in an agricultural region and in the vicinity are valuable deposits of sandstone, extensive

coal-fields and natural gas. The chief manufactures are glassware, chemical instruments, carriages, hardwood, bottles, electric cars, locomotives, machine shop products, rope, foundry products, flour and lumber products. There are about 160 manufacturing establishments in which there are 12,000 employees. The streets are well paved and well kept. The State encampment ground and the Auditorium, a fine theatre erected as a memorial to dead soldiers of the Civil War, are of much interest. There are 28 churches, a high school, public and parish elementary schools and a public library, established in 1877. The five banks have a combined capital of \$850,000, and the annual amount of business transacted is \$3,600,000. The government is administered under the charters in accordance with the Ohio State Municipal Code. The inhabitants are nearly all American born. Baltimore and Ohio Railroad Company has locomotive and rolling stock repair shops in Newark with more than 2,000 employees. The Wehrle Company operates the largest stove manufactory in the world with 2,500 employees. Newark is the seat of Dennison University with 700 students (coeducational). On its outskirts is Buckeye Lake, the largest inland pleasure resort in Ohio. This lake is nine miles long and from one to two miles in width. Pop. (1920) 26,718.

NEWARK SERIES, in geology, a term applied to that part of the Triassic system (q.v.) in eastern North America. Its limits are Nova Scotia on the north and South Carolina at the south. The typical deposits are near Newark, N. Y., whence the name is taken. The deposits in the series are conglomerates; breccias; thick red sandstones, which must have originated in crystalline waste, as is evident from the comparatively large amount of mica and the feldspaths; and basalt, which accompanies the sedimentary rocks and occurs in dikes and sheets, such that the violent volcanic character of their derivation is made certain. The fossils of the series are scarcely any of marine types, plants and foot-prints preponderating. The commercial value of the deposits of the Newark series is in the brown sandstone building stone of New Jersey and Connecticut, and the coal veins of North Carolina and Virginia.

NEWARK WORKS. See MOUND BUILDERS AND MOUNDS.

NEWBERRY, nŭ'bĕr-ĭ, John Strong, American geologist: b. Windsor, Conn., 22 Dec. 1822; d. New Haven, 7 Dec. 1892. His early life was passed chiefly in the Western Reserve, Ohio, and he was graduated at the Western Reserve College in 1846 and at the Cleveland Medical School in 1848. From 1851 to 1855 he practised medicine in Cleveland. He was assistant surgeon and geologist to the government expedition that explored the country between San Francisco and the Columbia River; also accompanied Lieutenant Ives in his exploration of the Colorado River, and the expedition under Captain Macomb in its exploration from the Santa Fé to the junction of the Grand and Green rivers. His reports upon the scientific results of these expeditions brought him great credit in the scientific world. At the beginning of the Civil War he became attached to the Sanitary Commission, and later secretary of its Western department. He was afterward

connected with the Smithsonian Institution, and with the Columbian (now George Washington) University, Washington, and in 1866 was appointed professor of geology and palæontology at the Columbia College School of Mines, which post he retained till his death. Besides many special reports and parts of general reports, his writings include: 'The Rock Oils of Ohio' (1859); 'Catalogue of the Plants of Ohio' (1860); 'Iron Resources of the United States' (1874); 'The Structure and Relations of Dinichthys' (1875); 'Palæozoic Fishes of North America' (1889); 'Later Extinct Floras' (1898); etc. He was especially conversant with the palæontology of the Carboniferous Era in America, and particularly with extinct fishes; and as a teacher he had great popularity and influence. He was among the early members of the National Academy of Sciences. The most interesting portions of the 'Report on the Colorado River of the West, Explored in 1857-58' (Washington 1861) were written by him and relate to the geology, physiography and Indians of that region. Consult the memoir by J. J. Stevenson in the *American Geologist* (Minneapolis, July 1893), and White, C. A., 'Biographical Memoir of John Strong Newberry' (Washington 1908).

NEWBERRY, Truman Handy, American naval commander and financier: b. Detroit, 5 Nov. 1864. He was graduated at Yale University in 1885 and entered the railroad business. His industry soon made him a prominent figure in business and financial enterprises of his State. Newberry was one of the organizers of the Michigan State Naval Brigade, serving as landsman (1895), lieutenant and navigator (1897-98). In the Spanish-American War he participated in the attack of the *Yosemite* on the Spanish munitions ship, *Antonio Lopez*. In 1899 he was appointed colonel and aide-de-camp to the governor of Michigan; and later became Assistant Secretary of the Navy (1905-08). On the retirement of Secretary Metcalfe, he was appointed Secretary of the Navy in the Cabinet of President Roosevelt, serving from December 1908 to March 1909. In the European War, Mr. Newberry was given the post of lieutenant-commander of the United States Naval Reserve. In 1918 he was elected to the United States Senate.

NEWBERRY, S. C., city, county-seat of Newberry County, on the Atlantic Coast Line and the Southern railroads, about 40 miles northwest of Columbia. It is in a region in which the cultivation of cotton is one of the chief industries. It has manufacturing establishments for cottonseed-oil, cotton goods, preparing cotton for shipment, coffins, fertilizers and lumber products. It has considerable trade, chiefly in cotton products, fruits and vegetables. It is the seat of Newberry Lutheran College and has a handsome city hall and courthouse. The electric-lighting plant and waterworks are civic property. A mayor and unicameral council elected every two years administer city affairs under a charter of 1894. Pop. 6,000.

NEWBERRY LIBRARY, Chicago, Ill., is a free library of reference established in 1887 and maintained by a moiety of the estate of Walter Loomis Newberry (1804-68), a pioneer merchant of Chicago. Since 1894 it has occupied a fine structure of Spanish-Romanesque

architecture built of Connecticut granite, situated on Walton place, between Dearborn avenue and North Clark street. The collection consists of over 375,000 books, pamphlets, manuscripts, etc., representative of the principal fields of knowledge and branches of learning which fall within its province; bibliography and the history of printing, religion and theology, philosophy, psychology and ethics, history, political science, geography, biography, language, literature and (in part) the fine arts. The original plans of the trustees contemplated the gathering of a general collection of reference and source books on all subjects. Later, however, a co-operative arrangement was entered into with the Chicago public and other libraries under which the field of knowledge was roughly divided among them, and a policy of non-duplication of books was adopted. In each of its divisions the library possesses many treasures, making it one of the most valuable book collections in the United States. Under the head of education, notably, teachers will find an excellent working collection of authoritative works on the past history of their profession and on its present condition, tendencies, methods, theory and practice. The majority of the books are, naturally, mainly intended for the use of professional scholars, but all classes of readers from the most learned investigator to the boy or girl seeking information for school use are welcomed.

NEWBURY, John, English publisher and bookseller: b. Waltham Saint Lawrence, Berkshire, 1713; d. London, 22 Dec. 1767. Going to London he began in 1745, in Saint Paul's Churchyard, the publishing and selling of books, which he combined with the sale of patent medicines. He also published *The Universal Chronicle and Weekly Gazette*, in which Johnson's 'Idlers' appeared, and *The Public Ledger*, in which Goldsmith's 'Citizen of the World' was printed. Newbery made a specialty of books for children, and published the 'Juvenile Library,' a choice collection of volumes, among which were 'Goody Two Shoes,' 'Tommy Trip and His Dog Jowler' and other surviving favorites. He was also publisher of the first religious periodical *The Christian Magazine*.

NEWBOLT, Sir Henry John, English author: b. Bilston, Staffordshire, 6 June 1862. He was educated at Clifton and Oxford and was called to the bar of Lincoln's Inn in 1887. After practising his profession till 1899 he established the next year the London *Monthly Review*, which he edited until 1904. He has published 'Taken from the Enemy' (1892); 'Mordred' (1895); 'Admirals All' (1897); 'The Island Race' (1897); 'Stories from Froissart' (1899); 'Froissart in Britain' (1900); 'The Sailing of the Long-Ships' (1902); 'Songs of the Sea' (1904); 'Songs of the Fleet' (1910); 'The Old Country' (1906); 'The New June' (1909); 'Songs of Memory and Hope' (1909); 'The Twymans' (1911); 'Poems New and Old' (1912); 'The Book of the Blue Sea' (1914); 'The Book of the Thin Red Line' (1915); 'History of the Oxfordshire and Buckinghamshire Light Infantry' (1915); 'Tales of the Great War' (1916); 'The Book of the Happy Warrior' (1917); 'A New Study of English Poetry' (1917). Certain of his patriotic poems, such as 'Admirals

All,' 'Playing the Game,' 'Drake's Hymn' and 'The Vigil,' have established his fame.

NEWBOLT, William Charles Edmund, English Anglican clergyman and author: b. Somerton, Somerset, 14 Aug. 1844. He was educated at Oxford, was vicar of Dymock 1870-77, and of Malvern Link 1877-88. He was principal of the Theological College, Ely, 1887-90, and is a canon and chancellor of Saint Paul's Cathedral. Among his published works are 'Counsels of Faith and Practice' (1883); 'The Fruit of the Spirit' (1888); 'The Prayer Book: its Voice and Teaching' (1889); 'Religion' (1889); 'The Dial of Prayer' (1901); 'Apostles of the Lord' (1901); 'Priestly Blemishes' (1902).

NEWBORN, a sect of Antinomians, which arose in the United States in the early part of the 18th century. Its founder was a German immigrant, named Mathias Bawmann (who died 1727). They held the doctrine of the deification of humanity by regeneration and that those who were regenerates were, like Christ, incapable of sin. They denied that the Bible was necessary for the illumination of Christians, and scoffed at the sacraments. They claimed that their regeneration or newbirth was brought about by dreams, apparitions and supernatural inspiration, and was like the new name written on the white stone and known only to him that receiveth it (Rev. ii, 17). The sect survived the death of its founder by about 20 years.

NEWBURGH, nū'berg, N. Y., city in Orange County, on the west bank of the Hudson River, and on the Erie and the West Shore railroads, 58 miles north of New York. The first settlement was made by emigrants from the Rhenish Palatinate, in the winter of 1708-09. They called the place, "Palatine Parish by Quassaic." The Germans were soon followed by emigrants from Great Britain, and in 1750 the English and Scotch were there in numbers sufficient to change the name to "Parish of Newburgh" in memory of Newburgh, in Aberdeen County, Scotland. Before the Revolution the farmers from the river brought their produce here to be sent to market. The lumber trade was most important; ships were built for trade with the West Indies and London; and at one time whaling was an industry of Newburgh. The city occupies a prominent place in the history of the Revolution. It was Washington's headquarters from March 1782 until 18 Aug. 1783. The "Hasbrouck House," which Washington occupied in Newburgh, was purchased in 1849 by the State of New York, and is now used as a museum for Revolutionary and Colonial relics. It is in charge of a board of trustees who have had it restored as when Washington occupied it. While in Newburgh, Washington received the letter (see NICOLA, LEWIS) asking him to become king; here the army was disbanded, and from here the Newburgh Addresses (q.v.) were issued. In 1800 Newburgh was incorporated as a village, the third in the State. After its incorporation the enterprising inhabitants built turnpikes to the farming sections west of the village, and in this way secured the trade of the farmers in the vicinity. Until 1830 sailing vessels plied regularly between New York and Newburgh, but after that date steamboats were used. The

opening of the Erie Canal diverted considerable trade from the village. The first general rowing regatta on the Hudson River was held here in 1837. Others followed in 1840, 1841 and 1842. The country around has many places of historical interest. (See NEW YORK). It was granted a city charter in 1865.

The city, viewed from the Hudson River, presents a pleasing arrangement of terraced slopes, broad, clean streets, many trees and beautiful buildings. It is about 310 feet above the river, or Newburgh Bay, as the river expansion here is called. It is in an agricultural region, the commercial centre of an extensive section and of a number of large industries. The chief manufactures are machine-shop products, plaster, cotton and woolen goods, felt hats, silk, leatherette, powder, paper, paper boxes, soap, ice machines, perfumes, furniture, springs, leather, carpets, flour, lumber, foundry products, dairy products, overalls and cigars. It has ship yards, extensive coal, brick and lumber yards. Large quantities of coal from Pennsylvania are brought here to be loaded in coasting vessels and barges. On the northeast corner of the grounds surrounding the "Headquarters" is the "Tower of Victory," made of stone, 53 feet high, with four archways leading into an atrium, and stairways leading into a belvedere. It contains a bronze statue of Washington, copied by O'Donovan from Houdon's model. Other statues represent the soldiers in the War of the Revolution. A tablet bears an inscription telling that the monument was erected by the authority of the Congress of the United States and of the State of New York. It cost \$67,000. The block of brownstone near the entrance marks the grave of Uzal Knapp, the last survivor of Washington's Life Guard; died in 1856. Newburgh has the first free public library in the State, a hospital, orphanage, county tuberculosis sanitarium and home for the friendless. Its educational institutions include several large public and parish schools (Roman Catholic), a free academy, Saint Patrick's Academy and Mount Saint Mary's Academy. There are 25 churches, one of them for colored people. The government is administered under Plan C of the Optional Charter Law of the State, which provides for a mayor and four councilmen, elected for four years. These five select a city manager who wields the executive power. The city owns and operates the waterworks. Pop. 30,366. Consult Ingersoll, 'Handy Guide to Hudson River'; Nutt, 'Newburgh: Her Institutions, Industries and Leading Citizens' (1891); Ruttenber, E. M., 'Town of Newburgh'; Powell, L. P., 'Historic Towns of the Middle States' (New York 1899).

NEWBURGH ADDRESSES, in *American history*, a term applied to two anonymous letters, appearing in 1783, after the close of the Revolution. They were written upon behalf of the American soldiers whose pay had been withheld. It was afterward made known that General John Armstrong was the author of the letters.

NEWBURGH SEDITION, in *American history*; while General Washington had his headquarters in Newburgh, on the Hudson, December 1782, great dissatisfaction manifested itself among his officers, and they addressed a memorial or "round robin" to Congress, de-

manding their back pay, and security for future services. Congress refused to grant the demands, and in the following March an attempt was made to inaugurate a revolt. The matter became so serious that Washington appeared before a meeting of the malcontents and delivered such a patriotic address that the spirit of insubordination immediately disappeared.

NEWBURYPORT, nü'būr-ī-pōrt, Mass., city and one of the county-seats of Essex County, on the Merrimac River, three miles from the sea, 35 miles northeast of Boston and on the Boston and Maine Railroad. It extends for about three miles along the bank of the river, but the streets leading back from the river are short; High street, the principal residence street, lies parallel with the river, and State street, the chief business street, is perpendicular to it. In the upper part of the city the river is crossed by a chain bridge (built 1792), the first suspension bridge in America. Among the notable buildings are the Putnam High School, the Anna Jacques Hospital, the Y. M. C. A. Memorial Building, the Old South Church, which contains the remains of George Whitfield, Marine Museum, Old Ladies' Home, and the public library, formerly the old Tracy mansion, where Washington and Lafayette were entertained; the library contains about 40,000 volumes. The house in which William Lloyd Garrison was born is also in the city. In the days of wooden sailing vessels, the chief industry of Newburyport was shipbuilding, and many of the most famous clipper ships were built there; some small vessels are still built. The harbor is good, but access to it difficult on account of the shifting sand bar at the mouth of the river; there is a considerable trade in coal brought to the city by coasting schooners. The more important industries now include boot and shoe factories, cotton factories, hat shops, an iron foundry, comb factory and a silver factory. The mayor, city council and board of aldermen are elected annually. The city owns and operates its waterworks, which were bought from a private company after considerable litigation. Newburyport was settled about 1635, separated from the town of Newbury in 1764, and chartered as a city in 1851. Theophilus Parsons made his home here and it is also the birthplace of Francis C. Lowell. It sent a large quota of troops to the Civil War, and many of its citizens, who were sea-captains, received money from the Alabama claims. Consult Currier, J. J., 'History of Newburyport' (Newburyport 1906); Hurd, D. H., 'History of Essex County, Mass.' (Philadelphia 1888); Smith, 'History of Newburyport, Mass.' (Boston 1854). Pop. 15,618.

NEWCASTLE, Margaret, DUCHESS OF. See CAVENDISH, MARGARET.

NEWCASTLE, Thomas Pelham Holles, 1ST DUKE OF, English Prime Minister: b. England, 1693; d. 17 Nov. 1768. He was the son and heir of the 1st Lord Pelham and as one of the largest land-owners in England his influence, which he used freely in the service of the king, won favor at court and he was made Duke of Newcastle in 1715. He was appointed secretary of state in 1724 under Walpole, to whose downfall he contributed, and held his

post until he succeeded his brother as Prime Minister in 1754. He retired in 1756 owing to his incompetent conduct of the French War, but was recalled in 1757 and formed the ministry so notable because of the dominating brilliancy of Pitt. He was forced out by Bute in 1762, and afterward lived a retired life with the exception of holding for a few months in 1765 the office of Lord Privy Seal. Newcastle was a small man for whom wealth and social position obtained high offices. He was ignorant of the most elementary things. Such abilities as he had lay in the manipulation and purchase of votes in Parliament, on which he spent money freely.

NEWCASTLE, William Cavendish, DUKE OF. See CAVENDISH, WILLIAM, DUKE OF NEWCASTLE.

NEWCASTLE, Del., city in New Castle County, on the Delaware River, and on the Philadelphia, Baltimore and Washington, and the Philadelphia and Reading railroads, about seven miles south of Wilmington. It was settled, in 1640, by Swedes. Later it was occupied by the Dutch and then by the English. Newcastle was the place where, in 1682, William Penn landed in America. In 1875 it was incorporated. It is in an agricultural region of fruit orchards and market gardens. Its good harbor, regular steamer connection with large cities, and railroad facilities make it an excellent shipping point for farm products, fruit and vegetables. Considerable fish, especially shad, are caught in the nearby waters. Its chief manufactures are flour, brick, canned goods, woolen and cotton goods, iron products, and men's underclothing. Newcastle has a library founded in 1812, several buildings dating back to Colonial times and two parks. Pop. 3,351.

NEWCASTLE, Ind., town, county-seat of Henry County, on the Blue River, and on the Pittsburgh, Cincinnati, Chicago and Saint Louis, the Cleveland, Cincinnati, Chicago and Saint Louis and the Lake Erie and Western railroads, about 45 miles northeast of Indianapolis. It is in a fertile agricultural and also a manufacturing region. The chief manufactures are agricultural implements, flour, paper boxes, iron and steel products, automobiles, caskets, scales, bridges, lathes, bridge works, pianos, brass furniture, carriages, brick and furniture. It has natural gas, good water power and excellent transportation facilities. Nearby is the Indiana village for epileptics comprising 1,250 acres. The city owns and operates the street-lighting plant and the waterworks. Pop. (1920) 14,458.

NEWCASTLE, Pa., city and county-seat of Lawrence County, situated about 50 miles north of Pittsburgh, at the confluence of the Shenango, the Neshannock, and the Mahoning rivers, which there form the Beaver River, and on the Pennsylvania, the Baltimore and Ohio, the Erie, the Pittsburgh and Lake Erie and the Buffalo and Pittsburgh railroads. The city covers an area of 4,773 acres and, situated as it is in one of the richest and most charming valleys in the world, and having unequalled advantages of water power and railway facilities, it offers exceptional opportunities to the ever-increasing population.

Aside from being the commercial centre for a productive agricultural region, the city is in the heart of rich deposits of iron ore, limestone, coal and clay, and is noted for its great variety of industries. These comprise steel and rolling mills, blast furnaces, tinplate mills, car shops, wire works, paints, hosiery, rubber tires, heating apparatus works, also manufactures of machinery, boilers, castings, blast furnace jackets, pottery and table ware, and vitreous sanitary ware.

Prominent among the public buildings are the United States Government Building, containing the post office, the city hall, the opera house and the Y. M. C. A. building, containing a large library, presented by Ira D. Sankey the evangelist. The Shenango Valley Hospital and the Almira Home for Aged Women are located there.

The inhabitants of the city worship in over 35 church edifices representing nearly all denominations. The educational advantages are of the highest standard of excellence; the pupils are accommodated and receive instructions in a high school supplemented with several graded public schools, while a well sustained business college prepares young men and women for commercial life. Besides these there are also several excellent parish schools.

Newcastle stands high in the average of highways paved; the public improvements have practically all been the outcome of the marvelous growth of the city within the last two decades; during that time the electric railway system, connecting with all the surrounding cities and towns, has been built; a complete system of arc lights has been introduced, the capacity of the water system trebled, and an excellent sewerage system constructed. Cascade Park, an amusement resort, was established by the traction company. The Old Park Cemetery and the Graceland cemeteries are the largest of the "cities of the dead." Newcastle was first settled in 1800 by Robert White; became a borough in 1869, and was chartered as a city in 1875. In 1914 the commission form of government was adopted. Pop. (1920) 44,938.

NEWCASTLE-UPON-TYNE, England, a parliamentary, municipal and county borough and episcopal city, in Northumberland County, and on the northern bank of the Tyne, nine miles from its mouth. It is about 272 miles northwest by rail from London and 124 miles southeast from Edinburgh. It occupies the sides and summits of hills that rise steeply from the river. Coal measures constitute the geological formation; and they stretch southwards to Ferry Hill, northwards to Chevington.

Public Buildings.—The principal public buildings are the Moot Hall (the Northumberland assizes are held here); the Hancock Museum (it contains the collection of John Hancock the naturalist, and many drawings of birds, etc., by Thomas Bewick, the engraver); the Keep of the old Castle, built in Henry II's reign and the Black Gate, at the entrance to the Castle yard (now used as an antiquarian museum). Of other buildings there may be mentioned the Town Hall; the Old Assembly Room; the guildhall (in which is the assize court of Newcastle), and below it, the Exchange; and the Grain Warehouse, on the Quayside. There are one central public and

four branch libraries, three of the latter donated by Sir W. H. Stephenson and one by Mr. Andrew Carnegie; while the Literary Philosophical Society, the Society of Antiquaries and the Church Institute have libraries attached. The Laing Art Gallery was donated by Mr. Alexander Laing in 1904. Of the theatres the chief are the Tyne Theatre and the Theatre Royal.

Places of Worship.—The cathedral church of Saint Nicholas has a famous lantern tower, which was added by Robert de Rhodes about 1450, 100 years after the completion of the church. The tower has been copied elsewhere but never equaled. The clock weighs two tons and is controlled from Greenwich. The largest peal of bells weighs 5 tons 18 cwt. Saint Andrew's is said to be the oldest church in Newcastle, but Saint John's disputes the claim. Saint Mary's Cathedral (Roman Catholic) was designed by Pugin; its charming spire was added in 1872.

Schools, Educational Institutions, etc.—Dame Allan's School, Saint Cuthbert's Grammar School (R. C.), Deaf and Dumb Institute, Northern Counties Orphanage, Church High School for Girls, Central High School, Royal Grammar School, etc. The Armstrong College was founded in 1871 by the University of Durham (to which it is affiliated) and the North of England Institute of Mining and Mechanical Engineers. The College of Medicine (also affiliated to the University of Durham) was built in 1887, and cost £31,000. Rutherford College, not affiliated to the University, was founded by the late Dr. Rutherford.

Municipal Enterprises.—The chief municipal undertakings are the markets, the public libraries, fire brigade, electric tramways, baths and washhouses.

Parks, Hospitals, Bridges.—Town Moor (said to have been held by the burgesses from time immemorial), 927 acres; Leazes, 86 acres; other parks and recreation grounds, 270 acres. The old Royal Infirmary is near the Central Station close to the Armstrong College; a new one to commemorate Queen Victoria's Diamond Jubilee was opened in 1906. Other hospitals, etc., are the Eye Infirmary, Fleming Memorial Hospital for Children, Hospital of Diseases of Throat and Ear, for Incurables, etc. The chief bridges over the Tyne are the High Level, 1,375 feet long, with the railway track 112 feet above high water (built by Robert Stephenson, 1846–50, at a cost of nearly £500,000); the Redheugh; the hydraulic swing bridge (built by Lord Armstrong at a cost of £233,000); and a new railway bridge (North Eastern Railway), opened by the king in July 1906. The Byker bridge crosses the Ouseburn and serves foot and vehicular traffic; whilst a railway viaduct, just to the north of it, carries the traffic of the North Eastern Railway.

Industries and Manufactures.—The coal mines are now all outside the city boundaries. Elswick Ordnance Works are in the west of the city, and this section is famous also for its cycles. The most notable other industries are engineering and shipbuilding. To them may be added the trade in lead, chains and anchors, the manufacture of cement, of steam winches and windlasses, of cordage and cable, paper, cranes, pumps and electric machinery. The

chemical trade, formerly active, has declined of late years. The chief exports are coals, machinery, chemicals, manures, cement, manufactured iron, paints, tar, fire-bricks, fire-clay, etc. Quays are built all down the river side; the docks have 19 feet at low water and accommodate vessels of about 7,000 tons.

History.—The town (first called Pons Ælii, then Novocastria, then Monkchester, then Newcastle-upon-Tyne) is situated near the eastern termination of the Wall of Hadrian, and Roman antiquities have been repeatedly discovered in it. In the Anglo-Saxon period it was a monastic centre. The fortress was built by Robert, son of William the Conqueror, about 1080. It was rebuilt by William Rufus, his younger brother, who "buidled the Newcastle upon the Tyne, the Scots for to gaynstande and to defende." About this time the town received its present name. It received a charter from King John, but the oldest extant is said to be by Henry III in 1239, which confers the right of digging for coal in the neighborhood. The coal trade had attained some importance by 1280. Newcastle was a frequent object of attack, and was repeatedly taken in the wars between England and Scotland. It furnished 17 ships to Edward III for the siege of Calais. It was taken by the Scottish Covenanting army in 1640 and in 1644, and in 1646 Charles was delivered here by the Scottish army to the parliamentary commissioners.

Government.—The city is governed by lord, mayor, sheriff, and council. In the year 1400 a royal charter created Newcastle a county in itself, and Newcastle's first sheriff was appointed in that year. In 1600 the great charter (confirming old privileges and adding new ones) was passed. In 1882 a royal charter created Newcastle a city. In 1906 it was made a royal borough. It is the seat of a United States consul. The city returns members to the House of Commons. Pop. 266,603.

Bibliography.—Bruce, 'Reid's Handbook to Newcastle' (1863, rev. ed. 1903); Gray, 'Chorographia' (1649, re-edited by Crawhall and Reid 1884); Histories by Bourne (1736); Brand (1798); Mackenzie (1827), and Welford (1883–87); Sykes, 'Local Records' (1833); Fordyce, 'Local Records' (1867–76); Guthrie, 'River Tyne' (1880); Rendel, 'Newcastle on Tyne: Its Municipal Origin and Growth' (1898); Richardson, 'Handbook to Industries of Newcastle and District' (1889); Johnson, 'Making of the Tyne' (1895); Heslop, 'Northumberland Words' (1893–94); Corporation Manual, current date, etc.

NEWCOMB, nū'kom, Harry Turner, American lawyer and statistician: b. Owosso, Mich., 4 Jan. 1867. He was graduated from the law department of Columbian University in 1891, and entered the offices of the Chicago, Milwaukee and Saint Paul Railroad in 1882. In 1895–99 he was chief of the transportation department of the division of statistics in the United States Department of Agriculture, and in 1899–1901 was expert chief of the division of agriculture for the United States census. In 1896–1901 he was lecturer on statistics at Columbian University, and in 1901–02 he was editor of the *Railway World*. He began the practice of the law in 1902 and was almost im-

mediately employed as counsel for the Philadelphia and Reading Coal and Iron Company in the arbitration before the Gray commission which settled the anthracite strike of 1902. He organized the firm of Newcomb, Churchill and Frey in 1907 and is now the senior member of Newcomb and Frey, its successor. His practice is chiefly in corporate matters and cases involving the law of interstate commerce and those of taxation, in all of which the principles of jurisprudence are in process of adjustment to meet new economic conceptions and conditions. He has written 'Railway Economics' (1898); 'The Postal Deficit' (1900); 'The Work of the Interstate Commerce Commission' (1905); 'Constitutionality of the Delegations in the Interstate Commerce Law' (1910), etc.

NEWCOMB, Simon, American astronomer; b. Wallace, Nova Scotia, 12 March 1835; d. Washington, D. C., 11 July 1909. He came to the United States in 1853 and taught in Maryland; computed on the *Nautical Almanac* at Cambridge 1857, and was graduated from the Lawrence Scientific School at Harvard 1858. He was appointed professor of mathematics in the United States navy in 1861 and assigned to duty at the Naval Observatory; negotiated contract for and supervised construction of the great telescope; was secretary of the transit of Venus commission (1871-82); and observed transit at the Cape of Good Hope in 1882. He also directed several parties to observe eclipses beginning in 1860. From 1877-97 he was senior professor of mathematics and superintendent of the *Nautical Almanac* office. He retired from active duty in the navy (1897) at the required age of 62, and thereafter devoted himself to both pure and popular science. He was professor in Johns Hopkins University 1884-94 and editor of the *American Journal of Mathematics*, retiring in 1901. He was a member of learned societies throughout the world. Since 1874 he was correspondent and since 1893 associate of the Institute of France, being the first native American to receive the latter honor since Franklin; he was also an officer of the Legion of Honor. He received distinctions and degrees from governments and universities in most civilized countries.

He lectured at Harvard, the Lowell Institute at Boston, etc., and delivered opening addresses at the Flower, Yerkes and other observatories. In connection with his work on mathematical astronomy, besides over 100 papers published in various scientific journals, he has written large works 'On the Secular Variations and Mutual Relations of the Orbits of the Asteroids' (1860); 'An Investigation of the Orbit of Neptune' (1874); 'Researches on the Motion of the Moon' (1876); 'Theory of the Inequalities in the Motion of the Moon' (1894); 'Tables of Uranus'; 'Measure of the Velocity of Light' (1884); 'Uranian and Neptune System'; 'Astronomical Constants and Eclipse Tables.' He founded the *Astronomical Papers of the American Ephemeris* and edited the first eight of this series, which contain his tables of the planets and of the stars now used by astronomers all over the world. This work contains Newcomb's famous lunar researches. Among his more popular writings are 'Popular Astronomy' (1878); 'School Astronomy'; 'Elements of Astronomy' (1900); 'Algebra Geometry'; 'Analytical Geometry'; 'Cal-

culus'; 'Essentials of Trigonometry'; 'The Stars' (1901); 'Astronomy for Everybody' (1902); 'A B C of Finance'; 'A Plain Man's Talk on the Labor Question' (1886); 'Principles of Political Economy' (1887); 'His Wisdom the Defender' (1900); 'Reminiscences of an Astronomer' (1903). He was given the rank of rear-admiral by Congress in 1906, and on his death in 1909 was given a military funeral. For an account of his place in science, see Benjamin, M., paper in 'Leading American Men of Science' (New York 1910), edited by D. S. Jordan.

NEWCOMB MEMORIAL COLLEGE FOR WOMEN, New Orleans. See **TULANE UNIVERSITY**.

NEWCOMEN, nū-kōm'ēn, Thomas, English inventor of the atmospheric steam engine; b. Dartmouth, Devonshire, February 1663; d. London, August 1729. With the financial help of John Cawley he experimented on Savery's engine, patented 1698, possibly had made previous study of the same problem at an earlier date and may have been a partner with Savery in the patent taken out in 1710. His improvement of Savery's engine consisted principally in separating boiler, pump and condenser. Steam was let into a cylinder from below and a piston above was thus forced up so that a pump rod attached to it by a balance arm was driven downward; cold water was then introduced into the condensing cylinder, a vacuum was there formed, and the external atmospheric pressure drew the piston down into the cylinder, the pump rod being forced up by this action. Newcomen's engine is practically the modern type, which, however, has Watts' condenser; it was successfully used, notably for pumping water from mines. See **STEAM AND STEAM ENGINES**.

NEWCOMES, The, by Thackeray, published in 1854-55, the last of the four very great novels of the author, is more closely united to 'Pendennis,' to which it is a quasi-sequel, than to 'Vanity Fair' or 'Esmond.' As the theme of 'Vanity Fair' presented a section of life in which most human endeavor ultimately turns to dust and ashes, and 'Pendennis' isolates with almost epic impressiveness the phenomena of the young man, so the 'Newcomes' dwells almost chiefly on family relations. As in the earlier stories Thackeray was faithful to what he saw, and the picture is a powerful one. It is a picture of family rivalry, intrigue, ambition, ill-feeling, worldliness, jealousy, weakness, credulity and many other unattractive characteristics. On the whole the various members of the family are represented in no amiable light: Barnes Newcome is especially detestable, and most of the other Newcomes are mean and selfish. The amiable weakness of the hero, Clive, deserves a better fate than his temporary martyrdom at the tongue of Mrs. Mack the Campaigner, most abominable of mothers-in-law. The two most famous and likable characters, Colonel Newcome and his niece, Ethel Newcome, though they have faults of the head if not of the heart, relieve the general impression. They are the real hero and heroine of the book, and are among the best-known characters in English literature; they are fairly representative of the great vividness and intensity of feeling with which the novel is writ-

ten. Like most of the author's novels, 'The Newcomes' is often highly satirical of English society, Barnes Newcome, Honeyman and young society ladies being specially ridiculed. Certain passages, notably that of the death of Colonel Newcome, are among the famous pieces of writing in English literature. Consult various lives, as that by Trollope and Mrs. Ritchie's introduction in the biographical edition of Thackeray's works.

WILLIAM T. BREWSTER.

NEWDIGATE (nū'dī-gāt) **PRIZE**, a prize in Oxford University, annually awarded for an English poem. It was founded by Sir Roger Newdigate, Bart. (1719-1806), its value being \$110. Among the winners have been several well-known men, such as Ruskin, Matthew and Sir Edwin Arnold, John Addington Symonds and W. H. Mallock.

NEWEL, in architecture, the central space or column round which the steps of a circular staircase are wound. When there is no central pillar the newel is said to be open. The term newel post is also used in this connection.

NEWELL, Frederick Haynes, American engineer, founder of the United States Reclamation Service and its chief engineer from 1902 to 1914: b. Bradford, Pa., 5 March 1862. He was graduated at the Massachusetts Institute of Technology in 1885. Soon after joining the United States Geological Survey in 1888 the director, J. W. Powell, placed him in charge of water investigation, steam gauging and reservoir site surveys, a work which finally developed into the Reclamation Service created by act of Congress, 17 June 1902. Under his direction were built the Roosevelt, Pathfinder, Elephant Butte, Arrowrock and other great dams, and the Gunnison tunnel for the reclamation of about 3,000,000 acres in the West. This work was done with a fund which from 1902 to 1914 amounted to about \$100,000,000. He was member of the commission on revision of land laws, the Inland Water-Ways Commission and of the Natural Advisory Board for fuels and structural materials. After resigning from the Reclamation Service in 1914 he was consulting engineer to that organization until appointed head of the civil engineering department of the State University of Illinois at Urbana. He is the author of 'Hydrography of the Arid Region' (1891); 'Agriculture by Irrigation' (1894); 'The Public Lands of the United States' (1895); 'Irrigation' (1902), and many special reports.

NEWELL, Peter ("SHEAF HERSEY"), American illustrator and humorist: b. McDonough Co., Ill., 5 March 1862; d. 15 Jan. 1924. He was educated at Bushnell, Ill., worked for a photographer, drew crayon portraits, studied in New York at the Art Students' League and in the early 90's became famous for his whimsical illustrations to humorous books and for his own pictures with text, which appeared in various periodicals and were collected as 'Topsys and Turvys' (1893-94), 'Peter Newell's Pictures and Rhymes' (1899), etc. His later work with its striking use of flat tones, possibly traceable to Japanese influence, is to be seen in the illustrations to Lewis Carroll's 'Alice in Wonderland,' 'Alice in the Looking-Glass,' 'The Hunting of the Snark,' 'Mr.

Munchausen,' 'Book of Clever Beasts,' etc. His more recent publications are 'The Hole Book' (1908); 'Jungle Jangle' (1909); 'The Slant Book' (1910); 'The Rocket Book' (1912).

NEWELL, Robert Henry, American humorist, whose pseudonym was "ORPHEUS C. KERR," that is "Office Seeker": b. New York, 13 Dec. 1836; d. Brooklyn, 1 July 1901. He was educated in New York; became assistant editor of the *Sunday Mercury* in 1859; for it wrote his first 'Orpheus C. Kerr Papers,' which were continued in three volumes (1861-64), none possessing much deeper humor than the kind suggested by the title. He was a war correspondent of the *New York Herald*; acted as an editor of the *New York World*, then of the *Daily Graphic*, and later of the *Hearth and Home*, which he left in 1876. In 1878 he began to suffer with writer's cramp and letter-blindness, from which he never recovered. Besides his humorous sketches Newell wrote 'There Was Once a Man,' an anti-Darwinian romance (1884); 'Avery Glibun' (1867); 'The Palace Beautiful' (1865), and 'Versatilities' (1871), both volumes of verse; 'The Cloven Foot,' an adaptation of 'Edwin Drood' (1870), and 'The Walking Doll,' a novel of New York life (1872).

NEWFOUNDLAND, The Atlantic Fisheries Dispute. This fertile source of friction between the United States and Great Britain antedates the War of Independence. In those times the American colonists, as fellow-subjects of England, prosecuted the fisheries of the Grand Banks and Saint Lawrence Gulf on equal terms with the inhabitants of Canada and Newfoundland. During the Revolution the Americans could not exercise it, but by the Treaty of 1783 they regained this liberty. The War of 1812 abrogated it again and seizures of their vessels for attempting to prosecute the industry brought about the Convention of 1818, which fixes the status of the question at present.

The agreement of 1818, known in diplomacy as the Convention of Ghent, is somewhat remarkable. The American commissioners claimed that they still possessed the privileges formerly enjoyed by them as British colonists although war had intervened and they had become an independent nation. The audacity of the claim startled the English government, who answered that it was preposterous. The Americans were bold and insistent, they had many friends,—and as every one desired peace and harmony the convention finally agreed on a compromise on the question. The British government were ignorant both of the geography and the trade of Newfoundland, and they considered the fishing rights they were giving away as practically valueless.

By this treaty the United States abandoned all claims to fishing within the territorial waters of the British North American possessions elsewhere, in return for the right to catch fish inshore on the southwest coast of Newfoundland, between Ramea Isles and Cape Ray; on the west coast, between Cape Ray and Quirpon Isles; on the coast of Labrador, from Mont Joli, opposite Anticosti, eastward and northward indefinitely; and on the shores of the Magdalen Islands, with the further privilege of landing to dry and cure their catch on the un-

settled portions of the southwest coast of Newfoundland and along Labrador.

Differences as to the extent of the territorial jurisdiction and the interpretation of the treaty made the question one of serious menace to Anglo-American amity, owing to the vigorous stand taken by Canada (including Newfoundland) against the American fishermen, until 1854, when by a reciprocity treaty the Canadian fishery products were granted free entry into the United States. This accord was abrogated by Congress in 1866, the Convention of 1818 being reverted to. At once friction revived, and in 1871 it became necessary to conclude the "Washington Treaty" which embraced a series of articles dealing with the fishery problem. These provided for reciprocal fishing concessions in Canadian waters, and in American waters north of lat. 36°, but as Canada claimed that America secured the more valuable privileges an arbitration to dispose of this point was agreed upon. The fishery articles became operative 1 July 1873, the arbitration was held at Halifax (Nova Scotia) in 1877, and the tribunal, presided over by M. De la Fosse, Belgian Minister at Washington, awarded Canada \$5,500,000, of which \$1,000,000 went to Newfoundland. Congress abrogated the "fishery articles" in 1885, and again the Convention of 1818 governed this entanglement with the result of further trouble, so that in 1888 another fishery treaty, on similar lines to its predecessors, was arranged between the plenipotentiaries, Secretary Bayard and Mr. Chamberlain, only to be rejected by the United States Senate.

At this point Newfoundland and Canada parted company, so far as their attitude toward the United States was concerned. A *modus vivendi* for two years, to admit of the treaty being adequately considered by the Senate, had been arranged between the high contracting parties, granting American fisher-vessels, on payment of a license of \$1.50 per ship-ton, the right to enter the non-treaty waters of Canada and Newfoundland to purchase bait, ice, stores, and outfits; to transship cargoes and to hire men. When the treaty was rejected Newfoundland saw that fishery reciprocity between the United States and Canada was hopeless, and offered the former an accord on her own behalf. The proposal was accepted in 1891, when Secretary Blaine and Colonial Secretary (subsequently Premier) Bond drafted the Bond-Blaine Convention, providing privileges for American fishermen in Newfoundland waters in return for free entry of Newfoundland fish into American markets.

When it was ready for ratification, Canada protested against it, claiming that Newfoundland should not be allowed to make such a compact without including the dominion, and the British government, to avert a collision between the greater colony and the smaller, pigeon-holed this draft till Canada should have had an opportunity to effect a similar understanding. But this she could not do, though the Conservative and Liberal cabinets both sought terms from Washington, and as neither Canada nor Newfoundland dared abrogate the *modus vivendi* while hoping for a solution of the deadlock the temporary arrangement continued year after year. In 1902 Canada withdrew her protest and Sir Robert Bond revived the moribund draft

with Secretary Hay, the new one being known as the Bond-Hay Treaty, and containing improvements suggested by 12 years of discussion.

In 1904 the United States Senate "amended this to death," at the instance of the New England fishery interests, and then Newfoundland resolved to cancel the *modus vivendi*. This her legislature did by an enactment in April 1905 excluding all American fishing vessels from her non-treaty waters, save for wood, water, shelter or repairs, privileges conceded by the Convention of 1818; and, as regards her treaty waters, restricting them to the mere rights that compact assured to them. The first effect was to hamper them in securing bait for their deep-sea fishing, for which Newfoundland is the natural base, because of its proximity to these shoals. The second was to partially destroy the winter herring fishery on the west coast. Here they have treaty rights, but these are not ample enough to enable them to prosecute this industry successfully, as they need large numbers of coastfolk for netting and the use of the strand for salting or freezing the fish, and the residents were forbidden to work for, or sell to them; it being usual for the Americans previously, with the approval of the colonial government, to buy whole cargoes from the settlers who caught the fish. The withdrawal of these privileges seriously hampered the Americans and lessened their catch. They would, indeed, have fared even worse but that they succeeded in evading the colonial laws by inducing the coastfolk to proceed outside the three-mile limit and hire on board their ships there, returning then into territorial waters and serving as members of their crews.

This claim of the Americans to ship Newfoundlanders outside the three-mile limit and then return with them into port as legally part of their crew was not confirmed at Washington. The State Department discountenanced it and instructed the American fishermen that they only bring into Newfoundland waters crews shipped in American ports.

Newfoundland, early in 1906, passed a further act making it illegal for any of her people to leave her waters for such a purpose, or for any foreign fishing vessel to enter her waters with such men on board, while the Americans were also required to pay light dues, observe colonial fishery regulations, and enter and clear at the custom-houses, which obligations they had declined to subscribe to since the rupture. On one of these questions, the claim of the Newfoundland government to compel all American vessels to enter and clear at the Custom House is unanswerable. All nations have an inherent right to protect their revenues from smuggling. The supply of goods aboard their schooners known as "the slop chest" is solely for this purpose. Canada has always compelled them to enter and clear their vessels when visiting Dominion ports, and Newfoundland claimed the same right. The United States government did not uphold its fishermen on this point. The payment of light dues rests upon the same basis. The most contentious question was, how far are the Americans bound to obey local fishery laws? Where these regulations are general and simply for the protection of the species from destruction, it would seem reasonable that they should be obeyed. One point on which

there was some friction was the right of the Americans to fish on Sunday. This irritated the Newfoundlanders more than anything else and caused the trouble years ago known as "the Fortune Bay Outrage." As grave international problems were involved in the whole question, the British and American governments opened negotiations for an adjustment of it, appeal being made to The Hague Tribunal and the decision was not reached until 7 Sept. 1910, and in July 1912 a supplementary treaty was concluded giving binding effect to those parts of the award which were in the nature of recommendations only.

Taken altogether the award was a victory for the United States. Neither British imperial nor colonial authorities can compel American fishermen to report to the custom houses, nor can they impose upon these fishermen light, harbor or other dues. Hereafter American fishermen can employ Newfoundlanders on their vessels and they will also have the right to purchase supplies and enjoy other commercial privileges in Canadian ports. It was also specified by the tribunal that future disputes regarding fisheries regulations shall be adjusted by an impartial commission selected for that purpose.

Hon. Elihu Root was the chief pleader for the United States at The Hague, while Sir William Robson appeared for Great Britain.

P. T. McGRATH,

Editor 'The Evening Herald,' Saint Johns, N. F.

NEWFOUNDLAND. Geography.—Newfoundland, the tenth largest island in the world, is situated on the east coast of North America, between lat. $46^{\circ} 37'$ and $51^{\circ} 39'$ N. and long. $52^{\circ} 35'$ and $59^{\circ} 25'$ W. It occupies much the same geographical position in the New World as the British Isles do in the Old. The colony lies generally in a more southern latitude than the British Isles. It is larger than Ireland, containing 42,734 square miles. It is divided from the continent on the southwest by Cabot Straits, about 60 miles wide, and on the northeast by the Straits of Belle Isle, 10 miles wide. It juts far out into the Atlantic and is the nearest American land to Europe, being only 1,640 miles from Ireland and 1,213 from New York. Labrador, from Hudson's Strait to Blanc Sablon, including the basin of the Hamilton, is included in the Dominion, the remainder of the Labrador Peninsula forming part of the Dominion of Canada. Area, 120,000 square miles with a coast line of about 600 miles facing Newfoundland.

Topographical Features.—On the east coast the land is high and looks very rocky and barren; on the west coast the character of the country changes completely after Cape Ray is passed. Instead of the stern, forbidding mountainous aspect of the east and south coast the land is level, well timbered and fertile. An American artist has declared that the scenery of Bay of Islands on the Newfoundland west coast is the most picturesque in North America. The numerous river valleys are very beautiful, especially the Humber, Codroy, etc. Much of the interior is moorland and marsh, well wooded around the numerous lakes and rivers. Most of the good land lies in these alluvial valleys. The west has a finer climate and the land

generally is superior to the soil of the eastern shore. In the interior there are many isolated peaks. The chain of mountains known as the Long Range extends from Cape Ray for about 100 miles into the interior. There is another high range of mountains near the centre of the island. The highest peak is a little over 2,000 feet. The Atlantic coast line of Newfoundland and the southern shore have noble inlets, bays and harbors, admirably adapted for carrying on its great industry, the cod fishery.

Hydrography.—The peculiar feature of Newfoundland are the innumerable lakes, only two of which are large, Grand Lake and Red Indian Lake. Both are long and narrow, Grand Lake about 60 miles long and Red Indian Lake about 50; but neither is over 10 miles wide in any part. Glover Island in Grand Lake is 52 miles long. The largest river in the island is the Exploits, which is navigable for about 50 miles from the mouth of its estuary. The Humber, Gander, Codroys and Terra Nova rivers are all fine streams, but of no value for navigation except by canoes.

Soil.—In many parts of the island there is very good land, especially in the Codroy Valley, Saint George's Bay and the Humber Valley. Deer Lake, Red Indian, Exploits Arm and the River Valley also contain good soil. Fine timber and good ground fit for cultivation surround both the Gander River and Lake. There is also good agricultural land around Avalon Peninsula. Trinity Bay, S. W. Arm, Green Bay, Notre Dame Bay, some parts of White Bay, Mortier, Placentia, Bonavista and Saint Mary's Bays. There are thousands of acres of splendid grazing ground and fine pasture lands specially suitable for sheep.

Minerals.—Newfoundland is celebrated as a producer of copper and iron, copper from the well-known Tilt Cove mine and iron from Bell Island. Iron of various kinds has been found in the north. The iron output in a recent year amounted to 656,000 tons. Argentiferous galena occurs in Placentia Bay. Asbestos is common and mica. Gold is being worked on a small scale in White Bay and petroleum of excellent quality is now being pumped at Parsons' Pond on the west coast. Slate and marble are abundant. A large deposit of talc has been opened and an aerial tramway built to it near Manuels Conception Bay. The country is almost wholly unexplored and her great mineral treasures, especially her valuable coal deposits, have not yet been tested in an efficient way with the boring machine. They are an extension of the Cape Breton coal fields and extend nearly across the island from Codroy to Green Bay. The annual mineral production is about \$3,000,000 in value.

Climate.—The Summer climate of Newfoundland from June until October is delightful. There is plenty of sunshine but no extremes of heat, seldom higher than 70° in the shade. The winter climate is not so severe as in Canada. Zero is only occasionally touched. The spring is late and the weather variable, due to the influence of the Labrador current which brings along the ice. During the last few decades the climate has improved and there is now no very heavy snowfall or intense frost before the end of November. The fog lies on the coast and only rarely comes in on the land.

Animal Life.—Newfoundland is the home of the woodland caribou. All the interior is one vast deer park where countless thousands of these fine animals range unmolested and unseen by man. Black bears, the grey wolf, now very scarce, the lynx, foxes, beavers and otters are indigenous. The varying hare has been introduced and now swarm all over the island. The Arctic hare is a native as well as the willow grouse and ptarmigan. There are plenty of snipe, ducks and geese, but no woodcock. The rivers abound with salmon and trout; there are no predaceous fishes, such as pike or pickerel.

Agriculture.—The main business of the colony is the fishery. Agriculture is only an auxiliary, and is mainly confined to the coast. The chief crops are oats, potatoes and turnips. There are 231,359 acres under cultivation or in pasture. About 541,000 bushels of potatoes; 11,000 bushels of oats; 65,298 bushels of turnips represent an average year's product. There are about 13,288 horses; 40,000 head of cattle; 100,000 sheep and 30,000 pigs. About \$600,000 worth of agricultural product is imported into the colony every year from the United States and Canada, all of which could be raised in the island. The farming around the capital is excellent. On the west coast, where the very best land is situated, is still very primitive. Before the outbreak of the war the total value of all the agricultural produce raised on the island was about \$2,000,000. This has been greatly increased by enhanced prices and more and better cultivation under the stern necessities of war.

Lumbering.—This industry has been greatly increased by capitalists from Canada and New England. The chief woods are spruce, white and yellow pine, red pine, fir, juniper, birch, witch hazel, aspen and white maple. There are now in operation several paper and pulp mills producing about 100 tons of paper and 250 tons of pulp daily, most of which is exported to England.

Fisheries.—The great industry of Newfoundland is the fishery. The Grand Bank fishery has declined of late but its loss has been made good by the increase of the fishery in coastal waters and along the Labrador Coast. Under the terms of the Anglo-French Convention of 1904 France renounced her exclusive fishing rights under the Treaty of Utrecht, but retained the right to fish in territorial waters from Saint John's Cape north to Cape Ray. In 1909 the Newfoundland fisheries disputes were submitted to The Hague and the award, given in 1910, secured the right of Great Britain to make regulations without the consent of the United States, subject to any limitations imposed by treaty. In the Grand Bank cod fishery in 1914, there were engaged 1,892 men and 105 Newfoundland sailing vessels, aggregating 7,790 net tons. The catch totaled 124,067 quintals of dry fish, valued at \$775,418. The coastal-waters cod fishery for the same year engaged 15,823 small sail vessels, motor boats, etc., and 48,221 men. The catch aggregated 1,032,198 quintals of dry fish, valued at \$6,193,188. On the Labrador fishery over 800 vessels and 5,500 men were engaged. The exports of codfish, including the Labrador fishery, aggregated 1,247,314 quintals. The lobster catch was 11,017 cases in 1914 and 6,022 cases in the year following. In the year 1914 there were eight vessels en-

gaged in whaling. The catch included 142 finbacks, 13 humpbacks, one sperm and five sulphur bottoms, a total of 161 whales, valued at \$85,008. The factories connected with the whaling industry turned out 150,146 gallons of oil, 256 tons of guano and over 80 tons of bone in 1914. The seal fishery in the same year yielded 233,719 seals, but fell to 47,004 in 1915. About 20 steam vessels and 4,000 men were formerly engaged in sealing. Sealing is now restricted by law to one month (16 March–16 April). The total value of all fisheries averages \$10,000,000 annually but in 1917 reached the unprecedented value of \$14,258,555. The codfishery, both in extent of area and in production, is the largest in the world. The most remarkable feature in this great industry is its stability and uniform success. As certain as seed time and harvest there come every year to the shores of Newfoundland the regular supply of the bait fishes in orderly sequence, herring, caplin and squid, and the voracious cod. The seal fishery is much more variable, some years being a complete failure, other years a great success. The industry was formerly prosecuted in sailing vessels, now it is carried on in 23 steamers. In 1918 a cold storage plant was erected for chilling fish, with a capacity of 200,000 pounds per day. During the year the chilled product of this plant was exported to England and fetched handsome prices.

The herring fishery is another large industry. The movements of the fish are sometimes very irregular and the year's catches variable, unlike the steady uniformity of the codfishery which has continued for over four centuries steadily productive. The Labrador herring, once so famous, is now a thing of the past. Owing to judicious protection, salmon are year by year increasing and every season an increasing number of anglers come to enjoy the sport, principally from the United States. See NEWFOUNDLAND, THE FRENCH SHORE QUESTION IN.

Manufactures.—Ship building is extensively carried on in the outports of the colony. There are also a very large number of saw mills, some very small and primitive, others on a large scale with all the best and most modern appliances. Nearly all the other manufactures are carried on at the capital, Saint Johns (q.v.). Paper-making has been inaugurated on a large scale and bids fair to have an annual output worth \$10,000,000.

Trade and Commerce.—The main import trade is done with Great Britain, United States and Canada. Imports in 1914–15 were valued at \$12,693,860; in 1913–14 they were valued at \$15,609,990, comprising textiles, \$1,852,968; flour, \$1,823,551; coal, \$1,066,762; hardware, \$901,756; salt pork, \$753,309; machinery, \$729,225; tea, \$224,382; molasses, \$208,949. The exports in the same year (1914–15) were valued at \$13,501,795 against \$15,549,185 in 1913–14, when there were exported dried cod to the value of \$8,071,899; pulp and paper, \$2,168,164; iron ore, etc., \$1,370,375; herring, \$469,546; seal oil, \$409,060; cod oil, \$386,825; seal skins, \$350,794; canned lobsters, \$347,941. Of the total imports (\$15,549,185) in 1913–14, merchandise to the value of \$3,826,529 came from the United Kingdom, \$5,192,462 from British possessions (mainly Canada) and \$5,796,906 from the United States. Exports to the value of \$3,256,446 were sent to the United Kingdom, \$2,522,159

to British possessions (mainly Canada), \$1,679,362 to the United States and \$7,676,606 to other countries. Imports from the United Kingdom in 1916-17 were valued at \$2,620,033, from the United States, \$10,233,899, and from Canada \$7,412,300. Trade with England is decreasing, whilst business with the States and Canada is on the increase.

The cause of this change is not far to seek. Whilst British capital has neglected Newfoundland, Canadians and Americans have been prompt to secure the advantages offered by the island's minerals and timber. They have realized that there are great possibilities in the colony. The exports of Newfoundland (1916-17, \$22,381,762) go principally to the United Kingdom, United States, Portugal, Brazil, Spain, Italy and Canada, chiefly dry codfish. Sealskins and oils go to the United States, England, and in small amounts to Canada. The iron ore goes to Canada, copper to England and iron pyrites to the United States. Trade is steadily increasing and the country is very prosperous.

The Revenue of the colony is nearly all derived from the customs and is considerably in excess of the expenditure. In 1913-14 and in 1914-15, however, the expenditures exceeded the revenues. In the first-named fiscal year the revenue was \$3,718,840 against \$4,029,070 for expenditure and in the following \$4,059,145 revenue against \$4,119,975 for expenditures. Customs receipts for 1916-17 amounted to \$4,470,537, and the total revenue was \$5,206,647; expenditures amounted to \$4,554,890. The public debt amounted in 1915 to \$32,328,415, principally incurred for railway construction and public works, and includes the municipal debt of Saint Johns.

Means of Communication.—There are steamers running along the coast north and south. There are excellent main and branch roads. With some of the northern outports and Labrador, communication in winter is maintained with difficulty by couriers. With the outside world, England, the United States and Canada there are several lines of steamers. There are in operation 828 miles of government railway line with a gauge of three feet six inches, and 47 miles of private lines. The government contracted for five branch lines in 1910 to Bonavista, Heart's Content, Grate's Grove, Trepassey, Fortune Bay and Bonne Bay, at \$15,000 per mile for construction and 4,000 acres of land per mile constructed for operation. These lines were opened by 1914 and have opened up fertile sections of land. There are 736 post offices, 4,524 miles of telegraph line and 926 miles of telephone wire.

Education.—This is conducted on purely denominational lines, each sect controlling its own educational money. Even the Salvation Army has its separate schools. In the capital and larger communities it works fairly well. The colleges and high schools are very efficient. In the smaller places this system of division is ruinous to good instruction. Its very worst effect is seen on some of the small islands where it actually destroys education. Students at colleges of the Roman Catholic Church, 492; Methodist colleges, 475; Church of England colleges, 375. The Church of England has 395 schools of all kinds, the Roman Catholic 368 and the Methodist 364, and other denominations

52. The attendance in Roman Catholic 17,560, Church of England 16,362, Methodist 15,488 and others 2,072, making a total of 51,482. The total expenditure on education in 1914, including government grants, fees, etc., was \$400,358.

Religion.—The principal denominations are Roman Catholics with 81,177 adherents, Church of England, 78,616; Methodists, 68,042, Salvation Army, 10,141; Presbyterians, 1,876 and 2,767 of other denominations.

Government.—The government is administered by a governor, assisted by an executive council not exceeding nine members, a legislative council not exceeding 24 members and an elective house of assembly consisting of 36 representatives. Members of the legislative council receive \$120 per session, members of assembly \$200 or \$300 per session, according as they are resident or not in Saint John's. The legislative council is nominated by the governor.

Population and Principal Towns.—In 1914 the population of Newfoundland was 247,710 (126,239 males and 121,471 females). The inhabitants are chiefly of Anglo-Saxon and Irish descent. Outside of the capital (32,292) there are no other large centres of population. The largest is Harbour Grace in Conception Bay, with 4,279 population; Bonavista, 3,696; Twillingate, 3,348; Carbonear, 3,703. Of the total population, 67,000 are engaged in the fisheries; 2,915 on farms; 5,376 are mechanics and 2,260 are miners. The birth rate is 30.42 and the death rate 15.66 per 1,000. In 1914 there were 11,260 immigrants and 10,825 emigrants.

History.—The early history of the Colony involves the story of the discovery of North America by John Cabot in 1497, a memorable voyage fraught with far-reaching consequences. The immediate result of the discovery was the springing up of a great transatlantic cod-fishery which first drew Britons from the narrow seas, made them a nation of sailors and laid the foundation of the British Colonial Empire. For a long time this industry was carried on secretly to avoid the exaction and tyranny of the Crown. There was not only a great fishery but a big barter trade in operation between the English and foreign sailors. By the reign of Elizabeth this business carried on by Devonshire men had grown so extensive that Raleigh declared it was the mainstay of the Western Counties then the chief maritime centre of England. The story of Newfoundland naturally divides itself into four periods. First, the early period from 1497 to 1610 when there was neither law, religion or government in the island. English and foreign fishermen were ruled in a rough way by the valiant men of Devon, traders and pirates. Second, the fishing admiral period, 1610 to 1711, a time of struggle between the settlers and the ship fishermen from England. The permanent inhabitants were very much aided by their colonial brethren from the American Colonies. Trade began with them in 1641 and so increased that by the time of the Revolution it amounted to \$4,000,000. One of the largest items in this trade was the supply of New England rum. Thousands of Devonshire men were smuggled away every year to New England and thus helped to build up the trade fisheries of the American Colonies which became so formidable as to rival England and excited the great admiration of Edmund Burke. Third, from 1711

to 1825 when the island was under naval governors and at last possessed a resident ruler and a form of settled administration. Fourth, the modern period from 1825 up to the present time. When first the Colony was discovered it was inhabited by a branch of the great Algonquin family of Indians known amongst themselves as the "Beothucks." Their principal settlement was in the interior around Red Indian Lake. They became extinct early in the last century. Misunderstandings arose between them and the white men and the feud ended in the dire disaster to the aborigines. Starvation and disease combined with the dire hostility of the Mic-Macs who early obtained the use of firearms helped to destroy this interesting race.

The modern period can only be very briefly sketched. The Colony suffered severely from the policy of the Home Government which opposed settlement and tried by every means to use the island simply as a fishing station for British fishermen. No grants of land were issued until 1813. After the country obtained a local government in 1832 and full responsible government in 1855, it went ahead fast. The most wonderful feature in its history is the marvelous recuperative power of the insular population,—under the direst calamities, invasions from the French, fires and lastly in 1892 a conflagration, which consumed half the Capital, followed in 1894 by a bank crash which financially ruined nearly every one in the island. The real advance of Newfoundland may be dated from the advent of the railway in 1881, since built right across the island, and giving regular communication with the United States and Canada. The movement was bitterly opposed by the fish merchants and others but every one now recognizes its beneficial results in building up new industries. The principal events in the modern history of the island were the settlement of the fisheries dispute with France and later with the United States. Federation with Canada has been more than once a burning political issue and even yet there are a few in favor of it.

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Revised by J. B. McDONNELL.

NEWFOUNDLAND, Bank of, in its widest sense is a submarine island 600 miles long and 200 miles broad covered by water less than 50 fathoms deep, lying off the island of Newfoundland, within a degree of the eastern

coast. They must be regarded as belonging to the primitive features of the terrestrial crust and forming part of the pedestal on which the American continent itself reposes. The confluence of the Arctic current and the Gulf stream generate here the fogs or vapors characteristic of the eastern waters of Newfoundland. During the spring, summer and autumn months when the Gulf stream prevails in this region, the mists roll up in abundance from the surface of the suddenly chilled waters and the surrounding seas become enveloped in fogs covering a space as large as France or even as half the European continent. The reports of sea-farers for the most part, familiar only with the southeastern ports and approaches of Newfoundland, tend to confuse the island itself with its banks; hence dense fogs are commonly regarded as a normal if not permanent feature of its climate. Doubtless during the prevalence of the south and southeast winds the vapors are rolled up from the banks by atmospheric currents, and at such times they are spread in thick masses over the creeks and inlets along the south coast. But as a rule they seldom penetrate far into the interior, and, according to the local saying, "The land eats the fog." The Great Bank, far more extensive than Newfoundland itself, does not present any indented contour lines like the shores of the island. The Great Bank is a curvilinear triangle with rounded outlines. If the whole submarine mass upheaved it would attach itself as a heavy peninsula to North America. A few cavities have been discovered in the sands of the bed. "Whale Hole," for instance, caused perhaps by the eddies of the conflicting currents in the western part of the Grand Bank, south of Cape Race, sinks to a depth of 400 feet. An equally deep chasm lies on the northwest. About 125 miles east another bank, called Bonnet-Flamand, rises in an oval mass above the chasms surrounding it, which sink to a depth of 500 fathoms. It is in the vicinity of these plateaus that the ocean bed drops into the deepest chasm yet revealed in the whole Atlantic. The seas break over the Newfoundland Banks although they are covered with water 40 or 50 fathoms deep. "Hence their approach is usually revealed to mariners," writes Élisée Réclus, "by the heavy chopping waters fringing their borders. But within this fringe of agitated waters the sea is generally calm, so that the Bank itself might be regarded as forming a veritable harbor of refuge but for the risk of collision with the fishing-smacks, or icebergs. The large Atlantic liners, the most dreaded in case of collision, owing to their speed and enormous size, pass regularly over the Southern 'tail' of the Bank, thereby prolonging their passage by three or four hours, but avoiding disaster. The long convoys of icebergs drifting with the polar current are a source of danger to be guarded against by the experience, skill and presence of mind of the mariners navigating these waters. The skipper has to study from a distance the aspect of the surface, the glint of the crystal masses reflected from the clouds, the dense fogs and clear skies. He must take note in the waters of the changes of temperature, of color and of animal life, and when the sea is wrapped in impenetrable mist he must be ready for every

contingency. These convoys, drifting down from the higher latitudes, pass for the most part along the eastern section of the Bank, a few straggling blocks alone attracted to the neighborhood of the Newfoundland coast. Their route is largely determined by the action of the Gulf Stream which sets in the direction from southwest to northeast.

"The hypothesis has long been advanced that the Newfoundland Banks have been formed by the débris of all kinds deposited by the melting icebergs in the region where converge the two opposing currents from Baffin Bay and the Gulf of Mexico. Careful observations have shown that in the North Atlantic the polar drift-ice contains but a very small quantity of the rocks and stony fragments and glacial clays either brought down with the glaciers from the rocky slopes of Greenland, or carried away from the bed of the lower gorges. All the blocks that get stranded on the Newfoundland coast are pure as crystal and singularly free from sedimentary matter. Hence they can have contributed little or nothing to the construction of the submarine bed stretching southeastwards from the island of Newfoundland. The fisheries grounds here are among the most productive in the world. The Banks are the chief breeding-place of the cod. Herring, salmon, trout, whales and seals are also found in great numbers. These treasures are stored by three nations: United States, England and France. See FISHERIES.

NEWFOUNDLAND, The French Shore Question in. The long-standing dispute between England and France about fishing rights in Newfoundland is generally known as "the French Shore question." Most writers begin its history with reference to the Treaty of Utrecht, (1713) when, by agreement between the two countries, certain privileges were given to the French on the west and northeast coast of Newfoundland. It really commences, however, with the defeat of the Invincible Armada. The extinction of Spain's naval power by that great victory left the two great powers face to face, and from this date begins the long duel between France and England for the command of the sea and the control of North America. The contest ended disastrously for France at the fall of Quebec and the battle of Trafalgar. Both her naval power and her great American Empire disappeared. All that now remained to her of New France were the two barren islets of Saint Pierre and Miquelon and the doubtful fishery rights in Newfoundland. It was the sentimental and national feeling involved in this dispute that made it so difficult to settle. The French claims are based on the Treaties of Utrecht (1713), Paris and Versailles, the main basis being the first of these agreements. It begins with declaring that the island of Newfoundland shall belong of right to Great Britain. Moreover, it shall not be lawful for the subjects of France to fortify any place in Newfoundland or to erect any buildings there, besides stakes made of boards and huts necessary and useful for the drying of fish, or to resort to the island beyond the time necessary for fishing and drying of fish. But it shall be allowed to the subjects of France to catch fish and to dry them on land, in that part only. The boundaries were first given between

Cape Bonavista and Point Riche on the west coast, afterward altered to the last limits between Cape John and Cape Ray. By the Treaty of Paris (1763) Saint Pierre and Miquelon were given to France. By the Treaty of Versailles (1783) the last boundaries were settled, and there was a secret declaration made by George III that the English were not to interrupt the French fishery by their competition. It was this last underhand clause, not made public in the Treaty, which has given rise to so much contention. The English government always claimed that it was a concurrent fishery. The French, and with right, argued that under this declaration their rights were exclusive—the French contention would have been unanswerable if they had been able to occupy the whole coast line, but, as a matter of fact, their business was solely confined to about a dozen stations. They encouraged English fishermen to settle near their establishments to take care of their property during their absence. As the French business on the coast declined the native settlers increased until they numbered 17,000, compared with the 300 Frenchmen. Difficulties and disputes between the rivals were constantly arising, and but for the tact and good management of the naval officers of both countries would have become acute. The highest authority on English foreign politics, Sir Charles Dilke, and Admiral Revilliere of the French navy declared it was "the most dangerous question between England and France." Carrying on this transatlantic fishery in rivalry with opponents who lived on the coast was utterly hopeless to the French. They were hampered with the burden of carrying on a business 2,000 miles from their base of supplies. Every season they had to bring out their men and gear from France, and in October to carry them all back again. No bounties could support such a hopeless undertaking. Up to the beginning of the last century the French carried on an immense business in Newfoundland as well as their Bank-fishery from Saint Pierre, but gradually the Shore fishery declined until of late years it has come down to a dozen old brigs and about 300 men from France. Although bounty was piled on bounty and millions of francs were spent by the home government in trying to keep the business alive, it went down and down. For a time after 1890, when by a "modus vivendi" the French were allowed to erect lobster factories, an added impetus was given to the industry. At that time 7,000 cases of lobsters, at \$11 and \$12 a case, were really worth more than their whole catch of cod. Eventually the lobsters became fished out. Since 1842, 20 commissions have sat upon the question, but no agreement could be arrived at. When the Anglo-French Convention of 1904, known as the Lansdowne-Cambon Convention, was eventually agreed on, the most difficult subject of all was the French shore dispute, but the great French Minister Delcassé rose to the occasion and made the nation actually believe that, although England was giving France a free hand in Morocco, territory in Africa, and valued gifts elsewhere, French fishery rights in Newfoundland still remained intact. As a matter of fact, the old treaties have been annulled. All the French fishermen have been paid more than 10 times the value of their premises, boats,

gear, etc., \$275,000, and since the agreement in 1904, and the arbitration about values, not a solitary Frenchman has ever returned to the French shore.

NEWFOUNLAND DOG, a large, handsome, long-haired, water-loving dog, originating in Newfoundland, probably from a cross between the native Indian sledge-dog and imported European dogs introduced by navigators early in the 17th century, and especially by the pointer. The breed showed extraordinary retrieving powers and was sent to Europe in so large numbers and at so high prices that it long ago became almost extinct in Newfoundland. It has, however, been maintained pure and has also increased in size by various breeding kennels both in Great Britain and the United States. The Newfoundland is massive in appearance and may attain a height of 31 inches at the shoulders; the average weight for dogs is 100 pounds and for bitches 85 pounds. The head is broad and massive with flat skull and somewhat square muzzle and the ears are small and lie close to the head. The fore legs are straight and the hind legs capable of powerful action and the tail is carried gaily but not curled over. The hair is straight and very thick and in color is black, black and white or bronze. For rescue work directed from the monastery of Saint Bernard in the Alps, the Newfoundland has superseded the famous Saint Bernard dog. For standard of points see Dog.

NEWGATE PRISON. At first marking the "New Gate" of the city of London as far back as the beginning of the 12th century, "New Gate" became Newgate prison in 1218, and throughout its career of 700 years, earned for itself a most unenviable reputation. It was rebuilt in the 15th century; the great fire of 1666 partially destroyed it, and the last edifice was erected in 1780, but suffered greatly in the Gordon Riots of that year, when 300 prisoners, felons as well as debtors, were let loose on the public. (See DICKENS' 'BARNABY RUDGE'). As late as 1850 prisoners were kept in herds like cattle, with no cleaners to attend to them. Proper sanitation or even decent ventilation was unknown in Newgate even up to the date of its demolition, and no attempt at all was made to separate the sexes until the early part of the 19th century.

Prisoners arrested by the king's warrant were the first inhabitants of Newgate. Then came Jew child-murderers and debtors. Thieves and other criminals were in due course locked up there, where they mixed with debtors, and owing to slackness of administration it became a great school of crime. Up to 1818 prisoners cooked their own meals. New "clients" were compelled to pay "garnish" or "footing" to their fellow-prisoners. If they could pay they could secure luxuries. If they were poor, they had to beg even for food. Prisoners were tortured at Newgate in the days of religious persecution. Many of them stayed for years and died there without ever having their cases heard in any court. Condemned criminals, during several reigns, were sent to Newgate, where Dick Turpin was incarcerated and others of his contemporaries. With an eye to their "edification," prisoners under sentence of death were at one time seated in the "condemned pew" around a

coffin at the chapel services. The building was gradually disused after 1877, and it was demolished in 1904 to make room for the Middlesex Sessions House. Consult Griffith's 'Chronicles of Newgate.' (1884).

NEWHALL, nū'hāl, Charles Stedman, American author: b. Boston, Mass., 4 Oct. 1842. He was graduated at Amherst in 1869 and at Union Theological Seminary in 1872. He held the pastorate of various churches and for a time served as teacher and college professor. In 1897 he was appointed United States assistant special forest agent and a little later superintendent of the United States Forest Reserves of central and northern California. He continued in the United States Forestry Service until 1905. He has written 'History of Fall River' (1862); 'Ruthie's Story' (1888); 'Vines of Northeastern America' (1897); 'Fire and the U. S. Reserves' (1902); 'Joe and the Howards' (1869); 'Harry's Trip to the Orient' (1885); 'Trees of Northeastern America' (1890); 'Shrubs of Northeastern America' (1893); 'Sheep and the U. S. Reserves' (1901); 'Lumbering and the U. S. Reserves' (1905), etc.

NEWHAVEN, England, town in Sussex, 56 miles south of London and eight miles east of Brighton. It was the ancient port of the Ouse and is now the well-known place of embarkation for Dieppe, between which place and Newhaven large and fast steamers ply daily in connection with the *Chemin de fer de l'Ouest*. The tidal harbor is enclosed by two piers and a breakwater, and Newhaven is one of the finest roadsteads on the English coast. The area is about 30 acres. The port is protected by fortifications. The shipping was of great importance in the 18th century; then it declined, and of late years it revived again. The harbor was first granted in 1713. Saint Michael's is a beautiful Norman church of the 12th century with a square Norman embattled tower and small semi-circular apse, curiously like that of Yainville-sur-Seine. At Bishopstone, one mile distant, is an interesting church with a Saxon porch and dial. Newhaven has a large coasting trade of coal and provisions, and France sends here wine, spirits, silk, fruit and vegetables. Considerable ship-building is also carried on. In the Bridge Hotel, Louis Philippe, a refugee from France, stayed in 1848 under the name of "Mr. Smith." Pop. 6,665.

NEWLANDS, Francis Griffith, American senator and legislator: b. Natchez, Miss., 28 Aug. 1848; d. Washington, D. C., 24 Dec. 1917. He studied at Yale, in the Columbian Law School (now George Washington University) in Washington, D. C., and was admitted to the bar in the District of Columbia in 1870. He practised law in San Francisco until 1886, when he became a trustee of the estate of his father-in-law, William Sharon, once United States senator from Nevada. In 1889 he removed to Nevada, settling in Reno. Here he became an ardent advocate of free silver coinage. He also took a vital interest in irrigation development and other matters of western interest. He was elected to the House of Representatives as a Democrat in 1893 and continued by re-election until 1903, when he became United States senator succeeding J. P. Jones. In 1909 and in 1914 he was re-elected. He framed the

Newlands Reclamation Act (1902); was member of the committees of ways and means, foreign affairs, etc.; was chairman on interstate commerce, prominent in rate legislation, internal improvement measures, regulation of industrial combinations and tariff bills. Yale gave him the degree of M.A. in 1901. For years Senator Newlands' chief interest had been in America's railway transportation lines and in the development of national waterways, both for transportation and for greater fertility of land. He was regarded as the pre-eminent expert on these matters. As author of Newlands Act, which provided a plan of land improvement in the arid West by development of waterways, he gained celebrity. For a long time he pressed legislation for the expenditure of many millions of dollars for waterways and irrigation improvement. In his railroad legislative work Senator Newlands enjoyed the closest confidence of President Wilson and was regarded as the administrative spokesman on such matters in the Senate. He was an earnest Democrat, but he regarded himself wholly as a public servant, and was one of the staunchest supporters of President Wilson in the Senate. On 24 Dec. 1917 he went to the Capitol to take up work in connection with an investigation by the Senate Interstate Commerce Committee, of which he was chairman, and was stricken in his office, dying shortly afterward.

NEWLANDS ACT. See **ARBITRATION, INTERNATIONAL.**

NEWMAN, Albert Henry, American Baptist clergyman and educator: b. Edgefield County, S. C., 25 Aug. 1852. He was graduated at Mercer University, Georgia, in 1871, and from the Rochester Theological Seminary in 1875. He became a college professor, and in 1881-1901 filled the chair of church history at McMaster University, Toronto, Ont., and 1901-07 held a professorship at Baylor University, Waco, Tex. From 1907 to 1913 he was professor of church history and dean of the faculty of the Southwestern Baptist Theological Seminary. He was professorial lecturer in the University of Chicago, 1905-12. Since 1913 he has been professor of church history in Baylor University. He was a contributor to the third edition of the 'Hauck-Herzog Realencyklopädie für Protestantische Theologie und Kirche' and to 'Der Protestantismus am ende des 19 Jahrhunderts,' to Hastings 'Dictionary of Christ and the Gospels' and 'Dictionary of Religion and Ethics,' etc. He has written 'The Baptist Churches in the United States' (1894); 'A Century of Baptist Achievement' (1901); 'Manual of Church History' (1900-03). He also translated and edited Immers' 'Hermeneutics of the New Testament' (1877). He was department editor for church history of 'The New Schaff-Herzog Encyclopedia of Religious Knowledge,' etc.

NEWMAN, Allen George, American sculptor: b. New York, 28 Aug. 1875. After receiving his education in the City College of New York and at the National Academy of Design in the same city, he devoted himself to sculpture. Among his numerous works are 'Night and Day' for the Harriman Bank, New York; 'Henry Hudson Monument,' erected by Colonial Dames of America at 72d street and Riverside Drive, New York; 'Joel Chandler

Harris Monument,' Atlanta, Ga.; 'Monument to the Women of the South,' Jacksonville, Fla.; 'General Philip Sheridan Monument,' Scranton, Pa.; 'General Oates, ex-Governor of Alabama,' Montgomery, Ala., and 'General Stirling Price,' Keytesville, Mo. He also made a bronze group, 'The Triumph of Peace,' Atlanta, Ga., and 'The Hiker,' a Spanish-American War soldier, Providence, R. I. Mr. Newman is a member of the National Sculpture Society, the Architectural League, the Union Internationale des Beaux Arts et des Lettres, and many other societies and clubs.

NEWMAN, Francis, English colonial governor in America: b. England, about 1600; d. New Haven, Conn., 18 Nov. 1660. He emigrated to New Hampshire in 1638, settled later in New Haven; was one of the committee which waited upon Peter Stuyvesant in 1653 to demand compensation for injuries received at the hands of the Dutch, and in 1654 became a commissioner for the united colonies. In 1658 he became governor of the New Haven colony, which office he held until his death.

NEWMAN, Francis William, English scholar: b. London, 27 June 1805; d. Weston-super-Mare, Somerset, 4 Oct. 1897. He was graduated at Worcester College, Oxford, in 1826; was Fellow of Balliol in 1826-30. Unable to subscribe to the 39 articles he withdrew and went to Bagdad as a missionary; became professor of classical literature in Manchester New College, York, in 1840; was professor of Latin at University College, London, 1846-69, and was made principal of University Hall, London, in 1848. A brother of Cardinal Newman (q.v.), the thought and faith of the two wholly diverged, the former accepting and the latter rejecting the entire historic basis of Christianity while retaining deistic belief. Francis made important contributions to the religious thought of his time. His 'Phases of Faith' (1850), an autobiographical narrative of his religious changes, excited much controversy and was undoubtedly his best-known writing; but 'The Soul: Its Sorrows and Aspirations' (1849), a singularly penetrating analysis of man's relations with God, shows him at his best. In 1876 he joined the British and Foreign Unitarian Association, of which he became vice-president in 1879. His further writings show the remarkable versatility of this liberal-minded but crotchety man, and treat of education, politics, religion and social questions. An interesting experiment was his 'Hiawatha Translated into Latin' (1862). Consult his 'Memoir and Letters,' edited by Sieveking (1909).

NEWMAN, John Henry, English author, theologian, preacher and cardinal in the Roman Catholic Church: b. London, England, 21 Feb. 1801; d. Edgbaston Oratory, Birmingham, England, 11 Aug. 1890. Newman was the eldest of six children of John Newman, a London banker, from whose family Newman inherited the taste for music which distinguished him. The family was of Dutch origin and had come to England in the latter part of the 17th century. Newman's mother, Jemima Fourdrinier, was of French Huguenot origin. From her he received a religious training of Calvinistic tendency, and was early brought up with a thorough knowledge of the Bible, which it is

said he almost knew by heart. Newman, who was a precocious boy and wrote much verse and prose, describes himself in the 'Apologia' as an imaginative and superstitious child. From the writers who most influenced him in his youth—particularly Law and Thomas Scott—he obtained two important beliefs that clung to him through life, the idea of eternal punishment and a belief in the necessity of dogma. When about 16 he became convinced that it was the will of God that he lead a single life.

Newman entered Trinity College, Oxford, in his 16th year, took his degree in 1820, and was elected a Fellow of Oriel in 1822. Here he came under several distinct influences, which had a good deal of effect on his career. From Bishop Butler's 'Analogy,' which he read about this time, he gleaned the principles, which ever after characterized his work and on which he wrote much, that revealed religion as manifested in outward institutions is the symbol of the natural religion underlying—an idea that was in accord with his boyish dreams—and that "probability is the guide of life." The strong personal influences were Dr. Hawkins, Provost of Oriel, to whose teachings Newman says he owed the habit of caution in statement and the weighing of words, and, among other doctrines, that of the value of tradition; Dr. Whately, who for a time somewhat arrested Newman's spiritual growth and developed his reasoning power; and his intimate friends, John Keble and Hurrell Froude, spiritual enthusiasts and haters of liberalism. His studies for 'The Arians of the Fourth Century' (pub. 1833) which he began at Oriel, tended to confirm his belief that "antiquity was the true exponent of the doctrines of Christianity and the basis of the Church of England," and stimulated his innate belief in the existence of spirits, good and evil, which he regarded as the causes of physical phenomena. These studies also undoubtedly laid the foundation for the course of reasoning which subsequently led him into the Church of Rome. Meanwhile, his progress in his profession had been rapid. In 1824 he took orders and was ordained curate of Saint Clement's Church, Oxford. The following year he became vice-principal of Saint Alban's Hall under Dr. Whately, a position which he gave up in 1826 to become tutor at Oriel. In 1828 he was appointed vicar of Saint Mary's, his only permanent position while a member of the Anglican Church; for in 1829 he broke with Whately because of his dislike for the tendency of the latter toward liberalism, and a year or two later retired from his tutorship at Oriel, for the reason that Dr. Hawkins, who then came into power, looked upon him and his friends, Keble and Froude, as too extreme in their views regarding the need of conformity to a more rigid order of things.

Throughout this period Newman was gradually becoming alive to the conviction that he had a special mission to perform, and further stimulus was added by the French Revolution of 1830 and the struggle in England which culminated in the Reform Bill of 1832. These tendencies toward liberalism he viewed with growing distrust. Not, however, till the close of his voyage with Froude to the south of Europe in the winter and spring of 1832-33 (during which he wrote many poems, including 'Lead Kindly Light') did the conviction be-

come urgent. Taken so very ill in Sicily on his return voyage that his servant despaired of his life, he was nevertheless convinced that he should not die; he kept saying to himself "We have work to do in England." Hurrying thither as soon as his health permitted, he and his friends at once began the Oxford Movement (q.v.).

The object of this movement was in general the upholding of the ideal of primitive Christianity against the assaults of liberalism. It was pursued with great earnestness by Newman and his friends, Froude, Keble, Pusey, Rose and others, and the means were the 'Tracts for the Times,' of which Newman was chief editor and author. He speaks of himself as occupying a modest position, but he was in reality the head of the movement. He himself held confidently to three principles which he endeavored to inculcate: the necessity of dogma in combatting liberalism; the existence of a visible church, "with sacraments and rites which are the channels of invisible grace"; and the belief that the Roman Catholic Church and the Pope were evil and anti-Christian. The first two of these beliefs he retained till the end of his life; it was in regard to the last that his views were completely altered and upon that belief his subsequent history turned. For Newman the Tractarian movement had two phases: up to 1839 he wrote in the spirit of full conviction and confidence; from then till the publication of the famous Tract 90 in 1841 there was a growing consciousness of the unsoundness of the arguments that he had been using against Catholicism. The chief task in the first period was the definition of the so-called "*Via Media*" in which the Tractarians endeavored to establish the true position of the church between Romanism and Liberalism—to construct, in Newman's words, "a possible road between a mountain and a morass, to be driven through formidable obstacles, if it is to exist, by the boldness and skill of the engineers." The principal book in which the doctrine is expounded is 'The Prophetical Office of the Church Viewed Relatively to Romanism and to Popular Protestantism' (1837). By 1839 the soundness of his position seemed to be established; but his studies had, unconsciously to himself, laid the train for the overthrow of what he had been advocating, and these doubts took shape during the next two years. The argument from Antiquity with which he had supported the *Via Media* turned out to be an equally good argument for the Catholic Church. He also made the discovery that in church history there had been *via medias* before; the various early sects of heretics had in his new view occupied much the same position as the Anglican Church. He was impressed by the fact that the early fathers whom he invoked in support of his effort at true compromise would inevitably, if alive, have sided with Rome, and his imagination—always a strong influence in his reasoning—was haunted by the words "*Securus judicat orbis terrarum*," which seemed to make nugatory all schism. The result was that he grew far less hostile to the Catholic Church, and with Tract 90 the movement against it came to an end. The main point of that tract was that the Thirty-nine Articles of the Anglican Church had originally been framed, for political rather than religious

purposes: they were designed to allow good Catholics to become members of the Anglican Church with mere loss of their allegiance to the Pope. If that was the case, then the Anglican had no better doctrinal support than the Roman Church.

From that time Newman regarded himself as practically dead to Anglicanism. In the storm of indignation which the tract evoked he did not, however, immediately retreat. Preferring to think the matter over carefully, he kept his living at Saint Mary's till 1843, and in that same year retracted the many hard things he had said about Rome. Two years later, in October, he entered the Roman Catholic Church, and early in 1846 left Oxford for good. After over a year in Rome (1846-47), he founded the Oratory of Saint Philip Neri, at Edgbaston, Birmingham, where, with the exception of four years (1854-58) spent in Dublin as rector of a new Catholic University, he remained until his death.

Though condemned as an apostate by common Anglican consent, and though living a very secluded life, Newman almost at once benefited by the change. Not only did he feel the peace of security, but his literary genius is said to have ripened wonderfully. Heretofore he had written somewhat tentatively, as one groping; now he expressed himself with sureness and an unwonted command of expression. His writings during the first 18 years after his conversion, nearly all in support of Catholicism, include such various types as his 'Discourses Addressed to Mixed Congregations' (1849); 'Lectures on Anglican Difficulties' (1850), and 'Lectures on Catholicism in England' (1851); various of the essays collected in 'Historical Studies'; two novels, 'Loss and Gain' (1848) and 'Callista' (1855); and what is in many respects his masterpiece of treatment, 'The Idea of a University,' a series of discourses which he delivered at Dublin in 1852 on the founding of the Roman Catholic University.

In 1864 occurred the controversy with Kingsley, which marks an epoch in Newman's life and in the position of the Catholics in England. Kingsley had said that the Roman clergy had little regard for truth, and had cited Newman as an advocate of cunning. Newman naturally asked for his evidence. Kingsley, in *Macmillan's Magazine*, where his first article had appeared, replied that he had mistaken Newman's tone, and apologized. Newman, reasonably dissatisfied with Kingsley's failure to produce the specific evidence, published the whole correspondence. Kingsley thereupon replied in a vigorous pamphlet entitled "What, then, Does Dr. Newman Mean?" in which he charged Newman with equivocation and cited all the instances he could find in Newman's life and works to prove his point. The merits of the controversy are as yet unsettled, though now of only historical interest; views would probably still range from extreme support of Newman to such words as those of Huxley, "That man is the slipperiest sophist I have ever met with. Kingsley was entirely right about him." ('Letters,' II, p. 240.) The effect of the controversy was the publication by Newman of the 'Apologia pro Vita Sua.' This, which appeared serially between 21 April and 2 June, gave the key to Newman's life as an internal state

The effect of the 'Apologia' was to temper in a great measure the feeling between the Catholics and the Anglicans, and it gave Newman the honorable position of peacemaker. From that time on he occupied a high place in England and received many dignities. In 1877 he was elected honorary fellow of Trinity College, Oxford, and two years later was created cardinal by Pope Leo XIII. Two works are to be especially noted, 'An Essay in Aid of a Grammar of Assent' (1870), in which Newman attempted to expound systematically the logic of belief aside from exact proof, and 'The Dream of Gerontius,' written shortly after the 'Apologia,' in which he delineated in poetical form the yearning of a soul toward certitude and truth.

These three books indicate where the place and power of Newman lie. His position is probably to be determined not by his intellectual contributions but by his personality which is of a high, noble and persuasive type, and which is expressed in a style of unsurpassed skill and delicacy. As a contributor of ideas and new truth, he is not so important. As a theologian, his life-long beliefs and teaching—that the world is controlled by the powers of darkness, that God is the only holy thing, that the Church is the only true revealer of God—in no wise differ from good Catholic opinion. The great argument on which he ultimately based all his claims, that of probability, that we act not from certainty but from states of certitude, that personality which can induce states of certitude is a better guide than strict reason—the basis of this he got from Bishop Butler, nor did he take into consideration the fact that his argument would allow anybody to believe anything at all, provided he could summon enough certitude in support of it. Doubtless the mass do use just such sanctions, and Newman has certainly, both in life and in work, put the argument as well as it has ever been put, but the method is wholly opposed to scientific proof, and it is easy therefore to see the reason for the view of such men as Huxley. The truth of the matter probably is that Newman, with all his training in logic, really had little regard for strict evidence; his course during the Oxford movement shows that he argued from predispositions and predilections, and his conversion was in part at least the result of evidence supplied solely by his imagination. But as a gracious and winning personality his place is of the highest, as is his power of expression. See *APOLOGIA PRO VITA SUA*; *DREAM OF GERONTIUS*; *IDEA OF A UNIVERSITY*.

Bibliography.—The chief sources of information are, among Newman's many works, the 'Apologia,' and 'The Letters and Correspondence of J. H. Newman,' edited by his sister, Mrs. Anne Mozley. The best 'Life' is that by Wilfred Ward (1912), and it is based on his private journals and correspondence. Lives and studies are those of H. J. Jennings ('Cardinal Newman, The Story of His Life'); R. H. Hutton ('Cardinal Newman'); William Barry (in 'Literary Lives'). Materials for a complete study are scattered in various books as Church's 'The Oxford Movement,' Mark Pattison's 'Memoirs,' Abbott's 'Philomythus' and 'The Anglican Career of John Henry

Newman,) and a score of others (consult a long list in the 'Dictionary of National Biography.') The more recent works, Brémond's 'The Mystery of Newman'; Sarolea's 'Cardinal Newman and his Influence on Religious Life and Thought,' and Thoreau-Dangin's 'English Catholic Revival,' may be recommended. The 'Index' to Newman's works, by Joseph Rickaby (1914), is valuable not only as an index, but for the illustrations it affords of his intellectual and spiritual development. There is an excellent short study of the conversion and the theology of Newman by R. M. Lovett (*Harvard Monthly*, Dec. 1892, Jan. 1893).

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NEWMAN, John Philip, American Methodist bishop: b. New York, 1 Sept. 1826; d. Saratoga, N. Y., 5 July 1899. He studied for the ministry and in 1849 was ordained. After filling various charges he preached in New Orleans in 1864-69; held three times (1869-72, 1876-78, 1885-87) the pastorate of the Metropolitan Methodist Church in Washington, D. C., and was chaplain of the Senate for three sessions. He was appointed by President Grant inspector of United States consulates in Asia in 1873, in 1879 was called to the Central Church, New York, and from 1882-84 was pastor of Madison Avenue Congregational Church. In 1888 he was elected bishop. He delivered the funeral oration on General Grant. His eloquence was of a highly ornate kind. He wrote 'From Dan to Beersheba' (1864); 'The Thrones and Palaces of Babylon and Nineveh from the Persian Gulf to the Mediterranean' (1876); 'Christianity Triumphant' (1884); 'Evenings with the Prophets on the Lost Empires' (1887); 'The Supremacy of the Law' (1890); 'Conversations with Christ' (1901).

NEW MARKET, Canada, town in York County, Ontario, 34 miles north of Toronto on the Holland River, the Grand Trunk Railroad and the Trent Canal extension. It is connected to Toronto by an electric railroad. Places of interest are the Park, the Fairy Lake and 'David's Temple' in the suburb of Sharon. The Friends' College is situated here. Newmarket is an enterprising manufacturing town and produces flour, lumber, office fittings, leather, clothing and wooden-ware. Pop. 2,996.

NEW MARKET, England, a market town in Cambridgeshire, 14 miles northeast of Cambridge on the Bury branch of the Great Eastern Railway. A part of the town is in Suffolk. Newmarket, called the "Metropolis of the Turf," has been celebrated for its horse-races from the time of James I when there was hawking also. Charles I instituted the first cup race, and a fine palace was built on the site of the lodge of James I for the use of Charles II when he came to the races. The market-house and the celebrated Jockey Club are the chief buildings. The town is full of residences belonging to patrons of the turf and racing and training stables. The racecourse lies southwest of the town over Newmarket Heath. It has a full extent of four miles, but is divided into various lengths to suit the different races. The course is intersected by the great earthwork called the Devil's Ditch (also Saint Edmund's Dyke). It is five miles long—the largest of the four im-

portant dykes or entrenchments which marked, at different periods, the boundary lines between the kingdoms of East Anglia and Mercia. Eight race-meetings are held every year, the best known of which are the "Thousand Guineas" (April) and the "Cesarewitch" (October). On the outskirts of the town, toward Bury, is the Fairstead, or exercising ground, where the trial gallops of young horses take place daily. Near this is the well-known Warren Hill. In the neighborhood of Newmarket, Roman ruins have been found. Of its two churches, Saint Mary's, perpendicular style, is the most interesting. It is in Suffolk. Pop. about 10,482. Consult Hore, J. P., 'History of Newmarket and Annals of the Turf' (2 vols., London 1886).

NEWNAN, nū'nān, Ga., city, county-seat of Coweta County, on the Central of Georgia and the Atlanta and West Point railroads, about 38 miles south by west of Atlanta. It is in a productive agricultural region in which cotton and fruits are extensively cultivated. The principal industrial establishments are cotton mills, grain elevators, cottonseed-oil mills, machine shops, flour mill, tannery, fertilizer works, a large plant for manufacturing boilers, engines, presses and mill machinery, fertilizer works and an ice factory. There is a fine courthouse and a Carnegie library. The city owns the waterworks and electric plants. Pop. 7,037.

NEWNES, nūnz, SIR **George**, English journalist: b. Matlock, 13 March 1851; d. Lynton, Devonshire, 9 June 1910. He was educated in London and entered journalism. He was the founder of *Tit-Bits*, a very successful weekly, the nature of which is indicated by its title; and he also founded the *Strand Magazine* and was proprietor of the *Westminster Gazette*. He was member of Parliament (Liberal) for the Newmarket division of Cambridgeshire, 1885-95, was created a baronet in 1895 and returned to Parliament from Swansea 1900-10. He applied much of his wealth to public purposes.

NEWNHAM (nūn'am) **COLLEGE**, England, an institution for the higher education of women at Cambridge, founded in 1871 and incorporated in 1880. Ordinarily no students are admitted under 18 years of age; the course of study corresponds with that of Cambridge University. There are a number of exhibitions and scholarships connected with the college, which is conducted on the same lines as Girton (q.v.). The faculty numbers about 26 and there is an average attendance of over 200 students.

NEWPORE, Fort, a former Revolutionary fortification on Ward Creek, near Oneida Lake, N. Y.

NEWPORT, nū'pōrt, **Christopher**, English sea captain: b. about 1565; d. 1618. In 1592 he commanded a ship in the West Indian expedition; sailed to Virginia in 1606, 1607, 1609 and 1611, was wrecked on the Bermudas in the third of those voyages, but made his way to Virginia after many adventures recounted by Jourdain in the 'Discovery of the Bermudas,' which Shakespeare may have used in writing the 'Tempest.' In 1612 he entered the employ of the East India Company, for whom he made several very successful voyages.

NEWPORT, **George**, English naturalist: b. Canterbury, 4 July 1803; d. London, 7 April

1854. He was educated at the London University and became a surgeon, but devoted much time to entomology, in which science he made valuable discoveries. He wrote 'Observations on the Anatomy, Habits, and Economy of *Athalia Centifolia*' (1838); 'Catalogue of the Myriapoda in the British Museum' (1856), etc.

NEWPORT, Ark., city and county-seat of Jackson County, 85 miles northeast of Little Rock, on the Chicago, Rock Island and Pacific, the Saint Louis, Iron Mountain and Southern, and on the White River railroads. It is situated in a cotton-growing district and its industries are connected mostly with this crop, consisting of cotton and oil mills, lumber mills, iron foundry and stave and handle works. Pop. (1920) 3,771.

NEWPORT, England, a town of Monmouthshire, on the Usk, 134 miles by rail west of London. It is one of the great trading ports communicating with the Bristol Channel. As one of the principal outlets for the produce of extensive collieries and iron and steel works in the vicinity, it has extensive dock accommodation covering over 126 acres, railway and ship-building plant, and a transporter bridge across the river. Its public buildings are all of modern erection and include town hall, market hall, county offices, public baths, museum, art gallery and technical institute. Its most ancient buildings are the remains of a 12th century castle and the church of Saint Woollos, a large edifice partly of Norman date. Pop. 83,691.

NEWPORT, Ky., city in Campbell County, at the confluence of the Ohio and Licking rivers and on the Louisville and Nashville and the Chesapeake and Ohio railroads. Cincinnati, on the Ohio, and Covington, on the Licking, are opposite Newport. The city was settled in 1791, in 1795 was incorporated and in 1850 was granted a city charter. It is a popular residential city for Cincinnati business men. It is in an agricultural region and farm products are among its most important shipments. The chief manufacturing establishments are sheet-iron works, carriage works, watch-case factory, steel plant, fly-screen works, lithographing plant and air-crome decorating works. It has large coal and brick yards and considerable river trade. Fort Thomas, a government military post, is on an elevation near the city. Some of the prominent buildings are the city hall, courthouse, post office, the banks, a Masonic temple, the churches and schools and the library. It is the seat of Mount Saint Martin's and Immaculate academies and it has good public and parish schools and a public library. The city now has commission government. It was formerly under the charter of 1894, which provided for a mayor who held office for four years and a council. The mayor appointed the police and firemen and the members of the water commission, and, subject to the approval of the aldermen, the superintendent of public works and the city auditor. The council elected the bridge commissioners. The board of education is elected by the people and the members hold office two years. The waterworks is owned and operated by the municipality. Pop. 29,317.

NEWPORT, N. H., town, county-seat of Sullivan County, on the Sugar River and on the Boston and Maine Railroad, about 35 miles

in direct line northwest of Concord and 45 miles northwest of Manchester. Its scenery and climate make it a favorite summer resort. It is in an agricultural and grazing region and the good water power contributes to its industrial prosperity. Its chief manufactures are woolen goods, agricultural implements, shoes, lumber and lumber products, clothing and dairy products. The Richards Library and Museum, the Carrie F. Wright Memorial Hospital and a high-class modern hotel are notable buildings. It is within six miles of Lake Sunapee, one of the most beautiful lakes in the world, and within three miles of the famous Corbin's Blue Mountains Forest Park. "Good roads" is one of the town's slogans and its streets and sidewalks are among the best for a town of its size in the State. The city owns and operates the waterworks. Pop. 4,400. Consult Wheeler, 'The History of Newport, N. H.' (Concord 1879).

NEWPORT, R. I., city, port of entry, county-seat of Newport County, in Rhode Island, on Narragansett Bay, and on the New York, New Haven and Hartford Railroad, about 30 miles south of Providence. It has daily steamer communications with Providence, New York, Fall River and other ports. It is a famous summer resort and in the season its facilities for transportation are much increased. Its beautiful scenery, equable climate, ease of access by land and water from New York, Boston and other large cities, make it a favorite watering place. Its occupancy by people of great wealth, who have built summer residences costing millions of dollars, has made it fashionable and exclusive. In 1639 Newport was settled by Roger Williams and later Anne Hutchinson and other refugees, who for religious convictions had been expelled from Massachusetts by the Puritans, came to Newport. At first Newport was independent in government, but in 1644 Roger Williams obtained a patent from the British Parliament under which all the colonies in what is now the State of Rhode Island were united under the name of "The Incorporation of Providence Plantations in the Narragansett Bay in New England." The charter gave much dissatisfaction and in 1663 was changed to a charter that continued in force until 1843. (See DORR'S REBELLION). A public school was established in Newport in 1840. From the beginning the place was a trading port of importance; its commerce was greater than that of New York in 1769-70. One of the first acts of resistance against Great Britain took place at Newport when the British sloop *Liberty* was destroyed here, while engaged in enforcing obnoxious smuggling laws. The British took possession of Newport 6 Dec. 1776 and held it for two years. The shipping of the place and the general trade were nearly destroyed during the Revolution. The British soldiers burned in all about 475 houses. In 1780 Rochambeau and his troops from France made Newport their headquarters. In 1784, the year after the Revolutionary War had closed, Newport was incorporated; but in 1786 it surrendered its charter and was not reincorporated for 77 years.

It is claimed by some historians that Newport and other parts of the United States were discovered by Northmen as early as the 11th

century. The "Old Stone Mill" in Touro Park is pointed out as a relic of the days of the Northmen; but it is now generally believed that this mill was built in the 17th century. Newport was one of the capitals of the State until 1900. Bishop Berkeley lived in Newport from 1729 to 1732 and here wrote his ode on Western progress and part of his 'Alciphron.' William Ellery Channing and Commodore M. C. Perry were born in Newport. Some of the historic places are the State House built in 1742; the city hall built in 1763; Redwood Library, 1748; Trinity Church (P. E.), 1725; the headquarters of the British army (Sayer House), in 1780. One of the oldest newspapers in the United States still in existence is the *Newport Mercury*, established by James Franklin in 1758. The oldest part of the city is around the harbor; the modern part, with its magnificent mansions, surrounded by well-kept lawns, is toward the ocean. Overlooking and guarding the harbor are Fort Greble and Fort Adam. Some of the attractions other than those mentioned are the long beaches, the bathing places, the "Hanging Rocks," the 12-mile Ocean Drive, Purgatory (a rocky fissure 50 feet in depth), the Cliff Walk and the Spouting Rock (when the water is disturbed by a storm it is forced through an opening in this rock). It has a United States torpedo station on Goat Island and a United States Naval Training Station and War College on Coaster Harbor, also a naval hospital (1897). The city has many parks, fountains and monuments which are works of art. It is the seat of Saint George's and Cloyne House schools and Saint Mary's Academy. A valuable collection of relics are in the Newport Historical Society building; there are several libraries, the People's, Redwood and others.

It still has a large fish trade, but the city is now known for its society life and its industries and commerce are of little value. Pop. 30,472. Consult Arnold, S. G., 'History of the State of Rhode Island' (2 vols., New York 1860); 'Rhode Island Colonial Records'; Brooks, 'The Controversy Touching the Stone Mill'; Greene, 'The Providence Plantation'; 'Newport in the Revolution,' an article in the *New England Magazine*; Mason, G. W., 'Reminiscences of Newport' (Newport 1884); Stone, E. M., 'Our French Allies' (Providence 1884).

NEWPORT, Vt., village, county-seat of Orleans County, on Lake Memphremagog, and on the Boston and Maine and the Canadian Pacific railroads, about 50 miles in direct line north by east of Montpelier. In the summer season it has regular steamer communication with all the villages and towns on the lake. It is a favorite summer resort on account of its climate, the scenery in the vicinity and the opportunities for fishing. Its trade is chiefly in farm products; its manufactures are lumber veneer of all kinds, large overall factory and creamery. It has fine church and school buildings and the Goodrich Memorial Library which contains 9,000 volumes. Pop. 4,976.

NEWPORT NEWS, Va., city and port of entry in Warwick County, on the James River and Hampton Roads, and at the terminus of the Chesapeake and Ohio Railroad, situated 70 miles southeast of Richmond and 14 miles north of Norfolk. The city lies in the centre of a

rich vegetable and fruit country. It is connected with Hampton and Old Point Comfort by electric railways. In the heart of the city facing the James River is Casino Park, which has become a popular resort. With several foreign and coast lines of steamships sailing hence, and with a fine harbor and excellent shipping facilities, Newport News has very recently become an important port and the centre of large commercial interests. The foreign trade in 1916 amounted to about \$79,000,000; the exports amounting to about 90 per cent of the above. The foreign commerce of the port is largely carried on by the Chesapeake and Ohio Railroad and the United States Shipping Company, making direct connection with England and the Continent. The city has become fourth in the United States in the shipment of grain. Here is an extensive shipbuilding plant, one of the largest in the world, giving employment to over 10,000 workmen; three dry-docks, 600, 700 and 900 feet long; two grain elevators with a capacity of 2,850,000 bushels; wood-working mills, ice factories, lumber mills, iron works, shoe factory, coal wharves, shirt factory and brewery. Newport News is governed, under its original charter of 1896, by a mayor, elected every four years, common council, consisting of 16 members, and a board of eight aldermen. The city has an improved system of waterworks and electric light and gas plants. Newport News is a young town practically lacking in history. It was first laid out in 1882 and incorporated in 1896. Its growth has been very rapid; the population in 1890 was 4,449; in 1917 it was 23,674; in 1920 it was 35,596.

NEWRY, nū'ri, Ireland, seaport and parliamentary borough in County Down and Armagh, on the Newry River, 38 miles southwest of Belfast and 73 miles north of Dublin by the Great Northern Railway. It is also on the Newry Canal at the head of Carlingford Lough and is connected also by canal with Lough Neagh. The place dates from 1131. In 1175 an abbey was founded here by Maurice McLoughlin, king of Ireland, and in 1543 this abbey was converted into a collegiate church for secular priests. It was dissolved by Edward VI, who granted it to Sir Nicholas Bagenal, marshal of Ireland. Bagenal made it his residence and laid the foundations of the town's prosperity. The castle, erected by De Courcey, was taken by Edward Bruce in 1318. In 1689 Newry was set on fire by the Duke of Berwick retreating before Schomberg. James I and James II granted charters to the town. Newry is handsomely built and the situation is striking as it lies in a narrow valley surrounded by mountains. The western part, called Ballybot, is connected with the older town by four bridges over the canal and four over the tidal water. Newry is one of the most important ports of the province of Ulster. It admits vessels of 2,000 tons to Victoria Docks, three miles from town. Vessels drawing 15 feet can ascend the canal to the Albert Basin. In connection with several sub-ports further down the Newry River it is the outlet for a large trade, particularly with Liverpool and Glasgow, in cattle and agricultural produce. Flax-spinning, weaving, tanning and granite polishing are the chief industries. The town possesses rope and sailworks, breweries, distilleries, tanneries and

flour-mills. Fine granite is quarried in the neighborhood. Pop. 12,587.

NEWS-LETTER, a popular name applied to the printed sheets or letters issued weekly in the early part of the 17th century, the news for which was collected in the coffee-houses. Originally they were literally letters of news written by professional newswriters and sent by them to their employers weekly. Many early printed newspapers took News-Letter as a title, as the *Boston Newsletter*, etc.

NEWSPAPER, a publication devoted primarily to daily sheets publishing the news as to current events. The term is also construed to cover semi-weekly and some weekly papers of the same class. Along with the news, newspapers customarily print comment, criticism or discussion of such events by editors and contributors. As such, the newspaper has become one of the most powerful factors in modern existence. Not only does it serve as a distributor of every form of knowledge, but it also guides the opinion of great masses of people, and more important still, it becomes the voice of the people; so that the demands of a newspaper with a large clientele are listened to attentively by all public officials from the highest to the lowest.

As a rule, newspapers are conducted for the money to be obtained by their publication. In a few cases they are operated by their owners as organs of their individual expression, or in the special interest of some political movement.

The cost of making a newspaper is prodigious. There are heavy charges for cable and telegraph news; a large staff of local newsgatherers must be maintained; special correspondents at points of great activity must be provided; the office forces must necessarily be of high-grade minds — not to mention the intricate and expensive machinery required to actually produce the printed sheet in the briefest possible period. The great weakness of the newspaper is its dependence upon its advertising patronage for its livelihood, the price at which it is sold to readers being scarcely more than the cost of distribution. Under these conditions it is not likely that the newspaper will print material which would tend to injure the business of the advertisers which support it, so that to some degree at least the advertising may be said to control the policy of the paper.

The larger daily morning papers usually publish two editions; the first for suburban distribution, the second for city circulation. The larger evening dailies print several editions, the first about noon, or even before, and three or four later editions, the last leaving the press about six o'clock. Later news of great importance or interest is handled in an "Extra." The principal dailies issue a Sunday edition made up of six or eight classified sections — News, Editorial, Dramatic, Sports, Household, Special Articles, etc.

Much of the general news, foreign and domestic, is gathered and transmitted to the individual papers by press associations. This service is distributed to a large number of subscribing members of the association, and the cost of gathering it is thus minimized. In addition to this association service, most of the larger papers have their own correspondents

at centres of important news and receive daily a very considerable special service by telegraph.

Making the Newspaper.— In the making of a newspaper the fundamental work is literary. The control of the character of the material prepared is vested in the editor-in-chief, who is in some cases also the principal owner. Upon him is laid the responsibility for the heads of the departments who are immediately in charge of the production of the literary material of the paper. The editorial writers are directly under the editor-in-chief and do their work in accordance with his suggestions or instructions. The managing editor is an executive. He directs the make-up of the paper, deciding what shall go in and the space it shall occupy. He calls upon the several editors for the material he may need to fill out the vacant spaces. In the actual construction of the paper, he or his assistant is on duty until the last page form is complete. In some instances the managing editor and the editor-in-chief are one. The city editor is in charge of the collecting of local news through his staff of reporters, who may number from 10 to 50. He assigns certain reporters to particular tasks, so as to "cover" all events likely to be of public interest. In the case of a morning paper the city editor is usually succeeded by a "night editor" who remains on duty until the forms are on the press. In the larger newspaper offices there is also a news editor, who receives and edits the telegraph and cable news. There may also be a political editor, whose province it is to write editorials in the interest of the political party with which the paper is affiliated; and a financial editor who records and comments upon the fluctuations in market values of stocks, bonds, etc. There must be also a sport editor, a dramatic editor and a musical editor, whose duties are sufficiently indicated by their titles, the two latter holding as well the positions of critics. The literary editor has charge of the strictly literary articles, book reviews, etc.

All the copy passes from the various editors to the "desk" where it is read by responsible assistants to the editor-in-chief, corrected as to character of statement, form and, if need be, spelling, punctuation, etc. From the desk it goes to the composing-room and is then under the direction of the superintendent or foreman. He is essentially a mechanic, whose duty it is to construct in type the literary material furnished him. In the city offices and in many of the larger country offices typesetting machines are in use, though a great deal of type is still set by hand. The typefounders report a continually increasing demand for their product despite the spread of the typesetting machines. The type as set, by whatever means, is assembled into page forms by the foreman under the direction of the managing editor. When the page is satisfactorily filled, the printing may be done directly from the type for a small issue. In the offices of the large papers the page forms are stereotyped and the printing done from the plate thus made. The pages are assembled for one side of the sheet on which the paper is printed in one part of the press and for the other side in another part, the web of paper passing first one set of page forms and then the other. When printed on both sides it passes to the folding machinery which folds and cuts apart

the individual papers and counts them at the delivery shelf. They are then delivered to the circulation manager whose business is to sell as many of them as possible. He has his force of delivery automobiles which hasten out on their various routes, leaving the bundles with news dealers or distributors.

The business department of the paper attends to the financial part of the combination, and with this department is associated the advertising editor, whose copy also goes independently to the composing-room, or to a separate jobroom, coming back in the form of type to the superintendent and the managing editor. With all its seeming complexity the various operations are carried on at top speed with perfect accord and with rarely a serious hitch.

Various commercial enterprises have arisen in connection with newspaper making. Some of these are known as "syndicates" who buy literary material from authors and sell it to newspapers in that form; or they may stereotype it and sell the "plate-matter," as it is called, ready for placing it on the press. Other syndicates or co-operative bureaus make up and sell newspaper sheets printed with items of general interest on one side. These are known as "patent insides" and are used very largely by country papers, which by their use have their typesetting reduced to half. The "patent insides" generally carry sufficient advertising to cover their cost and therefore are sold at little more than the cost of the paper they are printed on.

The total number of newspapers and periodicals published in the world at present is estimated at about 60,000, distributed as follows: United States and Canada, 26,360, of which about 2,600 are dailies and 650 semi-weeklies; Germany, 8,000; Great Britain, 8,000; France, 4,300; Japan, 2,000; Italy, 1,500; Austria-Hungary, 1,200; Asia (exclusive of Japan), 1,000; Spain, 850; Russia, 800; Australia, 1,000; Greece, 600; Switzerland, 450; Holland, 300; Belgium, 300; all others, 1,000. Of these more than half are printed in the English language. These figures were correct before the war. Since that outbreak many publications have ceased, but it may be presumed that they will generally resume upon the return of normal conditions. A detailed history of the newspaper in America will be found under *NEWSPAPERS, AMERICAN*.

Early Roman Bulletins.—The newspaper had its origin several centuries before the Christian era. The Romans published the *Acta Diurna*, the *Acta Publica*, the *Acta Senatus* and other journals. The *Acta Diurna* was a bulletin in which accounts were given of the progress of the imperial arms. The intelligence was communicated by the generals who received it from the officers under their command, and thus the contents became known throughout the army. The *Acta Diurna*, however, recorded other than military matters, such as trials, punishments, deaths and sacrifices. The *Acta Senatus* contained accounts of the various matters brought before the Senate, the opinions of the chief speakers and the decisions of the house, published regularly by command of Julius Cæsar, as part of the government gazette. The *Acta Publica* was a still nearer approach to the true newspaper form. During the later times of the republic, and

under the empire, it was published daily at Rome by the authority of the government. It contained a register of the births and deaths in the city; an account of the money paid into the treasury, from the provinces and everything relating to the supply of corn, and a kind of court circular, containing an account of the births, deaths, festivals and movements of the imperial family. Such details of public affairs as it was deemed expedient to publish were also included in it. The speeches in the Senate and the public assemblies were taken down by the early Roman short-hand writers called *actuarii*. These, assisted by clerks and notaries, drew up the *Acta* under the superintendence of censors, quaestors and other magistrates. The publication consisted in posting them in some public place, that any one who pleased might read them.

First Printed Journals.—"Ti Chau," better known as *The Peking Gazette*, was probably the first printed newspaper, and is the oldest daily journal in the world. It was first issued about 1340 A.D. The *Gazette* is still in existence, and is an official journal, forming a pamphlet of 20 to 40 pages of coarse paper, printed from wooden types on one side only, and having a colored paper cover. Toward the close of the 15th century, soon after the invention of printing, small sheets, usually in the epistolary form, appeared in Augsburg, Vienna, Ratisbon and Nuremberg. They were called *Relationen* and the *Neue Zeitung*, and gave accounts of the discovery of America and of other important public events, and like modern newspapers they chronicled the more interesting and startling local incidents. The *Notizie Scritte*, published monthly in Venice, in 1562, is said to have been the first Italian newspaper. Its price was a small coin called gazetta; hence the word gazette which came to be the popular name for the modern newspaper. The war which Venice waged in Dalmatia gave rise in 1563 to the custom in Venice of having military and commercial information read at a particular place by those desirous to learn the news, who paid for this privilege. A file of these Venetian papers, covering a period of 60 years, is still preserved in the Magliabecchi Library at Florence.

English Newspapers.—A printed bulletin entitled *Relations* was published in England as early as 1462, and in 1527 there was one called *New Tidings*, but neither of these presented more than a single piece of intelligence. A pamphlet called *The Newes from Spaine* made its appearance in the reign of Queen Elizabeth in order to convey to the people the tidings of the approaching armada from Spain, and the various counter-movements on the part of the British army and fleet. The first newspaper printed in English was published in Amsterdam, 2 Dec. 1620. It was a folio sheet printed both sides; and was issued by the Dutch bookseller Petrus Keerius, and his printer, Joris Veseler. A more pretentious journal was issued in 1622, under the title *The Weekly News from Italy, Germany, etc.*, published by Nathaniel Butter, Nicholas Bourne and Thomas Archer, and this may be regarded as the first specimen of the regular newspaper in England. Numerous other news journals followed, but it was not till the beginning

of the parliamentary wars that the newspaper first acquired political influence. One of these, published in November 1641, under the title of *Diurnal Occurrences, or the Heads of Several Proceedings in both Houses of Parliament*, is noticeable as the first which furnished a report of the proceedings in Parliament. The other papers which followed this were the *English Post*, *England's Memorable Accidents*, *The Kingdom's Weekly Intelligencer*, *The Spy*, *The Parliament's Scout*, *The London Post*, *The Country Messenger*, and were most of them published weekly. In Cromwell's time the principal journals were the *Mercurius Politicus* and the *Public Intelligencer*. The publication of newspapers without license was prohibited in the reign of Charles II, and an office was created called Licensor of the Press. Advertisements first appeared in English newspapers in 1652. The first copy of the *London Gazette* was issued 7 Nov. 1665 at Oxford, whither the court had retired in consequence of the plague then raging in London. It has since been uninterruptedly published twice a week as an official court circular. The first London daily paper was published in 1709 under the name of the *Daily Courant*. At this time appeared Defoe's journal, the *Review*. The first number of the *Tatler* was published on 23 April 1709, and of the *Spectator* on 1 March 1711. Though not properly newspapers in the modern sense of the term, their early numbers contained general news in addition to their other literary matter. In 1712 a tax or stamp-duty was imposed by the government of a half-penny on papers of half a sheet or less, and a penny on papers of a single and above a half sheet. The *London Daily Advertiser* first appeared in 1726, and became afterward celebrated by the publication of the famous "Letters of Junius" (q.v.). The *Morning Chronicle* appeared in 1769 and the *Morning Post* in 1772. The *Times* was first commenced 18 Jan. 1785, under the name of the *London Daily Universal Register*, which was afterward superseded by that of the *Times* on 1 Jan. 1788. It was ably conducted from the first by Mr. Walter, who in 1803 transferred the management to his son. The *Daily News* appeared in 1846, the *Daily Telegraph* in 1855, and the *Daily Standard* in 1857. Others of later establishment are the *Echo*, *Graphic*, *Mail*, *Pall Mall Gazette*, *Westminster Gazette*, etc. The provincial English press began with the *Norwich Postman*, published in 1706, and followed by the *Norwich Courant* in 1714, and the *Weekly Mercury, or Protestant's Packer* (at Norwich) in 1720. The *Worcester Postman* appeared in 1708, the *Newcastle Courant* in 1711, the *Kentish Post* in 1717 and the *Leeds Mercury* in 1718.

Ireland and Scotland.—The first newspaper published in Ireland was the *Dublin News-Letter*, in 1685, followed by the *Dublin Intelligencer* in 1690. The *Belfast News-Letter*, still flourishing, first appeared in 1737. The *Freeman's Journal* commenced in 1763. In Scotland, on 31 Dec. 1660, appeared at Edinburgh the first number of the *Mercurius Caledonius*, which had an existence of only three months. The *Edinburgh Evening Courant* was started in 1718. The *Caledonian Mercury* commenced in 1720 and existed 150 years. The *Edinburgh Gazette* dates from 1699. The first paper published in Glasgow was the *Glasgow Courant*, on

11 Nov. 1715, followed by the *Glasgow Journal* in 1729. The *Edinburgh Scotsman* was first issued in 1817 and the *Glasgow Herald* in 1782.

France.—The first French newspaper, the *Gazette de France*, appeared in 1631, edited by Theophraste Renaudot, a physician, who had been in the habit for some time previously of presenting to his patients a printed account of the various occurrences of the day. The *Gazette* had a most successful career and existed until 24 Aug. 1848, when it was suspended. Two weeks later it was resumed under the title of *Le Peuple Français*, which title was again altered to *L'Etoile de la France*. The *Gazette Burlesque*, a newspaper in verse, was commenced in 1650, under the management of the poet Jean Loret. The *Mercure Galant* was started by Donneau de Visé in 1672 and under the title of the *Mercure de France*, to which it was changed in 1717, continued to exist until 1853. After the Revolution a host of new papers appeared. Among these were the *Chronique de Paris*, the *Orateur du Peuple*, Herbert's *Père Duchesne* and *Ami du Peuple*. Of all the newspapers, however, commenced at this eventful period, the only ones which have survived are the *Journal des Débats* and the *Moniteur*. Under Napoleon the press was subjected to a rigid censorship, which was continued until 1819. During the reign of Louis Philippe appeared *La Presse* and *Le Siècle*, both of which commenced in 1836. Since that date the growth of the newspaper press in Paris has been rapid. In 1903 over 1,400 newspapers were regularly published in Paris alone, some 60 of these being daily political organs. The most important of all is the *Temps*, with politics of moderate republicanism. *Le Petit Journal*, a cheap popular journal, has a circulation of over 1,000,000 daily.

Germany.—Egenolf Emmel, sometimes called the father of journalism, established at Frankfort in 1615 *Die Frankfurter Oberpost-amszeitung*. A second journal was commenced at Hildesheim in 1619 and a third at Herford in 1630. At the end of the 17th century there were at least 30 daily newspapers in Germany. The *Hamburgischer Correspondent* appeared in 1714 as a continuation of the *Holsteinische Zeitungscorrespondance*, established in 1712. It was the first German newspaper which received news of foreign affairs from correspondents resident abroad. The *Allgemeine Zeitung* was published in 1798, and soon rose to the highest position in German journalism. Other important journals are the *Norddeutsche Allgemeine Zeitung*, the *National Zeitung*, the *Neue Preussische Zeitung*, the *Volks-Zeitung*, the *Vossische Zeitung*, the *Kölnische Zeitung*, etc.

Russia.—The first journal in Russia appeared in 1703, and was followed by several others during the first half of the 18th century. The press in Russia is under very strict supervision and thus naturally has but little influence in public affairs. The *Journal de Saint Petersburg*, in French, has a considerable circulation outside of Russia.

Holland and Belgium.—The pioneer newspaper of Holland was first published in 1656. The early Dutch newspapers were distinguished by the accuracy of the information furnished by them. It was not until 1830 that they began to comment on public occurrences, their crit-

icism having been previously directed to items of commercial intelligence. The principal Dutch journals are the *Allgemeene Handelsblad* of Amsterdam, the *Haarlemsche Courant*, the *Journal de la Haye* and *Staats-Courant*, the two latter published at The Hague. Among Belgian papers the *Indépendance Belge*, the *Journal de Bruxelles* and the *Etoile Belge* are distinguished for the ability with which they are conducted.

Australia.—There are nearly 1,000 papers published in Australia. The daily issues are excellent imitations of the London newspapers. The *Sydney Gazette* was established in 1803.

India.—The first Indian newspaper in the English language appeared in Bengal in 1780. There are upward of 300 newspapers published in the various vernacular tongues.

In Turkey the first newspaper appeared in 1795 in French and the first daily journal in Spain was published in 1704. The modern newspapers of Norway, Sweden, Denmark, Italy, South Africa, Switzerland, Portugal, Greece, China, Japan and South and Central America, are of less importance than those of the other countries heretofore mentioned, being largely local in character.

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NEWSPAPER SYNDICATE, an association for the furnishing of special news features, generally of a literary nature, to daily and weekly newspapers. See PRESS ASSOCIATIONS.

NEWSPAPERS, American. The history of the printing of newspapers in America properly begins on 25 Sept. 1690, for it was upon that date that Richard Pierce, of Boston, issued the first number of what was to have been a periodical publication. Strange as it may seem, however, this first American journalist was endowed with a sense of originality of which even the makers of the modern sensational newspaper might find reason to be proud, for, in his salutatory, he stated that as there were many false rumors being circulated in the town of Boston which were constantly doing a great deal of harm, he requested his readers to furnish him with a list of those persons who were starting such stories that he might advertise them in the succeeding issues of his paper. In other words, his plan was to print a regular weekly list of all the liars in town, a scheme which would certainly have sold many copies of the sheet had not the authorities put an end to the project by promptly suppressing the newspaper. This journal was to have borne the name of "Public Occurrences, both Foreign and Domestic."

As only one issue of this strange newspaper appeared, the historians of journalism have usually failed to mention it, but, instead, have given the credit for the publication of the first periodical to John Campbell, a Scotchman, and

the postmaster at Boston, who issued the first number of *The Boston News-Letter*, on 24 April 1704. It was printed on half a sheet of pot paper, $7\frac{1}{2} \times 12\frac{1}{2}$ inches, with a small pica type, and its entire contents consisted of several extracts from *The London Flying Post*, in relation to the Pretender; the queen's speech to Parliament regarding that subject; a few items of local news; four short paragraphs of marine intelligence from New York, Philadelphia and New London, and a single advertisement—that of the proprietor. This was just 82 years after the appearance of the first English newspaper in London and 99 years after the first newspaper in France. Germany had antedated all other countries, having made several short-lived attempts to establish periodical journals as early as the latter part of the 16th century.

For more than 15 years Campbell had the journalistic field entirely to himself, but, in the latter part of 1719, another paper, called *The Gazette*, was started in Boston and, in 1721, a third was established by James Franklin under the name of *The New England Courant*. In the meantime there had appeared at Philadelphia the first newspaper published outside of New England. It was called *The American Weekly Mercury*, and its first number was issued by Andrew Bradford, the son of William Bradford, 22 Dec. 1719. The first paper to be printed in New York was *The New York Gazette*, established in October 1725, but by 1740 the number of newspapers in the English colonies in America had increased to 11, three of which had been established in Pennsylvania—one being printed in German—one in New York, one in Virginia, one in South Carolina and the remaining five in Boston.

In the beginning the American newspaper was a very small affair, being little more than an abstract of such papers as might chance to arrive from Europe on or about the date of publication. In fact, little change was made in them until after the time of the Revolution when the political agitators found it convenient to make use of them in presenting their appeals to the people. It was largely for this purpose that the first daily newspaper, *The American Daily Advertiser*, was established in Philadelphia by Benjamin Franklin Bache, in 1774. During the time that the seat of government was at Philadelphia, it was this paper that was used by Jefferson to oppose the Federal section of Washington's administration as well as all measures which originated with Hamilton or his friends. In 1802 Zachariah Poulson became its proprietor and the name which he gave to it, *Poulson's Advertiser*, was retained until 1839, when it was consolidated with *The North American*.

The second daily newspaper was *The New York Daily Advertiser*, first issued on 1 March 1785, by Francis Childs and Company. About a year later, 20 July 1786, the first newspaper appeared west of the Alleghany Mountains. It was published at Pittsburgh, Pa., and was called *The Gazette*. During the early post-Revolutionary days, Alexander Hamilton's special organ was *The United States Gazette*, a paper established in New York in 1789, by John Fenno, of Boston.

The territory comprised within the New England States had no permanent daily newspaper until 3 March 1813, when the Boston

Daily Advertiser was started by William W. Clapp. Prior to that time two distinct attempts to establish such papers had been made. As early as 6 Oct. 1796, Alexander Martin, an Irishman, started *The Polar Star*, which lived about six months. It was followed, 1 Jan. 1798, by Caleb P. Wayne's *Federal Gazette*, which ceased publication in less than three months. Of the hundreds of papers started in New York between 1725 and 1827, when the first number of *The Journal of Commerce* appeared, only two now survive, *The Commercial Advertiser*, now better known as *The Globe and Commercial Advertiser*, and *The Evening Post*.

The history of the penny newspaper dates from 1830, the idea having been suggested by the *Illustrated Penny Magazine*, first issued in London during that year. During the next few years, therefore, several similar attempts to introduce cheap papers were made in the United States, notably at Philadelphia and Boston. As these publications were always as small as they were cheap, however, they were but short-lived, and it was not until 1 Jan. 1833, when the price of *The Morning Post* was reduced to one cent by its publishers, Dr. Shepard, Horace Greeley and Francis V. Story, that any pretentious effort was made to print a cheap newspaper. Although this experiment was not a success its failure was due to causes other than that of the price, so, when Benjamin H. Day established the *New York Sun*, 3 September of the same year, he also fixed its price at one cent and the day of the cheap press had come.

DEVELOPMENT OF AMERICAN JOURNALISM FROM 1775 TO 1915.

YEAR	Daily	Weekly	Semi-weekly	Monthly	Semi-monthly	Quarterly	Total
1775.....							37
1800.....							150
1810.....	27	28	3	*15			361
1828.....							861
1840.....							1,403
1850 (U.S.)..	254	1,902	31	100	95	19	2,526
1860 (U.S.)..	387	3,173	79	280		30	4,051
1870 (U.S.)..	574	4,295	115	622	96	49	5,871
1880 (U.S.)..	971	8,633	133	1,167	160	122	11,314
1880 (A)...	909	7,811	134	929	110	68	10,100
1885 (A)...	1,207	10,241	146	1,284	189	96	13,304
1890 (A)...	1,662	13,562	202	1,772	260	99	17,712
1895 (A)...	1,988	15,196	329	2,150	249	158	20,217
1900 (A)...	2,200	15,681	515	2,328	261	256	21,235
1905 (A)...	2,377	16,152	600	2,550	262	180	22,312
1910 (A)...	2,470	16,269	620	2,767	264	197	22,587
1915 (A)...	2,494	16,001	605	3,064	341	†445	23,040

(A) Ayer's American Newspaper Annual.

* Tri-weekly.

† Includes bi-monthlies and tri-weeklies.

Following are the 10 oldest newspapers of the United States which remain in existence in 1916:

Portsmouth, N. H., <i>New Hampshire Gazette</i> , established.....	1756
Newport, R. I., <i>Mercury</i>	1758
Windsor, Vt., <i>Journal</i>	1763
Hartford, Conn., <i>Courant</i>	1764
New Haven, Conn., <i>Journal-Courier</i>	1766
Philadelphia, Pa., <i>North American</i>	1771
Baltimore, Md., <i>American</i>	1773
Alexandria, Va., <i>Alexandria Gazette</i>	1784
Augusta, Ga., <i>Chronicle</i>	1785
Hudson, N. Y., <i>Gazette</i>	1785

The colonial newspapers devoted most of their small space to foreign affairs, copying from and reflecting the style of the London papers. Local matters were considered too well known to be worthy of mention. The arriving and sailing of vessels and sometimes the comings and goings of stagecoaches, with a few advertisements, mostly about slaves and apprentices, are about the only sort of local chronicles that can be found in the papers prior to 1750. Sometimes letters or parts of letters from people in adjoining towns were printed, but the rule seems to have been to regard as most important the things that were farthest away.

Between 1750 and 1760 there developed a style of vituperative journalism that prevailed largely until about 1833. The idea of freedom of the press had taken strong root in the American mind, and the early disposition was to use the newspapers to ventilate all sorts of animosities, but mainly political squabbles growing out of the competitions of office seekers. The press in the early days of the Republic was mainly partisan and secured most of its support from politicians. Advertising had not yet developed, and subscribers were few. Paper and printing were expensive, so that there was little to be made by running a newspaper. In fact, most of the journalists of the early days seem not to have depended upon their papers for a living, but to have run them as side issues. Under such conditions it is not surprising that space came to be given up largely to minor political squabbles and windy communications from writers hiding under such *nom-de-plumes* as "Vox Populi," "Veritas," etc.

There were no systematic attempts at news-gathering. Editors took their choice of what interested subscribers sent in, with never a thought of reporting important gatherings or conventions. It was not until 1833 that the first real American newspaper appeared in the *New York Sun* and the success of its policy of publishing the news instead of devoting its columns to the editor's personal and often eccentric opinions upon political matters was so immediate that it was soon followed by many rivals. Most notable of these was *The Herald*, first issued by James Gordon Bennett in 1835, which promptly took the lead. There had previously (1801) been established in New York *The Evening Post* (which William Cullen Bryant began to edit in 1828), and *The Journal of Commerce*, which dates from 1827.

Bennett was a natural reporter and gathered two or three times as much news as the *Sun*, and really laid the foundations of the modern school of American journalism. He was the first to print financial news, to discuss theatres and plays, to write up the happenings in clubs and social life and to give the talk of the street. He was also the first to attempt a prompt report of a big fire, with a picture of the burning building in 1836. Dana and Bryant showed themselves great editors, but Bennett outclassed all his contemporaries in business management, gathering the most news, both local and foreign, and getting it quickly on the street. He was also the first to develop a considerable line of advertising. He was the first to demand larger and faster printing presses and to issue the "triple sheet" of 12 pages, the progenitor of the modern multiple page newspaper.

In 1841 *The Tribune* entered the New York field, with Horace Greeley as editor, and if Bennett taught the others how to do business, to Greeley, Dana and Bryant must be awarded the credit of establishing the strong editorial utterances which have ever since been characteristic of the American press. Abandoning the vituperation of earlier journalists, these men, all gifted scholars, taught the growing newspaper editors of America how to write and how to edit newspapers so as to command the respect of their fellow-men, even when they disagreed with the editorial policy or conclusions.

The New York *Times* came in 1851, with Henry J. Raymond, an admirable reporter and able writer, worthy of his colleagues.

Other great newspapers and editors of the antebellum days were: The Springfield (Mass.) *Republican*, started as a weekly in 1824 and made a daily in 1844 and attaining national celebrity through the genius of Samuel Bowles. In 1830 The Boston *Transcript* appeared and the Detroit *Free Press* in 1831. The Philadelphia *Inquirer* dates from 1829. The Philadelphia *Public Ledger* was first issued in 1836 and under the management of George W. Childs easily led the press of Pennsylvania. The Baltimore *Sun*, New Orleans *Picayune* and Milwaukee *Sentinel* were all born in 1837. The Brooklyn *Eagle* first saw the light in 1841. The Cincinnati *Enquirer* in 1842 and the Cleveland *Plain Dealer* in 1843. The career of the Boston *Herald* began in 1846. The Chicago *Tribune* and Milwaukee *Wisconsin* were founded in 1847 and in 1848 the Cleveland *Leader* appeared and was brought into prominence by Edwin Cowles. The Saint Louis *Post-Dispatch*, over which Murat Halstead presided, was born in 1851, the same year as the New York *Times*. The first great paper founded on the Pacific Coast was the San Francisco *Call*, dating from 1856. The New York *World* did not appear until 1860 and it was along in the eighties before it received the inspiring guidance of Joseph Pulitzer, great editor and keen business man.

Prior to 1810 the circulation of the most widely read daily newspaper did not exceed 900 copies, while there were few publications, either weeklies or semi-weeklies, that could boast of a larger circulation than that of 600 copies. There were about 25 dailies in 1810, issuing 310 times a year; 36 semi-weeklies; seven tri-weeklies and 290 weeklies, the aggregate circulation for the

when the total products of the newspaper and periodical industry of the country was stated to be \$232,993,094, and when there were 108,672 persons employed in this business. During this year the amount received from advertising was \$148,534,392, while the amount from subscriptions and sales was \$84,438,703. The above table is interesting as showing the steady development in number and circulation of the industry of daily paper making in America.

Newsgathering.—To attempt to tell the story of the growth of the American newspaper without relating some particulars in regard to the wonderful feats which it has from time to time performed would be to give but a superficial view of the subject. Prior to the days of the telegraph the daily press had great difficulty in obtaining its information about current events in other parts of the country. To offset this disadvantage they adopted three methods of quick communication. One was by pony express; another was by carrier pigeons, and, when steam had been sufficiently developed to make fast traveling by rail or steamboat possible, special trains and boats were frequently chartered for special occasions. The New York *Herald* and the New York *Journal of Commerce* were the first papers to own swift sailing yachts which were used to obtain early information from incoming European vessels, while A. S. Abell, of the Baltimore *Sun*, established his own overland express between New Orleans and Baltimore. This consisted of 60 blooded horses, housed at conveniently located relay stations, and the project was so successful that, during the Mexican War, he not only beat all the other newspapers in getting news, but he secured his information so far ahead of the government's own dispatches that he was able to advise the officials at Washington of important events sometimes more than 30 hours before the reports of the happenings had been received at the War Office. Another instance of conspicuous enterprise was shown by Henry J. Raymond. While a reporter for the New York *Tribune*, he was sent to Boston to report a notable speech by Daniel Webster. Returning by boat, he arranged to have the necessary composition frames and cases erected in his room, that, as fast as he could write, the sheets might be put into type, so that all were ready for publication the instant he reached the office.

In 1846, when the entire country was so greatly excited over the Oregon boundary dispute with Great Britain, several of the newspapers combined to send a swift pilot boat to England. There all the important news was obtained; the boat returned as quickly as it went, and the American people were provided with the information they craved many days before it could possibly have arrived if it had come by the ordinary channels, the slow-sailing vessels of that day.

As so much enterprise was shown by newspaper publishers at a time when the means of quick communication were few and costly, it was but natural that they should have hailed the steam railroad and the electric telegraph with delight. During the 10 years between 1840 and 1850, the period in which these inventions were first generally extended, the circulation of the American papers increased more than two-fold.

YEAR	Number of daily papers published	Total circulation per issue
1850.....	254	758,454
1860.....	387	1,478,435
1870.....	574	2,601,547
1880.....	971	3,566,395
1890.....	1,610	8,387,188
1900.....	2,235	15,102,156
1910.....	2,470	*23,000,000
1915.....	2,494	*29,000,000

* Estimated.

year being estimated at considerably less than 2,000,000 copies, while the value of the paper used could not have been in excess of \$45,000. Compare those figures, therefore, with these from the last available United States census,

Samuel Toplift of Boston was the first systematic gatherer of foreign news in the United States. For 30 years, beginning about 1820, he met the European boats in Boston harbor, and brought the news to the Exchange Coffee House, whence it was forwarded to New York by pony express. In 1848 seven of the large New York daily paper owners combined forces for gathering news outside of the New York field, and the Associated Press was thus formed. In the course of time smaller news-gathering associations were formed by groups of newspapers in various localities. The New York Associated Press gathered the foreign and Washington news, and exchanged its budget of news with these smaller associations, thus covering the entire field. They dominated the news field for many years, and sometimes refused to serve newspapers, and did not serve other newspapers to their satisfaction. Competition arose in the United Press and the Western Press Association. A few of the more wealthy owners of the Associated Press then purchased a controlling interest in the United Press, and thus stopped competition, except that of the Western Association. These two associations ran in opposition for a few years, and then Melville E. Stone, manager of the Western Association, convinced all parties that conditions were wrong, and that there should be no private ownership of newsgathering. Thereupon the present Associated Press was born, as a New York corporation, in 1900, with conditions that enable any newspaper to come in, and exercise a vote in the control. It had, in 1916, a membership of about 900 newspapers, and expended in the vicinity of \$4,000,000 a year for news.

Owing to the high rates at first charged for telegraph and cable messages the papers of those days did not get the almost unlimited news service which they receive to-day. Even as late as 1879 the night rate from California to Boston was 10 cents a word; between Chicago and Boston it was five cents a word, and between Washington and Boston, two cents a word. Since that time the rates have been reduced fully 75 per cent. The original cable rate was \$100 for 20 words, whether served to newspapers or to the general public, while the rate to newspapers is now but 10 cents a word, either for day or night service.

The result of the high tolls was shown in the compact dispatches published by the newspapers of that day. For example, when the *America* won the international yacht race, 22 Aug. 1851, no report of the event was received by any American paper until 4 September, when the news came in the form of a dispatch from Halifax. On this day the report in the New York *Sun* contained about 500 words, the *Tribune* used but 250 words about the contest and the *Evening Post* was content with 200 words. So, too, when Brooks assaulted Sumner, the senator from Massachusetts, in 1854, the longest report sent to any Boston paper comprised less than half a column, and this was printed quite inconspicuously at the bottom of the page. In 1860, when Lincoln was nominated for the Presidency, at Chicago, one operator was able to send out all the press matter that was offered to him, while, at recent conventions, the hundred and more operators

have had all they could do to handle the millions of words of descriptive matter filed with them by correspondents representing every newspaper of prominence in the country. When these facts are remembered, however, it does not seem so strange that the aggregate number of words of press matter that went over the Western Union wires in 1879 was but 28,000,000, whereas the total number of words contained in press specials handled by the same company in recent years has been no less than 10 times as great.

Scarcely more than 40 years ago some of the most progressive journals in this country depended solely upon boys to carry their papers to their subscribers, while larger lots, the papers intended for dealers, were trundled through the streets on wheelbarrows. To-day all the newspapers have their own systems of fast delivery wagons, and the most progressive publishers charter "special" trains, not only for their Sunday editions, but frequently for other occasions during the year.

The growth of the Sunday newspaper, dates from the Civil War, but it was many years after the conclusion of that struggle before the large Sunday editions began to make their appearance. In fact, it was only in 1870 that one of the leading papers in Boston increased the size of its Sunday issue from four to eight pages, and, strangely enough, the change met with all kinds of adverse criticism. During the next few days many of the subscribers to this journal called at the office to protest that the new paper was much too large, and this same criticism has continued as the great Sunday papers have steadily increased in size.

In 1916 there were 10,929 cities and towns in the United States having newspapers. New York City led with 981, and New York State with 2,121; Illinois had 1,826, Pennsylvania 1,358, Ohio 1,128 and Texas 1,081; New York State had 208 dailies and 1,100 weeklies, Illinois 181 dailies and 995 weeklies, Pennsylvania 212 dailies and 840 weeklies, Ohio 172 dailies and 715 weeklies, Texas 98 dailies and 864 weeklies. No other State had as many as 1,000 newspapers. The Southern States had 4,131, the Mid-Western States 5,013, the Western 6,349, and the Pacific Slope States 2,079.

Classification of Papers.—While the newspaper directories and census reports class all sorts of publications together, and they are included in all the totals here given, it should be understood that many of the publications referred to are no longer generally known as newspapers, the title magazine being chosen by many monthlies and periodicals, by many weeklies, bi-monthlies, monthlies, etc. The first United States newspapers were mostly weeklies, and scarcely entitled to be called newspapers, because they did not begin to systematically gather news until after 1830. When the public came to appreciate what real news was, the daily newspapers experienced a rapid growth, and in 1916 there were 2,494 of them, more than in any other country on the globe. Their issues of six times a week represent a much greater volume of circulation advertising and general business than the 16,000 weeklies, the majority of which are what are termed country newspapers, retailing the minor happenings of the small towns, with their social gossip, interesting mainly to

those who have personal acquaintance in the locality.

The religious weekly had its rise before the Civil War, the *Independent* being emblematic of this class. These were the first publications to obtain national circulations in the United States. The first important trade paper was the *Dry Goods Economist*, established 1846; a year previous the *Scientific American* had made its debut. *Harper's Magazine* appeared in 1850 and *Harper's Weekly* in 1856. The *Iron Age*, the second great trade paper, was first issued by David Williams in 1855. The *Engineering and Mining Journal*, the first of the engineering press, had its modest beginning in 1866. The success of these papers in special fields opened the eyes of publishers to the opportunities of what is now known as trade journalism and class journalism, and many thousands of periodicals are now issued covering all important fields of human activity. The more important classes are indicated below:

Classified publications	No. in U. S.	Classified publications	No. in U. S.
Magazines, women's publications and mail order journals.	210	Insurance.	81
Religious.	1,031	Journalism.	19
Agricultural.	720	Juvenile.	311
Advertising.	18	Legal.	105
Architecture and building.	68	Liquor.	47
Automobiles.	79	Lumber and wood-working.	35
Papers for the blind.	9	Mechanical and engineering.	67
Books and writers.	26	Medical.	178
Business methods.	17	Military.	43
Carriages and harness.	14	Milk.	42
Clothing and furnishing.	26	Milling.	18
Collegiate.	512	Mining.	22
Commercial and industrial.	120	Moving pictures.	17
Decorating.	20	Music.	48
Dramatic.	21	Negro interests.	198
Drugs and paints.	63	Patriotic.	26
Educational.	195	Petroleum.	23
Electrical.	49	Philanthropical.	31
Fashion.	47	Poultry.	93
Financial.	92	Printing.	16
Fruit and produce.	19	Prohibition.	192
Furniture and upholstery.	28	Railway.	70
Groceries.	84	Real estate.	43
Historical.	41	Scientific.	102
Hotel and restaurant.	43	Shoe and leather.	22
		Sociology.	47
		Sports.	70
		Sunday school.	164
		Secret societies.	346
		Total.	1,463

The foreign language press, mostly weeklies, is formidable in both numbers and circulation.

German.	512	Chinese.	11
French.	131	Croatian.	16
Spanish.	120	Finnish.	18
Italian.	98	Greek.	16
Swedish.	70	Hollander.	19
Danish and Norwegian.	60	Hungarian.	19
Polish.	61	Slovak.	21
Bohemian.	57	Russian.	8
Yiddish.	34	Miscellaneous.	162
Japanese.	30		

The Publishers' Association.—With a realization that it was essential for the newspaper publishers to organize to remedy abuses in advertising, and confer on matters of mutual interest, the American Newspaper Publishers' Association was organized in 1887, and has for many years maintained a headquarters in New York City. Advertising has been systematized and connections largely insured through the co-operation of this organization. During recent years the annual gatherings have developed more and more into conferences as to wise business policies. They make five-year agreements

with the labor unions, deal as an organization with the express companies and paper manufacturers and maintain a bulletin for distributing regularly information of value to the members, who numbered in 1916 over 350 of the larger newspapers of the United States and Canada.

Mechanical Equipments.—The tremendous development of newspapers would have been impossible without the construction of rapid machines for printing, stereotyping, folding, typesetting, etc. Up to about 1840 the single cylinder printing press, with a capacity of 1,000 to 1,500 sheets on one side per hour, was the only means of newspaper production. R. Hoe and Company brought out a double cylinder machine, which doubled the capacity. Still more speed being required, the type-revolver was invented and manufactured in many forms by Hoe. (See PRINTING PRESSES). Then followed the perfecting press, printing from a roll of paper on both sides. About 1875 Andrew Campbell built a web stereotype perfecting press, with rotary folder, capable of high speed, but failed to push his invention. Shortly afterward the Hoes brought out their lightning perfecter, which was brought to its modern form by Stephen D. Tucker and Luther C. Crowell about 1884, and with this machine a majority of the great newspapers of the world are equipped. The capacity of a single machine is about 24,000 papers per hour, but by duplication and quadrupling the mechanism this output can be increased almost indefinitely, some presses having been built with a capacity of 216,000 eight-page papers per hour.

In recent years Goss, Scott, the Duplex and Wood companies have come into the field of fast newspaper presses, so that there is great variety of choice for the newspaper publisher. The smaller dailies are commonly equipped with the duplex presses, which print direct from the type, without stereotyping, at speeds of 3,000 to 10,000 papers per hour. Mechanical typesetting was first commercially successful in the United States, in the Thorne machine, but about 1885 the linotype machines of Ottmar Mergenthaler began to take the market. (See COMPOSING MACHINES). Another single type machine, the monotype, enjoys a large sale. In 1914 the intertype and linograph machines appeared, based largely on expired patents of the linotype.

In the field of stereotyping, the autoplote machine of H. A. W. Wood came into use about 1890, being the only automatic stereotyping machine, and generally employed by the great newspapers of the world. Since an increasing number of newspapers have circulations from 200,000 to 600,000 daily, requiring a press capacity that will deliver all these papers within two hours' time, and since these papers are commonly 16 to 24 pages in size, and occasionally 64 to 128 pages, it will be apparent that the pressrooms of the large daily papers have developed into vast manufacturing establishments of wonderful capacity and reliability.

CHARLES H. COCHRANE,
Of the Staff of *Newspaperdom*.

NEWSTEAD (nū'stéd) **ABBEY**, England, on the border of Sherwood Forest, 10 miles northwest of Nottingham, was an Augustinian Canons institution founded in 1170 by Henry II in atonement for Becket's murder. In 1540,

after the dissolution, it was given to Sir John Byron the Little, and is celebrated in connection with Lord Byron, the poet, who made the semi-ruinous edifice his home in 1808, but sold it in 1818. The abbey has since been restored, and has many carefully preserved relics of the poet. Consult Irving, 'Abbotsford and Newstead.'

NEWT, nūt, a small tailed batrachian of the genus *Diemyctylus*, *Triton*, or a related genus, usually classed under the *Salamandrinae*, but sometimes considered to constitute a distinct family, under the name *Pleurodelidae*. Newts are sometimes also called elfs or tritons, and the name is often loosely applied to salamanders of other genera not closely related. Among technical characteristics of the newts in general are the bony carpus and tarsus, the bony ball-and-socket joints of the vertebræ, the bony post-frontal-equamosal arch of the skull and the narrow bands of palatine teeth. The tongue is generally very small. The species are more strictly aquatic than most salamanders, and the males of most species undergo remarkable seasonal changes in the development of high dorsal crests, papillæ or other appendages on the arms and elsewhere; and of brilliant colors. About 20 species belonging to this group of genera are known, of which more than half are European, several Asiatic and only two North American, while none have been found elsewhere. The eastern American species (*Diemyctylus viridescens*), of which a quite distinct variety occurs in Texas and Mexico, is abundant throughout the Eastern States, and extends into Canada. It may be distinguished by the rather narrow arched head marked with a pair of longitudinal keels, and the handsome greenish red color of the back, the pale yellow below and the row of conspicuous scarlet, black-bordered spots on each side. In the adult stage just described this animal is about three and one-half inches long and completely aquatic. A terrestrial form is somewhat smaller, lacks the dorsal crest altogether, has a rougher skin and a bright vermilion color. This is the pretty little creature common in Eastern woods, which later returns to the water and assumes the greenish garb. Newts are chiefly nocturnal, and when abroad swim actively, not merely crawling on the bottom in the manner of most salamanders. They feed on all kinds of aquatic larvæ, worms, small mollusks and crustaceans, and are very voracious. During the breeding season in the spring the male develops a broad cutaneous fin, richly provided with sense organs on the back and tail, and becomes otherwise modified. The fertilized eggs are deposited singly, each in a gelatinous capsule whose adhesive nature permits of their attachment to water-plants, some of the leaves of which are drawn about each egg. The larvæ are strictly aquatic and possess three pairs of external gills, but after metamorphosing, leave the water and assume the red terrestrial phase, when they live in the woods under stones and logs, appearing at night or during rain. This stage lasts for several years, when they seek the water either in the spring or fall and soon acquire the adult color and characteristics. Whether or not they can again enter the red phase by leaving the water is not certainly determined. Like frogs, newts swallow the skin after molting, which appears to take place most readily while the animal is immersed in water.

The Pacific newt (*Diemyctylus torosus*) is nearly twice as large, and is further distinguished by the wide, flat keelless head, and brown, unspotted color. It is very abundant in California, and ranges from the southern part of that State to Alaska. Its habits are essentially similar to those of the Eastern species. It feeds on earthworms, snails, slugs, insects, and its own sloughed skin, eggs and young. In this species the eggs are deposited in clumps.

The numerous European species present many interesting differences in detail in habits, especially in the mode of reproduction. Some of them live habitually away from the water and migrate long distances to it in the spring, and one species is remarkable from the fact that the ribs penetrate the skin. All of the newts make very interesting and satisfactory aquarium pets.

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NEWTON, nū'ton, Alfred, English ornithologist and zoologist: b. Geneva, 11 June 1829; d. London, 7 June 1907. He was educated at Magdalene College, Cambridge, of which he was travelling Fellow 1854-63, Fellow in 1877 and till his death professor of zoology and comparative anatomy. He took a prominent part in urging bird protection by legislation; traveled in Lapland, Iceland, West Indies, North America, the Pacific and Spitzbergen; edited *The Ibis* (1865-70) and the *Zoological Record* (1870-72); contributed the ornithological articles in the 9th edition of the 'Encyclopædia Britannica'; and greatly advanced the study of the comparative anatomy of birds. He wrote 'The Zoology of Ancient Europe' (1862); 'Ootheca Woolleyana' (1864-1902); 'Zoology' (1894); and a 'Dictionary of Birds' (1893-96).

NEWTON, SIR Charles Thomas, English archaeologist: b. Bredwardine, Wales, 16 Sept. 1816; d. Margate, 28 Nov. 1894. He was educated at Shrewsbury School and at Christ Church College, Oxford, and was assistant in the department of antiquities in the British Museum, 1840-52. He became vice-consul at Mytilene in 1852 and acting consul at Rhodes in 1854; discovered the tomb of Mausolus at Halicarnassus and the famous bronze serpent of Delphi at Constantinople and after a year as consul at Rome in 1861 became keeper of Greek and Roman antiquities in the British Museum, being the first incumbent of this post and holding it until December 1885. During this term he furthered archaeological excavations in Ephesus, Priene, Smyrna, Sicily, Cyprus, Cyrene and Rhodes and procured for the British Museum the Farnese collection, the two Castellani collections and those of Pourtales and Blacas. From 1880 to 1888, Newton (who was knighted in 1887) was professor of classical archaeology in University College, London; to his work there and in the British Museum is largely due the revival of English interest in classical antiquities. He wrote 'Method of the Study of Ancient Art' (1850); 'History of Discoveries at Halicarnassus, Cnidus and Branchidae' (1862-63); 'Travels and Discoveries in the Levant' (1865); and 'Essays on Art and Archaeology' (1880).

NEWTON, Gilbert Stuart, English painter: b. Halifax, Nova Scotia, 20 Sept. 1794; d. Chelsea, England, 5 Aug. 1835. His mother was sis-

a delightful and accurate study of life among the Maori tribes before annexation.

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NEW ZEALAND FLAX. See FIBRE.

NEWARK, nū'ark, Del., town in Newcastle County, on the Philadelphia, Baltimore and Washington, and the Baltimore and Ohio railroads, about 11 miles south of Wilmington. It is in a section of the State noted for its productivity. The chief manufactures are paper, machinery, fibre, acids and canned goods. There is considerable trade in the manufactured articles, fruit and vegetables. It is the seat of the State College, opened in 1833. The town owns and operates the electric-light plant and the waterworks. Pop. 2,800.

NEWARK, N. J., city, county-seat of Essex County, metropolis of the State, in lat. 40° 41' N., long. 74° 10' W.; on the Passaic River and Newark Bay, eight miles by rail from New York City and within the direct zone of the business influence and activities of the nation's metropolis. In 1920 it ranked 11th in manufacturing and 15th in population among the cities of the United States. It has an area of 23.40 square miles, of which 6.48 square miles were until recently meadow land lying in the southern and southeastern section. The wharf frontage on the river and bay is 10½ miles; the width of the channel is 300 feet; depth at mean low water, 20 feet and at high water, 25 feet.

Port Newark Terminal.—In 1908 the city undertook the reclamation of its meadow land, but it was not until 1914, after the creation of the municipal department of docks and meadows, that substantial results began to appear. The area of the meadow development zone was 1,150 acres, and in a little over a year an area had been reclaimed aggregating 294 acres, of which 124 acres were reserved for new streets, freight yards, stations and dock frontage, and 170 acres were set apart for leasing for manufacturing and commercial purposes. The authorized bond issues for the development, up to 1 Oct. 1915, totaled \$2,250,006, and the disbursements and balances due on contracts, \$2,013,608. After the United States had been forced into the World War, this section was deemed of such vital importance to the National government that the latter bought and leased large portions of the reclaimed area, and in 1917 established there a great submarine-boat construction plant and an extensive reservation for the needs of the quartermaster's department of the army. These and other national acquisitions early in 1918 transformed a large part of the former useless salt meadow land into a bustling suburb and gave the city an additional industrial population of over 100,000.

Manufactures.—The city has the distinction of ranking first in the Union in the value of its manufactures and the diversity of its industries, according to its per capita population. It has 252 distinct lines of industry, 50 lines turning out values from one to \$30,000,000 annually. It is the largest fine jewelry manufacturing centre in the United States; produces the largest variety of leather for shoes, carriages and upholsterings; is the home of the mother-of-pearl button and novelty industry; produced the first malleable iron in America; built the first locomotive engine to travel up grade; made the first patent leather in the country and gave celluloid and its products to the world. In 1915 the city had 2,294 manufacturing establishments using power and employing over 10 persons, with an invested capital of \$225,640,600, employing 82,439 operatives; using material valued at \$130,299,000 and having an output valued at \$250,654,527. The leading industries, according to the value of the finished products exceeding \$5,000,000 were smelting and refining of metals, \$35,000,000; leather, tanned, curried and finished, \$20,118,000; foundry and machine shop products, \$15,403,000; malt liquors, \$12,072,000; jewelry, \$11,215,000; electrical machinery and apparatus, \$8,920,000; paints, oils and varnishes, \$7,761,000, and chemicals, \$6,077,000.

Transportation and Commerce.—The following trunk line railroads connect the city with all parts of the country: Pennsylvania, Lackawanna, Lehigh Valley, Erie and Reading (Central of New Jersey). Electric railways comprise the Hudson and Manhattan Tubes systems, and trolley lines extend to all important points in the State. Daily trunk line passenger trains to and from the city average 882; freight trains, 101; annual railway tonnage received, 2,366,350; shipped, 1,157,876; cars of merchandise freight received and shipped annually, 335,467; passenger stations, 14; freight delivery yards, 23; daily electric railway trains to and from New York, 233; time between the two cities, 18 minutes. The large number of local trains which connect with the New York ferries and the cities on the Hudson give Newark the advantage of the ocean steamer traffic. The Passaic River entering the Newark Bay furnishes the city a most important direct water route to the ocean.

Buildings and Municipal Improvements.—The number of public buildings in the city is 141; value of municipal property, \$73,468,507; principal public buildings: United States Government Building, Essex County Courthouse (cost \$1,750,000), City Hall (\$1,500,000), Free Public Library (\$350,000) and the public schools. The city is widely noted for the excellence of its water supply, having its source in the Pequannock River and delivered on the gravity system. The daily capacity of the watershed is 50,000,000 gallons and the average daily consumption, 46,500,000 gallons. There are eight storage and distributing reservoirs, with a storage capacity of 9,825,700,000 gallons. Newark has 260 miles of paved and 62 miles of unpaved streets; 309.19 miles of sewers; 5,575 gas and electric street lights; 20 city parks with gross area of about 20 acres; 5 county parks within the city of about 642 acres; city parkways of eight and one-half acres and a seashore camp of 11½ acres at Avon-by-the-Sea for deserving children during summer seasons. The police department, with 794 men, cost annually \$1,083,200 and the fire department, with 472 men, costs annually \$720,080. Recent municipal improvements also include Port Newark Terminal, previously noted.

Churches and Charitable Institutions.—Newark has a total of 181 churches divided denominationally as follows: Presbyterian, 34; Roman Catholic, 32; Baptist, 25; Methodist Episcopal, 18; Protestant Episcopal, 17; Jewish, 11; Lutheran, 10; Reformed Dutch, 8; Congregational, 3; Science, 2; Universalist, 1; miscellaneous bodies, 23. Its benevolent activities are promoted by 62 charitable organizations and in institutional work there are 12 hospitals, 5 orphan asylums and a large number of specialized centres.

Social Welfare.—There are over 700 regularly organized societies engaged in all manner of social service, besides a very large number of patriotic units rendering most efficient service for the Newark soldiers and sailors in the World War. Strictly social clubs exceed 100 in number; building and loan associations, 256; improvement associations, 13, and savings and loan associations, 9.

Educational Interests.—Public school property has an estimated value of over \$10-

720,000. There are 67 public schools of the different grades, with over 2,000 teachers and 73,000 pupils; cost of maintenance (1916), \$3,219,288; 52 private and parish schools with an estimated enrolment of 25,000; 4 public high schools, 8 business colleges, 2 academies and 7 technical, drawing, law, industrial and normal schools. The Free Public Library cost for building, equipment, etc., \$1,064,000, has over 245,000 volumes; circulates annually some 1,125,000 volumes and is maintained at an annual gross cost of approximately \$150,500. An attractive Art Museum is maintained in the Library building and in the library proper popular exhibitions are frequently given. Other libraries are the Prudential Insurance Company's Law and Medical Library and the library of the Lawyers' Club. The New Jersey Historical Society has a collection of books, manuscripts, paintings and other articles of great historical value. In 1918 the United States Shipping Board organized a school of marine engineering here, and in 1919 the principal technical school was raised to the dignity of the Co-Industrial College of Technology.

Banking and Insurance.—Under the National Banking Act of 1913, Newark is included in Federal Reserve District No. 2, of which New York City is the central reserve city. In 1917 there were 9 national banks, 11 trust companies, 5 savings institutions and 13 savings departments in national banks and trust companies. National banks had combined resources of \$76,954,256 and deposits of \$57,683,620; trust companies, resources of \$50,915,242 and deposits of \$39,463,402; savings banks, resources of \$50,568,925 and deposits of \$47,244,972. Building and loan associations had assets of \$63,978,185, receipts of \$36,980,243 and shareholders, 94,254. Two of the largest life insurance companies in the United States, the Prudential and the Mutual Benefit, have their home in Newark. Together they reported assets of \$636,582,170, income \$159,714,502, disbursements \$104,252,855. There were five fire insurance companies with \$3,950,000 combined capital, \$23,769,711 assets, \$12,300,924 income, \$10,789,234 disbursements and \$5,025,491 fire losses paid in 1916.

Vital Statistics.—In 1917 there were reported 43,769 dwellings and 18,298 factories and commercial buildings in the city. The very large type of apartment houses dotted the city thickly in all of its strictly residential sections and was even encroaching on bustling business thoroughfares. In 1918 the city faced a serious housing problem because of the great influx of workmen at Port Newark Terminal and also at many of the large industrial plants on account of the unprecedented demands of the World War. The number of births (1916) was 11,446; rate per 1,000, 29.7; death rate per 1,000, 16.5.

Finances.—The assessed valuation of all taxable real estate and personal property in 1916 was \$420,311,342; value of all municipal property, \$73,468,507; total bonded debt, \$42,961,200; aggregate of sinking funds applicable to bonded debt, \$11,650,082; total net debt, city and water, \$31,311,118; tax rate per \$1,000 of valuation, 24.50.

History.—Immediately following the English conquest of the New Netherlands, in 1664, a part of the Dutch possessions in North Amer-

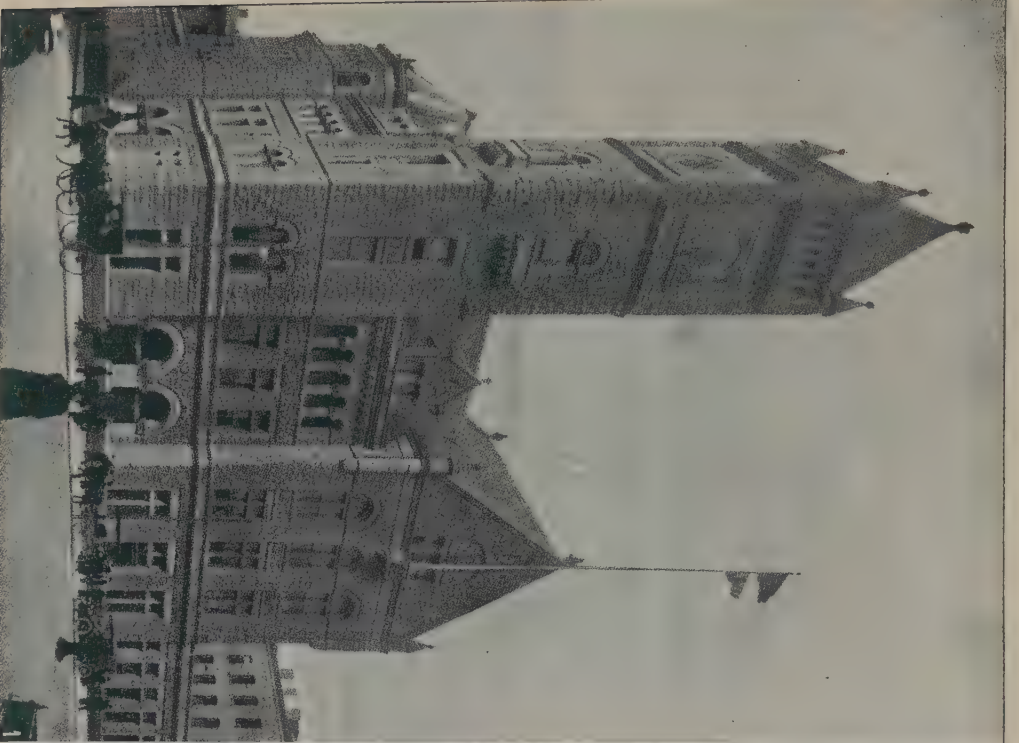
NEWARK, N. J.



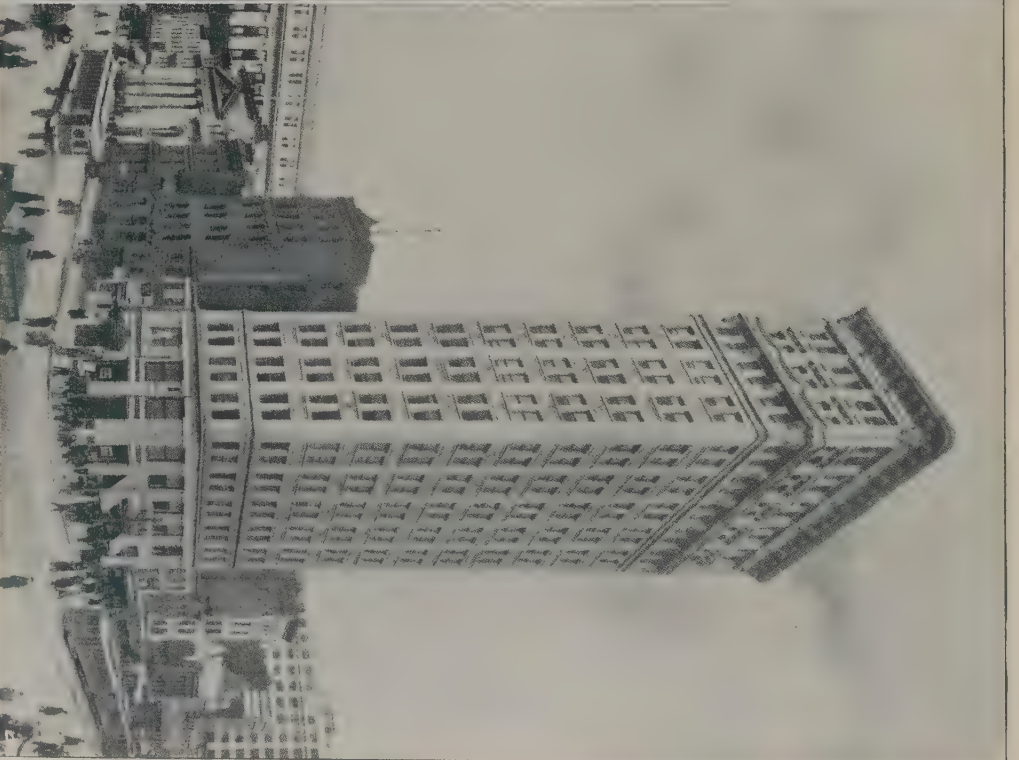
1 Court House

2 City Hall

NEWARK, N. J.



1 Post Office



2 Corner of Broad and Market Streets. Business District

ica, being practically what is now the State of New Jersey, was granted to Lord John Berkeley and Sir George Carteret. The settlement of northeastern New Jersey was immediately begun under a liberal form of government, a site near the mouth of the Passaic River proving attractive to certain Congregationalists, then settled in the colony of Connecticut. In May 1666, the New Englanders removed "their families, their beloved pastor, their church records and communion service, their deacons and their household goods" to the site of the future city of Newark. By 1685, Newark, in which the Congregationalists had settled, was a compact town of 500 inhabitants. The system of local government was like that of many early New England villages, being the limitation of political and religious activity, through the agency of the town meeting to those who professed Congregationalism.

The strong element of conservatism, characteristic of the settlement of Newark, remained unchanged until long after the opening of the 19th century. Religion and education were warmly supported, and for several years the College of New Jersey, now Princeton University, was located at Newark. The tidal waters of the Passaic River gave easy access to New York, the country-side supplying provisions and wood to the inhabitants of Manhattan Island. Newark was also engaged in a coastwise trade. To a degree the young community was somewhat isolated owing to the difficulty of road-building over the marshes and the ridge of rocks separating Newark from Paulus Hook, now Jersey City.

In the Revolutionary struggle Newark took an active part. As early as June 1774, her inhabitants protested against the Port Bill, and offered to become parties to a plan of union to redress grievances. In November of the same year inhabitants of Newark, as members of the Essex County grand jury, patriotically answered the charge of the loyalist chief justice, while in January 1775, the royal newspapers were boycotted by many of the inhabitants of the town. In the spring of that year some of the inhabitants declared that they were willing to risk their lives and fortunes for American liberty. The "gentlemen traders of this town" were recommended not to supply provisions to Canada and other loyal portions of North America. In March 1776, the Newark committee regulated the price of West India products, and traders were notified that defiance of regulation would cause the storekeeper to be declared an enemy to his country.

Newark was early identified with the efforts made to secure internal improvements, even before the second war with England. Turnpikes were extended in every direction, bringing the town in close communication with the northwestern portion of the State, from which section Newark has largely drawn men who have become locally prominent. During the early years of the 19th century the first bank organized in New Jersey (1804) was established in Newark, while one of the chain of banks having the word "state" in their titles (1812) was located in this city. In 1824 the city was declared by legislative enactment to be the terminal of the Morris and Essex Canal, which was soon constructed, and united the waters of New

York Bay with those of the upper Delaware. During the early 30's the New Jersey Railroad was built between Jersey City and New Brunswick, which with Camden and Amboy connections placed Newark on the direct route between New York and Philadelphia. Following the construction of these lines, now a part of the Pennsylvania Railroad system, came railroads now forming parts of the Lackawanna and the Central Railroad of New Jersey systems, and more recently the extension of the Hudson and Manhattan tube service to the city. For five months in 1916 (May 1-Oct. 1) the city was in gala attire, celebrating the 250th anniversary of its founding. In 1917 the city adopted the commission form of government under five commissioners between whom in a like number of groups all former municipal departments were divided. In 1919 the United States Post Office Department selected a tract in the Forest Hill section of the city for a landing field for its aerial mail service. Pop. (1810) 8,008; (1830) 10,953; (1850) 38,894; (1860) 71,941; (1870) 105,050; (1880) 136,508; (1890) 181,830; (1900) 246,070; (1910) 347,460; (1920, Federal census) 414,524. Consult City records; Atkins, 'The History of Newark, N. J.'; 'Records of the Town of Newark, 1666-1836'; Dodd, H. P., 'Newark of Former Days and Newark of To-day' (1907); Urquhart, Frank J., 'A Short History of Newark' (1910, 1916); Newark Public Library, 'The Newarker' (5 vols., 1911-16); Dana, John Cotton, 'The Study of a City in the Schools of that City' (1911).

GEORGE J. HAGAR,
New Jersey Historical Society.

NEWARK, N. Y., village in Wayne County, on the Barge Canal, and on the West Shore, the New York Central and Pennsylvania railroads, about 176 miles west by north of Albany, and 30 miles east by south of Rochester. It was settled in 1820 by people from Rensselaer County in the eastern part of the State. It was incorporated as a village in 1825. It is in a fertile agricultural region, but the village has considerable manufacturing interests, including tinware works, paper box factories, a glass factory, canning and preserving factory and other establishments. Newark has a large trade in farm and dairy products, fruit and its manufactured articles. Its educational institutions are the Union Free School and Academy, the public elementary schools and the free public library. There are several churches and a number of church and literary charitable and educational societies. The State Custodial Asylum for Feeble-Minded Women is located here. The population consists of nearly all native-born Americans, over one-half of whom are of Dutch, German and Irish descent. The water-works are village property. Pop. 6,964.

NEWARK, Ohio, city, county-seat of Licking County, at the junction of three branches of the Licking River and on the Ohio Canal and the Baltimore and Ohio and the Pennsylvania railroads, about 30 miles east by north of Columbus, and within 14 miles of the centre of the State. It was settled in 1802 by a colony from the eastern part of the United States. Nearby are two large mounds which belong to the works of the "Mound Builders." It is in an agricultural region and in the vicinity are valuable deposits of sandstone, extensive,

coal-fields and natural gas. The chief manufactures are glassware, chemical instruments, carriages, hardwood, bottles, electric cars, locomotives, machine shop products, rope, foundry products, flour and lumber products. There are about 160 manufacturing establishments in which there are 12,000 employees. The streets are well paved and well kept. The State encampment ground and the Auditorium, a fine theatre erected as a memorial to dead soldiers of the Civil War, are of much interest. There are 28 churches, a high school, public and parish elementary schools and a public library, established in 1877. The five banks have a combined capital of \$850,000, and the annual amount of business transacted is \$3,600,000. The government is administered under the charters in accordance with the Ohio State Municipal Code. The inhabitants are nearly all American born. Baltimore and Ohio Railroad Company has locomotive and rolling stock repair shops in Newark with more than 2,000 employees. The Wehrle Company operates the largest stove manufactory in the world with 2,500 employees. Newark is the seat of Dennison University with 700 students (coeducational). On its outskirts is Buckeye Lake, the largest inland pleasure resort in Ohio. This lake is nine miles long and from one to two miles in width. Pop. (1920) 26,718.

NEWARK SERIES, in geology, a term applied to that part of the Triassic system (q.v.) in eastern North America. Its limits are Nova Scotia on the north and South Carolina at the south. The typical deposits are near Newark, N. Y., whence the name is taken. The deposits in the series are conglomerates; breccias; thick red sandstones, which must have originated in crystalline waste, as is evident from the comparatively large amount of mica and the feldspaths; and basalt, which accompanies the sedimentary rocks and occurs in dikes and sheets, such that the violent volcanic character of their derivation is made certain. The fossils of the series are scarcely any of marine types, plants and foot-prints preponderating. The commercial value of the deposits of the Newark series is in the brown sandstone building stone of New Jersey and Connecticut, and the coal veins of North Carolina and Virginia.

NEWARK WORKS. See MOUND BUILDERS AND MOUNDS.

NEWBERRY, nū'bĕr-ĭ, **John Strong**, American geologist: b. Windsor, Conn., 22 Dec. 1822; d. New Haven, 7 Dec. 1892. His early life was passed chiefly in the Western Reserve, Ohio, and he was graduated at the Western Reserve College in 1846 and at the Cleveland Medical School in 1848. From 1851 to 1855 he practised medicine in Cleveland. He was assistant surgeon and geologist to the government expedition that explored the country between San Francisco and the Columbia River; also accompanied Lieutenant Ives in his exploration of the Colorado River, and the expedition under Captain Macomb in its exploration from the Santa Fé to the junction of the Grand and Green rivers. His reports upon the scientific results of these expeditions brought him great credit in the scientific world. At the beginning of the Civil War he became attached to the Sanitary Commission, and later secretary of its Western department. He was afterward

connected with the Smithsonian Institution, and with the Columbian (now George Washington) University, Washington, and in 1866 was appointed professor of geology and palæontology at the Columbia College School of Mines, which post he retained till his death. Besides many special reports and parts of general reports, his writings include: 'The Rock Oils of Ohio' (1859); 'Catalogue of the Plants of Ohio' (1860); 'Iron Resources of the United States' (1874); 'The Structure and Relations of Dinichthys' (1875); 'Palæozoic Fishes of North America' (1889); 'Later Extinct Floras' (1898); etc. He was especially conversant with the palæontology of the Carboniferous Era in America, and particularly with extinct fishes; and as a teacher he had great popularity and influence. He was among the early members of the National Academy of Sciences. The most interesting portions of the 'Report on the Colorado River of the West, Explored in 1857-58' (Washington 1861) were written by him and relate to the geology, physiography and Indians of that region. Consult the memoir by J. J. Stevenson in the *American Geologist* (Minneapolis, July 1893), and White, C. A., 'Biographical Memoir of John Strong Newberry' (Washington 1908).

NEWBERRY, Truman Handy, American naval commander and financier: b. Detroit, 5 Nov. 1864. He was graduated at Yale University in 1885 and entered the railroad business. His industry soon made him a prominent figure in business and financial enterprises of his State. Newberry was one of the organizers of the Michigan State Naval Brigade, serving as landsman (1895), lieutenant and navigator (1897-98). In the Spanish-American War he participated in the attack of the *Yosemite* on the Spanish munitions ship, *Antonio Lopez*. In 1899 he was appointed colonel and aide-de-camp to the governor of Michigan; and later became Assistant Secretary of the Navy (1905-08). On the retirement of Secretary Metcalfe, he was appointed Secretary of the Navy in the Cabinet of President Roosevelt, serving from December 1908 to March 1909. In the European War, Mr. Newberry was given the post of lieutenant-commander of the United States Naval Reserve. In 1918 he was elected to the United States Senate.

NEWBERRY, S. C., city, county-seat of Newberry County, on the Atlantic Coast Line and the Southern railroads, about 40 miles northwest of Columbia. It is in a region in which the cultivation of cotton is one of the chief industries. It has manufacturing establishments for cottonseed-oil, cotton goods, preparing cotton for shipment, coffins, fertilizers and lumber products. It has considerable trade, chiefly in cotton products, fruits and vegetables. It is the seat of Newberry Lutheran College and has a handsome city hall and courthouse. The electric-lighting plant and waterworks are civic property. A mayor and unicameral council elected every two years administer city affairs under a charter of 1894. Pop. 6,000.

NEWBERRY LIBRARY, Chicago, Ill., is a free library of reference established in 1887 and maintained by a moiety of the estate of Walter Loomis Newberry (1804-68), a pioneer merchant of Chicago. Since 1894 it has occupied a fine structure of Spanish-Romanesque

architecture built of Connecticut granite, situated on Walton place, between Dearborn avenue and North Clark street. The collection consists of over 375,000 books, pamphlets, manuscripts, etc., representative of the principal fields of knowledge and branches of learning which fall within its province; bibliography and the history of printing, religion and theology, philosophy, psychology and ethics, history, political science, geography, biography, language, literature and (in part) the fine arts. The original plans of the trustees contemplated the gathering of a general collection of reference and source books on all subjects. Later, however, a co-operative arrangement was entered into with the Chicago public and other libraries under which the field of knowledge was roughly divided among them, and a policy of non-duplication of books was adopted. In each of its divisions the library possesses many treasures, making it one of the most valuable book collections in the United States. Under the head of education, notably, teachers will find an excellent working collection of authoritative works on the past history of their profession and on its present condition, tendencies, methods, theory and practice. The majority of the books are, naturally, mainly intended for the use of professional scholars, but all classes of readers from the most learned investigator to the boy or girl seeking information for school use are welcomed.

NEWBERRY, John, English publisher and bookseller: b. Waltham Saint Lawrence, Berkshire, 1713; d. London, 22 Dec. 1767. Going to London he began in 1745, in Saint Paul's Churchyard, the publishing and selling of books, which he combined with the sale of patent medicines. He also published *The Universal Chronicle* and *Weekly Gazette*, in which Johnson's 'Idlers' appeared, and *The Public Ledger*, in which Goldsmith's 'Citizen of the World' was printed. Newbery made a specialty of books for children, and published the 'Juvenile Library,' a choice collection of volumes, among which were 'Goody Two Shoes,' 'Tommy Trip and His Dog Jowler' and other surviving favorites. He was also publisher of the first religious periodical *The Christian Magazine*.

NEWBOLT, Sir Henry John, English author: b. Bilston, Staffordshire, 6 June 1862. He was educated at Clifton and Oxford and was called to the bar of Lincoln's Inn in 1887. After practising his profession till 1899 he established the next year the London *Monthly Review*, which he edited until 1904. He has published 'Taken from the Enemy' (1892); 'Mordred' (1895); 'Admirals All' (1897); 'The Island Race' (1897); 'Stories from Froissart' (1899); 'Froissart in Britain' (1900); 'The Sailing of the Long-Ships' (1902); 'Songs of the Sea' (1904); 'Songs of the Fleet' (1910); 'The Old Country' (1906); 'The New June' (1909); 'Songs of Memory and Hope' (1909); 'The Twymans' (1911); 'Poems New and Old' (1912); 'The Book of the Blue Sea' (1914); 'The Book of the Thin Red Line' (1915); 'History of the Oxfordshire and Buckinghamshire Light Infantry' (1915); 'Tales of the Great War' (1916); 'The Book of the Happy Warrior' (1917); 'A New Study of English Poetry' (1917). Certain of his patriotic poems, such as 'Admirals

All,' 'Playing the Game,' 'Drake's Hymn' and 'The Vigil,' have established his fame.

NEWBOLT, William Charles Edmund, English Anglican clergyman and author: b. Somerton, Somerset, 14 Aug. 1844. He was educated at Oxford, was vicar of Dymock 1870-77, and of Malvern Link 1877-88. He was principal of the Theological College, Ely, 1887-90, and is a canon and chancellor of Saint Paul's Cathedral. Among his published works are 'Counsels of Faith and Practice' (1883); 'The Fruit of the Spirit' (1888); 'The Prayer Book: its Voice and Teaching' (1889); 'Religion' (1889); 'The Dial of Prayer' (1901); 'Apostles of the Lord' (1901); 'Priestly Blemishes' (1902).

NEWBORN, a sect of Antinomians, which arose in the United States in the early part of the 18th century. Its founder was a German immigrant, named Mathias Bawmann (who died 1727). They held the doctrine of the deification of humanity by regeneration and that those who were regenerates were, like Christ, incapable of sin. They denied that the Bible was necessary for the illumination of Christians, and scoffed at the sacraments. They claimed that their regeneration or newbirth was brought about by dreams, apparitions and supernatural inspiration, and was like the new name written on the white stone and known only to him that receiveth it (Rev. ii, 17). The sect survived the death of its founder by about 20 years.

NEWBURGH, nū'bèrg, N. Y., city in Orange County, on the west bank of the Hudson River, and on the Erie and the West Shore railroads, 58 miles north of New York. The first settlement was made by emigrants from the Rhenish Palatinate, in the winter of 1708-09. They called the place, "Palatine Parish by Quassaic." The Germans were soon followed by emigrants from Great Britain, and in 1750 the English and Scotch were there in numbers sufficient to change the name to "Parish of Newburgh" in memory of Newburgh, in Aberdeen County, Scotland. Before the Revolution the farmers from the river brought their produce here to be sent to market. The lumber trade was most important; ships were built for trade with the West Indies and London; and at one time whaling was an industry of Newburgh. The city occupies a prominent place in the history of the Revolution. It was Washington's headquarters from March 1782 until 18 Aug. 1783. The "Hasbrouck House," which Washington occupied in Newburgh, was purchased in 1849 by the State of New York, and is now used as a museum for Revolutionary and Colonial relics. It is in charge of a board of trustees who have had it restored as when Washington occupied it. While in Newburgh, Washington received the letter (see NICOLA, LEWIS) asking him to become king; here the army was disbanded, and from here the Newburgh Addresses (q.v.) were issued. In 1800 Newburgh was incorporated as a village, the third in the State. After its incorporation the enterprising inhabitants built turnpikes to the farming sections west of the village, and in this way secured the trade of the farmers in the vicinity. Until 1830 sailing vessels plied regularly between New York and Newburgh, but after that date steamboats were used. The

opening of the Erie Canal diverted considerable trade from the village. The first general rowing regatta on the Hudson River was held here in 1837. Others followed in 1840, 1841 and 1842. The country around has many places of historical interest. (See *NEW YORK*). It was granted a city charter in 1865.

The city, viewed from the Hudson River, presents a pleasing arrangement of terraced slopes, broad, clean streets, many trees and beautiful buildings. It is about 310 feet above the river, or Newburgh Bay, as the river expansion here is called. It is in an agricultural region, the commercial centre of an extensive section and of a number of large industries. The chief manufactures are machine-shop products, plaster, cotton and woolen goods, felt hats, silk, leatherette, powder, paper, paper boxes, soap, ice machines, perfumes, furniture, springs, leather, carpets, flour, lumber, foundry products, dairy products, overalls and cigars. It has ship yards, extensive coal, brick and lumber yards. Large quantities of coal from Pennsylvania are brought here to be loaded in coasting vessels and barges. On the northeast corner of the grounds surrounding the "Headquarters" is the "Tower of Victory," made of stone, 53 feet high, with four archways leading into an atrium, and stairways leading into a belvedere. It contains a bronze statue of Washington, copied by O'Donovan from Houdon's model. Other statues represent the soldiers in the War of the Revolution. A tablet bears an inscription telling that the monument was erected by the authority of the Congress of the United States and of the State of New York. It cost \$67,000. The block of brownstone near the entrance marks the grave of Uzal Knapp, the last survivor of Washington's Life Guard; died in 1856. Newburgh has the first free public library in the State, a hospital, orphanage, county tuberculosis sanitarium and home for the friendless. Its educational institutions include several large public and parish schools (Roman Catholic), a free academy, Saint Patrick's Academy and Mount Saint Mary's Academy. There are 25 churches, one of them for colored people. The government is administered under Plan C of the Optional Charter Law of the State, which provides for a mayor and four councilmen, elected for four years. These five select a city manager who wields the executive power. The city owns and operates the waterworks. Pop. 30,366. Consult Ingersoll, 'Handy Guide to Hudson River'; Nutt, 'Newburgh: Her Institutions, Industries and Leading Citizens' (1891); Ruttenber, E. M., 'Town of Newburgh'; Powell, L. P., 'Historic Towns of the Middle States' (New York 1899).

NEWBURGH ADDRESSES, in *American history*, a term applied to two anonymous letters, appearing in 1783, after the close of the Revolution. They were written upon behalf of the American soldiers whose pay had been withheld. It was afterward made known that General John Armstrong was the author of the letters.

NEWBURGH SEDITION, in *American history*; while General Washington had his headquarters in Newburgh, on the Hudson, December 1782, great dissatisfaction manifested itself among his officers, and they addressed a memorial or "round robin" to Congress, de-

manding their back pay, and security for future services. Congress refused to grant the demands, and in the following March an attempt was made to inaugurate a revolt. The matter became so serious that Washington appeared before a meeting of the malcontents and delivered such a patriotic address that the spirit of insubordination immediately disappeared.

NEWBURYPORT, nū'būr-i-pōrt, Mass., city and one of the county-seats of Essex County, on the Merrimac River, three miles from the sea, 35 miles northeast of Boston and on the Boston and Maine Railroad. It extends for about three miles along the bank of the river, but the streets leading back from the river are short; High street, the principal residence street, lies parallel with the river, and State street, the chief business street, is perpendicular to it. In the upper part of the city the river is crossed by a chain bridge (built 1792), the first suspension bridge in America. Among the notable buildings are the Putnam High School, the Anna Jacques Hospital, the Y. M. C. A. Memorial Building, the Old South Church, which contains the remains of George Whitfield, Marine Museum, Old Ladies' Home, and the public library, formerly the old Tracy mansion, where Washington and Lafayette were entertained; the library contains about 40,000 volumes. The house in which William Lloyd Garrison was born is also in the city. In the days of wooden sailing vessels, the chief industry of Newburyport was shipbuilding, and many of the most famous clipper ships were built there; some small vessels are still built. The harbor is good, but access to it difficult on account of the shifting sand bar at the mouth of the river; there is a considerable trade in coal brought to the city by coasting schooners. The more important industries now include boot and shoe factories, cotton factories, hat shops, an iron foundry, comb factory and a silver factory. The mayor, city council and board of aldermen are elected annually. The city owns and operates its waterworks, which were bought from a private company after considerable litigation. Newburyport was settled about 1635, separated from the town of Newbury in 1764, and chartered as a city in 1851. Theophilus Parsons made his home here and it is also the birthplace of Francis C. Lowell. It sent a large quota of troops to the Civil War, and many of its citizens, who were sea-captains, received money from the Alabama claims. Consult Currier, J. J., 'History of Newburyport' (Newburyport 1906); Hurd, D. H., 'History of Essex County, Mass.' (Philadelphia 1888); Smith, 'History of Newburyport, Mass.' (Boston 1854). Pop. 15,618.

NEWCASTLE, Margaret, DUCHESS OF. See CAVENDISH, MARGARET.

NEWCASTLE, Thomas Pelham Holles, 1ST DUKE OF, English Prime Minister: b. England, 1693; d. 17 Nov. 1768. He was the son and heir of the 1st Lord Pelham and as one of the largest land-owners in England his influence, which he used freely in the service of the king, won favor at court and he was made Duke of Newcastle in 1715. He was appointed secretary of state in 1724 under Walpole, to whose downfall he contributed, and held his

post until he succeeded his brother as Prime Minister in 1754. He retired in 1756 owing to his incompetent conduct of the French War, but was recalled in 1757 and formed the ministry so notable because of the dominating brilliancy of Pitt. He was forced out by Bute in 1762, and afterward lived a retired life with the exception of holding for a few months in 1765 the office of Lord Privy Seal. Newcastle was a small man for whom wealth and social position obtained high offices. He was ignorant of the most elementary things. Such abilities as he had lay in the manipulation and purchase of votes in Parliament, on which he spent money freely.

NEWCASTLE, William Cavendish, DUKE OF. See **CAVENDISH, WILLIAM, DUKE OF NEWCASTLE.**

NEWCASTLE, Del., city in New Castle County, on the Delaware River, and on the Philadelphia, Baltimore and Washington, and the Philadelphia and Reading railroads, about seven miles south of Wilmington. It was settled, in 1640, by Swedes. Later it was occupied by the Dutch and then by the English. Newcastle was the place where, in 1682, William Penn landed in America. In 1875 it was incorporated. It is in an agricultural region of fruit orchards and market gardens. Its good harbor, regular steamer connection with large cities, and railroad facilities make it an excellent shipping point for farm products, fruit and vegetables. Considerable fish, especially shad, are caught in the nearby waters. Its chief manufactures are flour, brick, canned goods, woolen and cotton goods, iron products, and men's underclothing. Newcastle has a library founded in 1812, several buildings dating back to Colonial times and two parks. Pop. 3,351.

NEWCASTLE, Ind., town, county-seat of Henry County, on the Blue River, and on the Pittsburgh, Cincinnati, Chicago and Saint Louis, the Cleveland, Cincinnati, Chicago and Saint Louis and the Lake Erie and Western railroads, about 45 miles northeast of Indianapolis. It is in a fertile agricultural and also a manufacturing region. The chief manufactures are agricultural implements, flour, paper boxes, iron and steel products, automobiles, caskets, scales, bridges, lathes, bridge works, pianos, brass furniture, carriages, brick and furniture. It has natural gas, good water power and excellent transportation facilities. Nearby is the Indiana village for epileptics comprising 1,250 acres. The city owns and operates the street-lighting plant and the waterworks. Pop. (1920) 14,458.

NEWCASTLE, Pa., city and county-seat of Lawrence County, situated about 50 miles north of Pittsburgh, at the confluence of the Shenango, the Neshannock, and the Mahoning rivers, which there form the Beaver River, and on the Pennsylvania, the Baltimore and Ohio, the Erie, the Pittsburgh and Lake Erie and the Buffalo and Pittsburgh railroads. The city covers an area of 4,773 acres and, situated as it is in one of the richest and most charming valleys in the world, and having unequalled advantages of water power and railway facilities, it offers exceptional opportunities to the ever-increasing population.

Aside from being the commercial centre for a productive agricultural region, the city is in the heart of rich deposits of iron ore, limestone, coal and clay, and is noted for its great variety of industries. These comprise steel and rolling mills, blast furnaces, tinplate mills, car shops, wire works, paints, hosiery, rubber tires, heating apparatus works, also manufactories of machinery, boilers, castings, blast furnace jackets, pottery and table ware, and vitreous sanitary ware.

Prominent among the public buildings are the United States Government Building, containing the post office, the city hall, the opera house and the Y. M. C. A. building, containing a large library, presented by Ira D. Sankey the evangelist. The Shenango Valley Hospital and the Almira Home for Aged Women are located there.

The inhabitants of the city worship in over 35 church edifices representing nearly all denominations. The educational advantages are of the highest standard of excellence; the pupils are accommodated and receive instructions in a high school supplemented with several graded public schools, while a well sustained business college prepares young men and women for commercial life. Besides these there are also several excellent parish schools.

Newcastle stands high in the average of highways paved; the public improvements have practically all been the outcome of the marvelous growth of the city within the last two decades; during that time the electric railway system, connecting with all the surrounding cities and towns, has been built; a complete system of arc lights has been introduced, the capacity of the water system trebled, and an excellent sewerage system constructed. Cascade Park, an amusement resort, was established by the traction company. The Old Park Cemetery and the Graceland cemeteries are the largest of the "cities of the dead." Newcastle was first settled in 1800 by Robert White; became a borough in 1869, and was chartered as a city in 1875. In 1914 the commission form of government was adopted. Pop. (1920) 44,938.

NEWCASTLE-UPON-TYNE, England, a parliamentary, municipal and county borough and episcopal city, in Northumberland County, and on the northern bank of the Tyne, nine miles from its mouth. It is about 272 miles northwest by rail from London and 124 miles southeast from Edinburgh. It occupies the sides and summits of hills that rise steeply from the river. Coal measures constitute the geological formation; and they stretch southwards to Ferry Hill, northwards to Chevington.

Public Buildings.—The principal public buildings are the Moot Hall (the Northumberland assizes are held here); the Hancock Museum (it contains the collection of John Hancock the naturalist, and many drawings of birds, etc., by Thomas Bewick, the engraver); the Keep of the old Castle, built in Henry II's reign and the Black Gate, at the entrance to the Castle yard (now used as an antiquarian museum). Of other buildings there may be mentioned the Town Hall; the Old Assembly Room; the guildhall (in which is the assize court of Newcastle), and below it, the Exchange; and the Grain Warehouse, on the Quayside. There are one central public and

four branch libraries, three of the latter donated by Sir W. H. Stephenson and one by Mr. Andrew Carnegie; while the Literary Philosophical Society, the Society of Antiquaries and the Church Institute have libraries attached. The Laing Art Gallery was donated by Mr. Alexander Laing in 1904. Of the theatres the chief are the Tyne Theatre and the Theatre Royal.

Places of Worship.—The cathedral church of Saint Nicholas has a famous lantern tower, which was added by Robert de Rhodes about 1450, 100 years after the completion of the church. The tower has been copied elsewhere but never equaled. The clock weighs two tons and is controlled from Greenwich. The largest peal of bells weighs 5 tons 18 cwt. Saint Andrew's is said to be the oldest church in Newcastle, but Saint John's disputes the claim. Saint Mary's Cathedral (Roman Catholic) was designed by Pugin; its charming spire was added in 1872.

Schools, Educational Institutions, etc.—Dame Allan's School, Saint Cuthbert's Grammar School (R. C.), Deaf and Dumb Institute, Northern Counties Orphanage, Church High School for Girls, Central High School, Royal Grammar School, etc. The Armstrong College was founded in 1871 by the University of Durham (to which it is affiliated) and the North of England Institute of Mining and Mechanical Engineers. The College of Medicine (also affiliated to the University of Durham) was built in 1887, and cost £31,000. Rutherford College, not affiliated to the University, was founded by the late Dr. Rutherford.

Municipal Enterprises.—The chief municipal undertakings are the markets, the public libraries, fire brigade, electric tramways, baths and washhouses.

Parks, Hospitals, Bridges.—Town Moor (said to have been held by the burgesses from time immemorial), 927 acres; Leazes, 86 acres; other parks and recreation grounds, 270 acres. The old Royal Infirmary is near the Central Station close to the Armstrong College; a new one to commemorate Queen Victoria's Diamond Jubilee was opened in 1906. Other hospitals, etc., are the Eye Infirmary, Fleming Memorial Hospital for Children, Hospital of Diseases of Throat and Ear, for Incurables, etc. The chief bridges over the Tyne are the High Level, 1,375 feet long, with the railway track 112 feet above high water (built by Robert Stephenson, 1846–50, at a cost of nearly £500,000); the Redheugh; the hydraulic swing bridge (built by Lord Armstrong at a cost of £233,000); and a new railway bridge (North Eastern Railway), opened by the king in July 1906. The Byker bridge crosses the Ouseburn and serves foot and vehicular traffic; whilst a railway viaduct, just to the north of it, carries the traffic of the North Eastern Railway.

Industries and Manufactures.—The coal mines are now all outside the city boundaries. Elswick Ordnance Works are in the west of the city, and this section is famous also for its cycles. The most notable other industries are engineering and shipbuilding. To them may be added the trade in lead, chains and anchors, the manufacture of cement, of steam winches and windlasses, of cordage and cable, paper, cranes, pumps and electric machinery. The

chemical trade, formerly active, has declined of late years. The chief exports are coals, machinery, chemicals, manures, cement, manufactured iron, paints, tar, fire-bricks, fire-clay, etc. Quays are built all down the river side; the docks have 19 feet at low water and accommodate vessels of about 7,000 tons.

History.—The town (first called Pons Ælii, then Novocastria, then Monkchester, then Newcastle-upon-Tyne) is situated near the eastern termination of the Wall of Hadrian, and Roman antiquities have been repeatedly discovered in it. In the Anglo-Saxon period it was a monastic centre. The fortress was built by Robert, son of William the Conqueror, about 1080. It was rebuilt by William Rufus, his younger brother, who "buylded the Newcastle upon the Tyne, the Scots for to gaynstande and to defende." About this time the town received its present name. It received a charter from King John, but the oldest extant is said to be by Henry III in 1239, which confers the right of digging for coal in the neighborhood. The coal trade had attained some importance by 1280. Newcastle was a frequent object of attack, and was repeatedly taken in the wars between England and Scotland. It furnished 17 ships to Edward III for the siege of Calais. It was taken by the Scottish Covenanting army in 1640 and in 1644, and in 1646 Charles was delivered here by the Scottish army to the parliamentary commissioners.

Government.—The city is governed by lord, mayor, sheriff, and council. In the year 1400 a royal charter created Newcastle a county in itself, and Newcastle's first sheriff was appointed in that year. In 1600 the great charter (confirming old privileges and adding new ones) was passed. In 1882 a royal charter created Newcastle a city. In 1906 it was made a royal borough. It is the seat of a United States consul. The city returns members to the House of Commons. Pop. 266,603.

Bibliography.—Bruce, 'Reid's Handbook to Newcastle' (1863, rev. ed. 1903); Gray, 'Chorographia' (1649, re-edited by Crawhall and Reid 1884); Histories by Bourne (1736); Brand (1798); Mackenzie (1827), and Welford (1883–87); Sykes, 'Local Records' (1833); Fordyce, 'Local Records' (1867–76); Guthrie, 'River Tyne' (1880); Rendel, 'Newcastle on Tyne: Its Municipal Origin and Growth' (1898); Richardson, 'Handbook to Industries of Newcastle and District' (1889); Johnson, 'Making of the Tyne' (1895); Heslop, 'Northumberland Words' (1893–94); Corporation Manual, current date, etc.

NEWCOMB, nū'kom, Harry Turner, American lawyer and statistician: b. Owosso, Mich., 4 Jan. 1867. He was graduated from the law department of Columbian University in 1891, and entered the offices of the Chicago, Milwaukee and Saint Paul Railroad in 1882. In 1895–99 he was chief of the transportation department of the division of statistics in the United States Department of Agriculture, and in 1899–1901 was expert chief of the division of agriculture for the United States census. In 1896–1901 he was lecturer on statistics at Columbian University, and in 1901–02 he was editor of the *Railway World*. He began the practice of the law in 1902 and was almost im-

mediately employed as counsel for the Philadelphia and Reading Coal and Iron Company in the arbitration before the Gray commission which settled the anthracite strike of 1902. He organized the firm of Newcomb, Churchill and Frey in 1907 and is now the senior member of Newcomb and Frey, its successor. His practice is chiefly in corporate matters and cases involving the law of interstate commerce and those of taxation, in all of which the principles of jurisprudence are in process of adjustment to meet new economic conceptions and conditions. He has written 'Railway Economics' (1898); 'The Postal Deficit' (1900); 'The Work of the Interstate Commerce Commission' (1905); 'Constitutionality of the Delegations in the Interstate Commerce Law' (1910), etc.

NEWCOMB, Simon, American astronomer: b. Wallace, Nova Scotia, 12 March 1835; d. Washington, D. C., 11 July 1909. He came to the United States in 1853 and taught in Maryland; computed on the *Nautical Almanac* at Cambridge 1857, and was graduated from the Lawrence Scientific School at Harvard 1858. He was appointed professor of mathematics in the United States navy in 1861 and assigned to duty at the Naval Observatory; negotiated contract for and supervised construction of the great telescope; was secretary of the transit of Venus commission (1871-82); and observed transit at the Cape of Good Hope in 1882. He also directed several parties to observe eclipses beginning in 1860. From 1877-97 he was senior professor of mathematics and superintendent of the *Nautical Almanac* office. He retired from active duty in the navy (1897) at the required age of 62, and thereafter devoted himself to both pure and popular science. He was professor in Johns Hopkins University 1884-94 and editor of the *American Journal of Mathematics*, retiring in 1901. He was a member of learned societies throughout the world. Since 1874 he was correspondent and since 1893 associate of the Institute of France, being the first native American to receive the latter honor since Franklin; he was also an officer of the Legion of Honor. He received distinctions and degrees from governments and universities in most civilized countries.

He lectured at Harvard, the Lowell Institute at Boston, etc., and delivered opening addresses at the Flower, Yerkes and other observatories. In connection with his work on mathematical astronomy, besides over 100 papers published in various scientific journals, he has written large works 'On the Secular Variations and Mutual Relations of the Orbits of the Asteroids' (1860); 'An Investigation of the Orbit of Neptune' (1874); 'Researches on the Motion of the Moon' (1876); 'Theory of the Inequalities in the Motion of the Moon' (1894); 'Tables of Uranus'; 'Measure of the Velocity of Light' (1884); 'Uranian and Neptune System'; 'Astronomical Constants and Eclipse Tables.' He founded the *Astronomical Papers of the American Ephemeris* and edited the first eight of this series, which contain his tables of the planets and of the stars now used by astronomers all over the world. This work contains Newcomb's famous lunar researches. Among his more popular writings are 'Popular Astronomy' (1878); 'School Astronomy'; 'Elements of Astronomy' (1900); 'Algebra Geometry'; 'Analytical Geometry'; 'Cal-

culus'; 'Essentials of Trigonometry'; 'The Stars' (1901); 'Astronomy for Everybody' (1902); 'A B C of Finance'; 'A Plain Man's Talk on the Labor Question' (1886); 'Principles of Political Economy' (1887); 'His Wisdom the Defender' (1900); 'Reminiscences of an Astronomer' (1903). He was given the rank of rear-admiral by Congress in 1906, and on his death in 1909 was given a military funeral. For an account of his place in science, see Benjamin, M., paper in 'Leading American Men of Science' (New York 1910), edited by D. S. Jordan.

NEWCOMB MEMORIAL COLLEGE FOR WOMEN, New Orleans. See TULANE UNIVERSITY.

NEWCOMEN, nū-kōm'ēn, Thomas, English inventor of the atmospheric steam engine: b. Dartmouth, Devonshire, February 1663; d. London, August 1729. With the financial help of John Cawley he experimented on Savery's engine, patented 1698, possibly had made previous study of the same problem at an earlier date and may have been a partner with Savery in the patent taken out in 1710. His improvement of Savery's engine consisted principally in separating boiler, pump and condenser. Steam was let into a cylinder from below and a piston above was thus forced up so that a pump rod attached to it by a balance arm was driven downward; cold water was then introduced into the condensing cylinder, a vacuum was there formed, and the external atmospheric pressure drew the piston down into the cylinder, the pump rod being forced up by this action. Newcomen's engine is practically the modern type, which, however, has Watts' condenser; it was successfully used, notably for pumping water from mines. See STEAM AND STEAM ENGINES.

NEWCOMES, The, by Thackeray, published in 1854-55, the last of the four very great novels of the author, is more closely united to 'Pendennis,' to which it is a quasi-sequel, than to 'Vanity Fair' or 'Esmond.' As the theme of 'Vanity Fair' presented a section of life in which most human endeavor ultimately turns to dust and ashes, and 'Pendennis' isolates with almost epic impressiveness the phenomena of the young man, so the 'Newcomes' dwells almost chiefly on family relations. As in the earlier stories Thackeray was faithful to what he saw, and the picture is a powerful one. It is a picture of family rivalry, intrigue, ambition, ill-feeling, worldliness, jealousy, weakness, credulity and many other unattractive characteristics. On the whole the various members of the family are represented in no amiable light: Barnes Newcome is especially detestable, and most of the other Newcomes are mean and selfish. The amiable weakness of the hero, Clive, deserves a better fate than his temporary martyrdom at the tongue of Mrs. Mack the Campaigner, most abominable of mothers-in-law. The two most famous and likable characters, Colonel Newcome and his niece, Ethel Newcome, though they have faults of the head if not of the heart, relieve the general impression. They are the real hero and heroine of the book, and are among the best-known characters in English literature; they are fairly representative of the great vividness and intensity of feeling with which the novel is writ-

ten. Like most of the author's novels, 'The Newcomes' is often highly satirical of English society, Barnes Newcome, Honeyman and young society ladies being specially ridiculed. Certain passages, notably that of the death of Colonel Newcome, are among the famous pieces of writing in English literature. Consult various lives, as that by Trollope and Mrs. Ritchie's introduction in the biographical edition of Thackeray's works.

WILLIAM T. BREWSTER.

NEWDIGATE (nū'dī-gāt) **PRIZE**, a prize in Oxford University, annually awarded for an English poem. It was founded by Sir Roger Newdigate, Bart. (1719-1806), its value being \$110. Among the winners have been several well-known men, such as Ruskin, Matthew and Sir Edwin Arnold, John Addington Symonds and W. H. Mallock.

NEWEL, in architecture, the central space or column round which the steps of a circular staircase are wound. When there is no central pillar the newel is said to be open. The term newel post is also used in this connection.

NEWELL, Frederick Haynes, American engineer, founder of the United States Reclamation Service and its chief engineer from 1902 to 1914: b. Bradford, Pa., 5 March 1862. He was graduated at the Massachusetts Institute of Technology in 1885. Soon after joining the United States Geological Survey in 1888 the director, J. W. Powell, placed him in charge of water investigation, steam gauging and reservoir site surveys, a work which finally developed into the Reclamation Service created by act of Congress, 17 June 1902. Under his direction were built the Roosevelt, Pathfinder, Elephant Butte, Arrowrock and other great dams, and the Gunnison tunnel for the reclamation of about 3,000,000 acres in the West. This work was done with a fund which from 1902 to 1914 amounted to about \$100,000,000. He was member of the commission on revision of land laws, the Inland Water-Ways Commission and of the Natural Advisory Board for fuels and structural materials. After resigning from the Reclamation Service in 1914 he was consulting engineer to that organization until appointed head of the civil engineering department of the State University of Illinois at Urbana. He is the author of 'Hydrography of the Arid Region' (1891); 'Agriculture by Irrigation' (1894); 'The Public Lands of the United States' (1895); 'Irrigation' (1902), and many special reports.

NEWELL, Peter ("SHEAF HERSEY"), American illustrator and humorist: b. McDonough Co., Ill., 5 March 1862; d. 15 Jan. 1924. He was educated at Bushnell, Ill., worked for a photographer, drew crayon portraits, studied in New York at the Art Students' League and in the early 90's became famous for his whimsical illustrations to humorous books and for his own pictures with text, which appeared in various periodicals and were collected as 'Tonys and Turvys' (1893-94), 'Peter Newell's Pictures and Rhymes' (1899), etc. His later work with its striking use of flat tones, possibly traceable to Japanese influence, is to be seen in the illustrations to Lewis Carroll's 'Alice in Wonderland,' 'Alice in the Looking-Glass,' 'The Hunting of the Snark,' 'Mr.

Munchausen,' 'Book of Clever Beasts,' etc. His more recent publications are 'The Hole Book' (1908); 'Jungle Jangle' (1909); 'The Slant Book' (1910); 'The Rocket Book' (1912).

NEWELL, Robert Henry, American humorist, whose pseudonym was "ORPHEUS C. KERR," that is "Office Seeker": b. New York, 13 Dec. 1836; d. Brooklyn, 1 July 1901. He was educated in New York; became assistant editor of the *Sunday Mercury* in 1859; for it wrote his first 'Orpheus C. Kerr Papers,' which were continued in three volumes (1861-64), none possessing much deeper humor than the kind suggested by the title. He was a war correspondent of the *New York Herald*; acted as an editor of the *New York World*, then of the *Daily Graphic*, and later of the *Hearth and Home*, which he left in 1876. In 1878 he began to suffer with writer's cramp and letter-blindness, from which he never recovered. Besides his humorous sketches Newell wrote 'There Was Once a Man,' an anti-Darwinian romance (1884); 'Avery Glibun' (1867); 'The Palace Beautiful' (1865), and 'Versatilities' (1871), both volumes of verse; 'The Cloven Foot,' an adaptation of 'Edwin Drood' (1870), and 'The Walking Doll,' a novel of New York life (1872).

NEWFOUNDLAND, The Atlantic Fisheries Dispute. This fertile source of friction between the United States and Great Britain antedates the War of Independence. In those times the American colonists, as fellow-subjects of England, prosecuted the fisheries of the Grand Banks and Saint Lawrence Gulf on equal terms with the inhabitants of Canada and Newfoundland. During the Revolution the Americans could not exercise it, but by the Treaty of 1783 they regained this liberty. The War of 1812 abrogated it again and seizures of their vessels for attempting to prosecute the industry brought about the Convention of 1818, which fixes the status of the question at present.

The agreement of 1818, known in diplomacy as the Convention of Ghent, is somewhat remarkable. The American commissioners claimed that they still possessed the privileges formerly enjoyed by them as British colonists although war had intervened and they had become an independent nation. The audacity of the claim startled the English government, who answered that it was preposterous. The Americans were bold and insistent, they had many friends,—and as every one desired peace and harmony the convention finally agreed on a compromise on the question. The British government were ignorant both of the geography and the trade of Newfoundland, and they considered the fishing rights they were giving away as practically valueless.

By this treaty the United States abandoned all claims to fishing within the territorial waters of the British North American possessions elsewhere, in return for the right to catch fish inshore on the southwest coast of Newfoundland, between Ramea Isles and Cape Ray; on the west coast, between Cape Ray and Quirpon Isles; on the coast of Labrador, from Mont Joli, opposite Anticosti, eastward and northward indefinitely; and on the shores of the Magdalen Islands, with the further privilege of landing to dry and cure their catch on the un-

settled portions of the southwest coast of Newfoundland and along Labrador.

Differences as to the extent of the territorial jurisdiction and the interpretation of the treaty made the question one of serious menace to Anglo-American amity, owing to the vigorous stand taken by Canada (including Newfoundland) against the American fishermen, until 1854, when by a reciprocity treaty the Canadian fishery products were granted free entry into the United States. This accord was abrogated by Congress in 1866, the Convention of 1818 being reverted to. At once friction revived, and in 1871 it became necessary to conclude the "Washington Treaty," which embraced a series of articles dealing with the fishery problem. These provided for reciprocal fishing concessions in Canadian waters, and in American waters north of lat. 36°, but as Canada claimed that America secured the more valuable privileges an arbitration to dispose of this point was agreed upon. The fishery articles became operative 1 July 1873, the arbitration was held at Halifax (Nova Scotia) in 1877, and the tribunal, presided over by M. De la Fosse, Belgian Minister at Washington, awarded Canada \$5,500,000, of which \$1,000,000 went to Newfoundland. Congress abrogated the "fishery articles" in 1885, and again the Convention of 1818 governed this entanglement with the result of further trouble, so that in 1888 another fishery treaty, on similar lines to its predecessors, was arranged between the plenipotentiaries, Secretary Bayard and Mr. Chamberlain, only to be rejected by the United States Senate.

At this point Newfoundland and Canada parted company, so far as their attitude toward the United States was concerned. A *modus vivendi* for two years, to admit of the treaty being adequately considered by the Senate, had been arranged between the high contracting parties, granting American fisher-vessels, on payment of a license of \$1.50 per ship-ton, the right to enter the non-treaty waters of Canada and Newfoundland to purchase bait, ice, stores, and outfits; to transship cargoes and to hire men. When the treaty was rejected Newfoundland saw that fishery reciprocity between the United States and Canada was hopeless, and offered the former an accord on her own behalf. The proposal was accepted in 1891, when Secretary Blaine and Colonial Secretary (subsequently Premier) Bond drafted the Bond-Blaine Convention, providing privileges for American fishermen in Newfoundland waters in return for free entry of Newfoundland fish into American markets.

When it was ready for ratification, Canada protested against it, claiming that Newfoundland should not be allowed to make such a compact without including the dominion, and the British government, to avert a collision between the greater colony and the smaller, pigeon-holed this draft till Canada should have had an opportunity to effect a similar understanding. But this she could not do, though the Conservative and Liberal cabinets both sought terms from Washington, and as neither Canada nor Newfoundland dared abrogate the *modus vivendi* while hoping for a solution of the deadlock the temporary arrangement continued year after year. In 1902 Canada withdrew her protest and Sir Robert Bond revived the moribund draft

with Secretary Hay, the new one being known as the Bond-Hay Treaty, and containing improvements suggested by 12 years of discussion.

In 1904 the United States Senate "amended this to death," at the instance of the New England fishery interests, and then Newfoundland resolved to cancel the *modus vivendi*. This her legislature did by an enactment in April 1905 excluding all American fishing vessels from her non-treaty waters, save for wood, water, shelter or repairs, privileges conceded by the Convention of 1818; and, as regards her treaty waters, restricting them to the mere rights that compact assured to them. The first effect was to hamper them in securing bait for their deep-sea fishing, for which Newfoundland is the natural base, because of its proximity to these shoals. The second was to partially destroy the winter herring fishery on the west coast. Here they have treaty rights, but these are not ample enough to enable them to prosecute this industry successfully, as they need large numbers of coastfolk for netting and the use of the strand for salting or freezing the fish, and the residents were forbidden to work for, or sell to them; it being usual for the Americans previously, with the approval of the colonial government, to buy whole cargoes from the settlers who caught the fish. The withdrawal of these privileges seriously hampered the Americans and lessened their catch. They would, indeed, have fared even worse but that they succeeded in evading the colonial laws by inducing the coastfolk to proceed outside the three-mile limit and hire on board their ships there, returning then into territorial waters and serving as members of their crews.

This claim of the Americans to ship Newfoundlanders outside the three-mile limit and then return with them into port as legally part of their crew was not confirmed at Washington. The State Department discountenanced it and instructed the American fishermen that they only bring into Newfoundland waters crews shipped in American ports.

Newfoundland, early in 1906, passed a further act making it illegal for any of her people to leave her waters for such a purpose, or for any foreign fishing vessel to enter her waters with such men on board, while the Americans were also required to pay light dues, observe colonial fishery regulations, and enter and clear at the custom-houses, which obligations they had declined to subscribe to since the rupture. On one of these questions, the claim of the Newfoundland government to compel all American vessels to enter and clear at the Custom House is unanswerable. All nations have an inherent right to protect their revenues from smuggling. The supply of goods aboard their schooners known as "the slop chest" is solely for this purpose. Canada has always compelled them to enter and clear their vessels when visiting Dominion ports, and Newfoundland claimed the same right. The United States government did not uphold its fishermen on this point. The payment of light dues rests upon the same basis. The most contentious question was, how far are the Americans bound to obey local fishery laws? Where these regulations are general and simply for the protection of the species from destruction, it would seem reasonable that they should be obeyed. One point on which

there was some friction was the right of the Americans to fish on Sunday. This irritated the Newfoundlanders more than anything else and caused the trouble years ago known as "the Fortune Bay Outrage." As grave international problems were involved in the whole question, the British and American governments opened negotiations for an adjustment of it, appeal being made to The Hague Tribunal and the decision was not reached until 7 Sept. 1910, and in July 1912 a supplementary treaty was concluded giving binding effect to those parts of the award which were in the nature of recommendations only.

Taken altogether the award was a victory for the United States. Neither British imperial nor colonial authorities can compel American fishermen to report to the custom houses, nor can they impose upon these fishermen light, harbor or other dues. Hereafter American fishermen can employ Newfoundlanders on their vessels and they will also have the right to purchase supplies and enjoy other commercial privileges in Canadian ports. It was also specified by the tribunal that future disputes regarding fisheries regulations shall be adjusted by an impartial commission selected for that purpose.

Hon. Elihu Root was the chief pleader for the United States at The Hague, while Sir William Robson appeared for Great Britain.

P. T. McGRATH,

Editor (*The Evening Herald*), Saint Johns, N. F.

NEWFOUNDLAND. Geography.—Newfoundland, the tenth largest island in the world, is situated on the east coast of North America, between lat. 46° 37' and 51° 39' N. and long. 52° 35' and 59° 25' W. It occupies much the same geographical position in the New World as the British Isles do in the Old. The colony lies generally in a more southern latitude than the British Isles. It is larger than Ireland, containing 42,734 square miles. It is divided from the continent on the southwest by Cabot Straits, about 60 miles wide, and on the northeast by the Straits of Belle Isle, 10 miles wide. It juts far out into the Atlantic and is the nearest American land to Europe, being only 1,640 miles from Ireland and 1,213 from New York. Labrador, from Hudson's Strait to Blanc Sablon, including the basin of the Hamilton, is included in the Dominion, the remainder of the Labrador Peninsula forming part of the Dominion of Canada. Area, 120,000 square miles with a coast line of about 600 miles facing Newfoundland.

Topographical Features.—On the east coast the land is high and looks very rocky and barren; on the west coast the character of the country changes completely after Cape Ray is passed. Instead of the stern, forbidding mountainous aspect of the east and south coast the land is level, well timbered and fertile. An American artist has declared that the scenery of Bay of Islands on the Newfoundland west coast is the most picturesque in North America. The numerous river valleys are very beautiful, especially the Humber, Codroy, etc. Much of the interior is moorland and marsh, well wooded around the numerous lakes and rivers. Most of the good land lies in these alluvial valleys. The west has a finer climate and the land

generally is superior to the soil of the eastern shore. In the interior there are many isolated peaks. The chain of mountains known as the Long Range extends from Cape Ray for about 100 miles into the interior. There is another high range of mountains near the centre of the island. The highest peak is a little over 2,000 feet. The Atlantic coast line of Newfoundland and the southern shore have noble inlets, bays and harbors, admirably adapted for carrying on its great industry, the cod fishery.

Hydrography.—The peculiar feature of Newfoundland are the innumerable lakes, only two of which are large, Grand Lake and Red Indian Lake. Both are long and narrow, Grand Lake about 60 miles long and Red Indian Lake about 50; but neither is over 10 miles wide in any part. Glover Island in Grand Lake is 52 miles long. The largest river in the island is the Exploits, which is navigable for about 50 miles from the mouth of its estuary. The Humber, Gander, Codroys and Terra Nova rivers are all fine streams, but of no value for navigation except by canoes.

Soil.—In many parts of the island there is very good land, especially in the Codroy Valley, Saint George's Bay and the Humber Valley. Deer Lake, Red Indian, Exploits Arm and the River Valley also contain good soil. Fine timber and good ground fit for cultivation surround both the Gander River and Lake. There is also good agricultural land around Avalon Peninsula. Trinity Bay, S. W. Arm, Green Bay, Notre Dame Bay, some parts of White Bay, Mortier, Placentia, Bonavista and Saint Mary's Bays. There are thousands of acres of splendid grazing ground and fine pasture lands specially suitable for sheep.

Minerals.—Newfoundland is celebrated as a producer of copper and iron, copper from the well-known Tilt Cove mine and iron from Bell Island. Iron of various kinds has been found in the north. The iron output in a recent year amounted to 656,000 tons. Argentiferous galena occurs in Placentia Bay. Asbestos is common and mica. Gold is being worked on a small scale in White Bay and petroleum of excellent quality is now being pumped at Parsons' Pond on the west coast. Slate and marble are abundant. A large deposit of talc has been opened and an aerial tramway built to it near Manuels Conception Bay. The country is almost wholly unexplored and her great mineral treasures, especially her valuable coal deposits, have not yet been tested in an efficient way with the boring machine. They are an extension of the Cape Breton coal fields and extend nearly across the island from Codroy to Green Bay. The annual mineral production is about \$3,000,000 in value.

Climate.—The Summer climate of Newfoundland from June until October is delightful. There is plenty of sunshine but no extremes of heat, seldom higher than 70° in the shade. The winter climate is not so severe as in Canada. Zero is only occasionally touched. The spring is late and the weather variable, due to the influence of the Labrador current which brings along the ice. During the last few decades the climate has improved and there is now no very heavy snowfall or intense frost before the end of November. The fog lies on the coast and only rarely comes in on the land.

Animal Life.—Newfoundland is the home of the woodland caribou. All the interior is one vast deer park where countless thousands of these fine animals range unmolested and unseen by man. Black bears, the grey wolf, now very scarce, the lynx, foxes, beavers and otters are indigenous. The varying hare has been introduced and now swarm all over the island. The Arctic hare is a native as well as the willow grouse and ptarmigan. There are plenty of snipe, ducks and geese, but no woodcock. The rivers abound with salmon and trout; there are no predaceous fishes, such as pike or pickerel.

Agriculture.—The main business of the colony is the fishery. Agriculture is only an auxiliary, and is mainly confined to the coast. The chief crops are oats, potatoes and turnips. There are 231,359 acres under cultivation or in pasture. About 541,000 bushels of potatoes; 11,000 bushels of oats; 65,298 bushels of turnips represent an average year's product. There are about 13,288 horses; 40,000 head of cattle; 100,000 sheep and 30,000 pigs. About \$600,000 worth of agricultural product is imported into the colony every year from the United States and Canada, all of which could be raised in the island. The farming around the capital is excellent. On the west coast, where the very best land is situated, is still very primitive. Before the outbreak of the war the total value of all the agricultural produce raised on the island was about \$2,000,000. This has been greatly increased by enhanced prices and more and better cultivation under the stern necessities of war.

Lumbering.—This industry has been greatly increased by capitalists from Canada and New England. The chief woods are spruce, white and yellow pine, red pine, fir, juniper, birch, witch hazel, aspen and white maple. There are now in operation several paper and pulp mills producing about 100 tons of paper and 250 tons of pulp daily, most of which is exported to England.

Fisheries.—The great industry of Newfoundland is the fishery. The Grand Bank fishery has declined of late but its loss has been made good by the increase of the fishery in coastal waters and along the Labrador Coast. Under the terms of the Anglo-French Convention of 1904 France renounced her exclusive fishing rights under the Treaty of Utrecht, but retained the right to fish in territorial waters from Saint John's Cape north to Cape Ray. In 1909 the Newfoundland fisheries disputes were submitted to The Hague and the award, given in 1910, secured the right of Great Britain to make regulations without the consent of the United States, subject to any limitations imposed by treaty. In the Grand Bank cod fishery in 1914, there were engaged 1,892 men and 105 Newfoundland sailing vessels, aggregating 7,790 net tons. The catch totaled 124,067 quintals of dry fish, valued at \$775,418. The coastal-waters cod fishery for the same year engaged 15,823 small sail vessels, motor boats, etc., and 48,221 men. The catch aggregated 1,032,198 quintals of dry fish, valued at \$6,193,188. On the Labrador fishery over 800 vessels and 5,500 men were engaged. The exports of codfish, including the Labrador fishery, aggregated 1,247,314 quintals. The lobster catch was 11,017 cases in 1914 and 6,022 cases in the year following. In the year 1914 there were eight vessels en-

gaged in whaling. The catch included 142 finbacks, 13 humpbacks; one sperm and five sulphur bottoms, a total of 161 whales, valued at \$85,008. The factories connected with the whaling industry turned out 150,146 gallons of oil, 256 tons of guano and over 80 tons of bone in 1914. The seal fishery in the same year yielded 233,719 seals, but fell to 47,004 in 1915. About 20 steam vessels and 4,000 men were formerly engaged in sealing. Sealing is now restricted by law to one month (16 March–16 April). The total value of all fisheries averages \$10,000,000 annually but in 1917 reached the unprecedented value of \$14,258,555. The codfishery, both in extent of area and in production, is the largest in the world. The most remarkable feature in this great industry is its stability and uniform success. As certain as seed time and harvest there come every year to the shores of Newfoundland the regular supply of the bait fishes in orderly sequence, herring, caplin and squid, and the voracious cod. The seal fishery is much more variable, some years being a complete failure, other years a great success. The industry was formerly prosecuted in sailing vessels, now it is carried on in 23 steamers. In 1918 a cold storage plant was erected for chilling fish, with a capacity of 200,000 pounds per day. During the year the chilled product of this plant was exported to England and fetched handsome prices.

The herring fishery is another large industry. The movements of the fish are sometimes very irregular and the year's catches variable, unlike the steady uniformity of the codfishery which has continued for over four centuries steadily productive. The Labrador herring, once so famous, is now a thing of the past. Owing to judicious protection, salmon are year by year increasing and every season an increasing number of anglers come to enjoy the sport, principally from the United States. See NEWFOUNDLAND, THE FRENCH SHORE QUESTION IN.

Manufactures.—Ship building is extensively carried on in the outports of the colony. There are also a very large number of saw mills, some very small and primitive, others on a large scale with all the best and most modern appliances. Nearly all the other manufactures are carried on at the capital, Saint Johns (q.v.). Paper-making has been inaugurated on a large scale and bids fair to have an annual output worth \$10,000,000.

Trade and Commerce.—The main import trade is done with Great Britain, United States and Canada. Imports in 1914-15 were valued at \$12,693,860; in 1913-14 they were valued at \$15,609,990, comprising textiles, \$1,852,968; flour, \$1,823,551; coal, \$1,066,762; hardware, \$901,756; salt pork, \$753,309; machinery, \$729,225; tea, \$224,382; molasses, \$208,949. The exports in the same year (1914-15) were valued at \$13,501,795 against \$15,549,185 in 1913-14, when there were exported dried cod to the value of \$8,071,899; pulp and paper, \$2,168,164; iron ore, etc., \$1,370,375; herring, \$469,546; seal oil, \$409,060; cod oil, \$386,825; seal skins, \$350,794; canned lobsters, \$347,941. Of the total imports (\$15,549,185) in 1913-14, merchandise to the value of \$3,826,529 came from the United Kingdom, \$5,192,462 from British possessions (mainly Canada) and \$5,796,906 from the United States. Exports to the value of \$3,256,446 were sent to the United Kingdom, \$2,522,159

to British possessions (mainly Canada), \$1,679,362 to the United States and \$7,676,606 to other countries. Imports from the United Kingdom in 1916-17 were valued at \$2,620,033, from the United States, \$10,233,899, and from Canada \$7,412,360. Trade with England is decreasing, whilst business with the States and Canada is on the increase.

The cause of this change is not far to seek. Whilst British capital has neglected Newfoundland, Canadians and Americans have been prompt to secure the advantages offered by the island's minerals and timber. They have realized that there are great possibilities in the colony. The exports of Newfoundland (1916-17, \$22,381,762) go principally to the United Kingdom, United States, Portugal, Brazil, Spain, Italy and Canada, chiefly dry codfish. Sealskins and oils go to the United States, England, and in small amounts to Canada. The iron ore goes to Canada, copper to England and iron pyrites to the United States. Trade is steadily increasing and the country is very prosperous.

The Revenue of the colony is nearly all derived from the customs and is considerably in excess of the expenditure. In 1913-14 and in 1914-15, however, the expenditures exceeded the revenues. In the first-named fiscal year the revenue was \$3,718,840 against \$4,029,070 for expenditure and in the following \$4,059,145 revenue against \$4,119,975 for expenditures. Customs receipts for 1916-17 amounted to \$4,470,537, and the total revenue was \$5,206,647; expenditures amounted to \$4,554,890. The public debt amounted in 1915 to \$32,328,415, principally incurred for railway construction and public works, and includes the municipal debt of Saint John's.

Means of Communication.—There are steamers running along the coast north and south. There are excellent main and branch roads. With some of the northern outports and Labrador, communication in winter is maintained with difficulty by couriers. With the outside world, England, the United States and Canada there are several lines of steamers. There are in operation 828 miles of government railway line with a gauge of three feet six inches, and 47 miles of private lines. The government contracted for five branch lines in 1910 to Bonavista, Heart's Content, Grate's Grove, Trepassey, Fortune Bay and Bonne Bay, at \$15,000 per mile for construction and 4,000 acres of land per mile constructed for operation. These lines were opened by 1914 and have opened up fertile sections of land. There are 736 post offices, 4,524 miles of telegraph line and 926 miles of telephone wire.

Education.—This is conducted on purely denominational lines, each sect controlling its own educational money. Even the Salvation Army has its separate schools. In the capital and larger communities it works fairly well. The colleges and high schools are very efficient. In the smaller places this system of division is ruinous to good instruction. Its very worst effect is seen on some of the small islands where it actually destroys education. Students at colleges of the Roman Catholic Church, 492; Methodist colleges, 475; Church of England colleges, 375. The Church of England has 395 schools of all kinds, the Roman Catholic 368 and the Methodist 364, and other denominations

52. The attendance in Roman Catholic 17,560, Church of England 16,362, Methodist 15,488 and others 2,072, making a total of 51,482. The total expenditure on education in 1914, including government grants, fees, etc., was \$400,358.

Religion.—The principal denominations are Roman Catholics with 81,177 adherents, Church of England, 78,616; Methodists, 68,042, Salvation Army, 10,141; Presbyterians, 1,876 and 2,767 of other denominations.

Government.—The government is administered by a governor, assisted by an executive council not exceeding nine members, a legislative council not exceeding 24 members and an elective house of assembly consisting of 36 representatives. Members of the legislative council receive \$120 per session, members of assembly \$200 or \$300 per session, according as they are resident or not in Saint John's. The legislative council is nominated by the governor.

Population and Principal Towns.—In 1914 the population of Newfoundland was 247,710 (126,239 males and 121,471 females). The inhabitants are chiefly of Anglo-Saxon and Irish descent. Outside of the capital (32,292) there are no other large centres of population. The largest is Harbour Grace in Conception Bay, with 4,279 population; Bonavista, 3,696; Twillingate, 3,348; Carbonear, 3,703. Of the total population, 67,000 are engaged in the fisheries; 2,915 on farms; 5,376 are mechanics and 2,260 are miners. The birth rate is 30.42 and the death rate 15.66 per 1,000. In 1914 there were 11,260 immigrants and 10,825 emigrants.

History.—The early history of the Colony involves the story of the discovery of North America by John Cabot in 1497, a memorable voyage fraught with far-reaching consequences. The immediate result of the discovery was the springing up of a great transatlantic cod-fishery which first drew Britons from the narrow seas, made them a nation of sailors and laid the foundation of the British Colonial Empire. For a long time this industry was carried on secretly to avoid the exaction and tyranny of the Crown. There was not only a great fishery but a big barter trade in operation between the English and foreign sailors. By the reign of Elizabeth this business carried on by Devonshire men had grown so extensive that Raleigh declared it was the mainstay of the Western Counties then the chief maritime centre of England. The story of Newfoundland naturally divides itself into four periods. First, the early period from 1497 to 1610 when there was neither law, religion or government in the island. English and foreign fishermen were ruled in a rough way by the valiant men of Devon, traders and pirates. Second, the fishing admiral period, 1610 to 1711, a time of struggle between the settlers and the ship fishermen from England. The permanent inhabitants were very much aided by their colonial brethren from the American Colonies. Trade began with them in 1641 and so increased that by the time of the Revolution it amounted to \$4,000,000. One of the largest items in this trade was the supply of New England rum. Thousands of Devonshire men were smuggled away every year to New England and thus helped to build up the trade fisheries of the American Colonies which became so formidable as to rival England and excited the great admiration of Edmund Burke. Third, from 1711

to 1825 when the island was under naval governors and at last possessed a resident ruler and a form of settled administration. Fourth, the modern period from 1825 up to the present time. When first the Colony was discovered it was inhabited by a branch of the great Algonquin family of Indians known amongst themselves as the "Beothucks." Their principal settlement was in the interior around Red Indian Lake. They became extinct early in the last century. Misunderstandings arose between them and the white men and the feud ended in the dire disaster to the aborigines. Starvation and disease combined with the dire hostility of the Mic-Macs who early obtained the use of firearms helped to destroy this interesting race.

The modern period can only be very briefly sketched. The Colony suffered severely from the policy of the Home Government which opposed settlement and tried by every means to use the island simply as a fishing station for British fishermen. No grants of land were issued until 1813. After the country obtained a local government in 1832 and full responsible government in 1855, it went ahead fast. The most wonderful feature in its history is the marvelous recuperative power of the insular population,—under the direst calamities, invasions from the French, fires and lastly in 1892 a conflagration, which consumed half the Capital, followed in 1894 by a bank crash which financially ruined nearly every one in the island. The real advance of Newfoundland may be dated from the advent of the railway in 1881, since built right across the island, and giving regular communication with the United States and Canada. The movement was bitterly opposed by the fish merchants and others but every one now recognizes its beneficial results in building up new industries. The principal events in the modern history of the island were the settlement of the fisheries dispute with France and later with the United States. Federation with Canada has been more than once a burning political issue and even yet there are a few in favor of it.

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Revised by J. B. McDONNELL.

NEWFOUNDLAND, Bank of, in its widest sense is a submarine island 600 miles long and 200 miles broad covered by water less than 50 fathoms deep, lying off the island of Newfoundland, within a degree of the eastern

coast. They must be regarded as belonging to the primitive features of the terrestrial crust and forming part of the pedestal on which the American continent itself reposes. The confluence of the Arctic current and the Gulf stream generate here the fogs or vapors characteristic of the eastern waters of Newfoundland. During the spring, summer and autumn months when the Gulf stream prevails in this region, the mists roll up in abundance from the surface of the suddenly chilled waters and the surrounding seas become enveloped in fogs covering a space as large as France or even as half the European continent. The reports of sea-farers for the most part, familiar only with the southeastern ports and approaches of Newfoundland, tend to confuse the island itself with its banks; hence dense fogs are commonly regarded as a normal if not permanent feature of its climate. Doubtless during the prevalence of the south and southeast winds the vapors are rolled up from the banks by atmospheric currents, and at such times they are spread in thick masses over the creeks and inlets along the south coast. But as a rule they seldom penetrate far into the interior, and, according to the local saying, "The land eats the fog." The Great Bank, far more extensive than Newfoundland itself, does not present any indented contour lines like the shores of the island. The Great Bank is a curvilinear triangle with rounded outlines. If the whole submarine mass upheaved it would attach itself as a heavy peninsula to North America. A few cavities have been discovered in the sands of the bed. "Whale Hole," for instance, caused perhaps by the eddies of the conflicting currents in the western part of the Grand Bank, south of Cape Race, sinks to a depth of 400 feet. An equally deep chasm lies on the northwest. About 125 miles east another bank, called Bonnet-Flamand, rises in an oval mass above the chasms surrounding it, which sink to a depth of 500 fathoms. It is in the vicinity of these plateaus that the ocean bed drops into the deepest chasm yet revealed in the whole Atlantic. The seas break over the Newfoundland Banks although they are covered with water 40 or 50 fathoms deep. "Hence their approach is usually revealed to mariners," writes *Élisée Réclus*, "by the heavy chopping waters fringing their borders. But within this fringe of agitated waters the sea is generally calm, so that the Bank itself might be regarded as forming a veritable harbor of refuge but for the risk of collision with the fishing-smacks, or icebergs. The large Atlantic liners, the most dreaded in case of collision, owing to their speed and enormous size, pass regularly over the Southern 'tail' of the Bank, thereby prolonging their passage by three or four hours, but avoiding disaster. The long convoys of icebergs drifting with the polar current are a source of danger to be guarded against by the experience, skill and presence of mind of the mariners navigating these waters. The skipper has to study from a distance the aspect of the surface, the glint of the crystal masses reflected from the clouds, the dense fogs and clear skies. He must take note in the waters of the changes of temperature, of color and of animal life, and when the sea is wrapped in impenetrable mist he must be ready for every

contingency. These convoys, drifting down from the higher latitudes, pass for the most part along the eastern section of the Bank, a few straggling blocks alone attracted to the neighborhood of the Newfoundland coast. Their route is largely determined by the action of the Gulf Stream which sets in the direction from southwest to northeast.

"The hypothesis has long been advanced that the Newfoundland Banks have been formed by the débris of all kinds deposited by the melting icebergs in the region where converge the two opposing currents from Baffin Bay and the Gulf of Mexico. Careful observations have shown that in the North Atlantic the polar drift-ice contains but a very small quantity of the rocks and stony fragments and glacial clays either brought down with the glaciers from the rocky slopes of Greenland, or carried away from the bed of the lower gorges. All the blocks that get stranded on the Newfoundland coast are pure as crystal and singularly free from sedimentary matter. Hence they can have contributed little or nothing to the construction of the submarine bed stretching southeastwards from the island of Newfoundland. The fisheries grounds here are among the most productive in the world. The Banks are the chief breeding-place of the cod. Herring, salmon, trout, whales and seals are also found in great numbers. These treasures are stored by three nations: United States, England and France. See FISHERIES.

NEWFOUNDLAND, The French Shore Question in. The long-standing dispute between England and France about fishing rights in Newfoundland is generally known as "the French Shore question." Most writers begin its history with reference to the Treaty of Utrecht, (1713) when, by agreement between the two countries, certain privileges were given to the French on the west and northeast coast of Newfoundland. It really commences, however, with the defeat of the Invincible Armada. The extinction of Spain's naval power by that great victory left the two great powers face to face, and from this date begins the long duel between France and England for the command of the sea and the control of North America. The contest ended disastrously for France at the fall of Quebec and the battle of Trafalgar. Both her naval power and her great American Empire disappeared. All that now remained to her of New France were the two barren islets of Saint Pierre and Miquelon and the doubtful fishery rights in Newfoundland. It was the sentimental and national feeling involved in this dispute that made it so difficult to settle. The French claims are based on the Treaties of Utrecht (1713), Paris and Versailles, the main basis being the first of these agreements. It begins with declaring that the island of Newfoundland shall belong of right to Great Britain. Moreover, it shall not be lawful for the subjects of France to fortify any place in Newfoundland or to erect any buildings there, besides stakes made of boards and huts necessary and useful for the drying of fish, or to resort to the island beyond the time necessary for fishing and drying of fish. But it shall be allowed to the subjects of France to catch fish and to dry them on land, in that part only. The boundaries were first given between

Cape Bonavista and Point Riche on the west coast, afterward altered to the last limits between Cape John and Cape Ray. By the Treaty of Paris (1763) Saint Pierre and Miquelon were given to France. By the Treaty of Versailles (1783) the last boundaries were settled, and there was a secret declaration made by George III that the English were not to interrupt the French fishery by their competition. It was this last underhand clause, not made public in the Treaty, which has given rise to so much contention. The English government always claimed that it was a concurrent fishery. The French, and with right, argued that under this declaration their rights were exclusive—the French contention would have been unanswerable if they had been able to occupy the whole coast line, but, as a matter of fact, their business was solely confined to about a dozen stations. They encouraged English fishermen to settle near their establishments to take care of their property during their absence. As the French business on the coast declined the native settlers increased until they numbered 17,000, compared with the 300 Frenchmen. Difficulties and disputes between the rivals were constantly arising, and but for the tact and good management of the naval officers of both countries would have become acute. The highest authority on English foreign politics, Sir Charles Dilke, and Admiral Revilliere of the French navy declared it was "the most dangerous question between England and France." Carrying on this transatlantic fishery in rivalry with opponents who lived on the coast was utterly hopeless to the French. They were hampered with the burden of carrying on a business 2,000 miles from their base of supplies. Every season they had to bring out their men and gear from France, and in October to carry them all back again. No bounties could support such a hopeless undertaking. Up to the beginning of the last century the French carried on an immense business in Newfoundland as well as their Bank-fishery from Saint Pierre, but gradually the Shore fishery declined until of late years it has come down to a dozen old brigs and about 300 men from France. Although bounty was piled on bounty and millions of francs were spent by the home government in trying to keep the business alive, it went down and down. For a time after 1890, when by a "modus vivendi" the French were allowed to erect lobster factories, an added impetus was given to the industry. At that time 7,000 cases of lobsters, at \$11 and \$12 a case, were really worth more than their whole catch of cod. Eventually the lobsters became fished out. Since 1842, 20 commissions have sat upon the question, but no agreement could be arrived at. When the Anglo-French Convention of 1904, known as the Lansdowne-Cambon Convention, was eventually agreed on, the most difficult subject of all was the French shore dispute, but the great French Minister Delcassé rose to the occasion and made the nation actually believe that, although England was giving France a free hand in Morocco, territory in Africa, and valued gifts elsewhere, French fishery rights in Newfoundland still remained intact. As a matter of fact, the old treaties have been annulled. All the French fishermen have been paid more than 10 times the value of their premises, boats,

gear, etc., \$275,000, and since the agreement in 1904, and the arbitration about values, not a solitary Frenchman has ever returned to the French shore.

NEWFOUNDLAND DOG, a large, handsome, long-haired, water-loving dog, originating in Newfoundland, probably from a cross between the native Indian sledge-dog and imported European dogs introduced by navigators early in the 17th century, and especially by the pointer. The breed showed extraordinary retrieving powers and was sent to Europe in so large numbers and at so high prices that it long ago became almost extinct in Newfoundland. It has, however, been maintained pure and has also increased in size by various breeding kennels both in Great Britain and the United States. The Newfoundland is massive in appearance and may attain a height of 31 inches at the shoulders; the average weight for dogs is 100 pounds and for bitches 85 pounds. The head is broad and massive with flat skull and somewhat square muzzle and the ears are small and lie close to the head. The fore legs are straight and the hind legs capable of powerful action and the tail is carried gaily but not curled over. The hair is straight and very thick and in color is black, black and white or bronze. For rescue work directed from the monastery of Saint Bernard in the Alps, the Newfoundland has superseded the famous Saint Bernard dog. For standard of points see Dog.

NEWGATE PRISON. At first marking the "New Gate" of the city of London as far back as the beginning of the 12th century, "New Gate" became Newgate prison in 1218, and throughout its career of 700 years, earned for itself a most unenviable reputation. It was rebuilt in the 15th century; the great fire of 1666 partially destroyed it, and the last edifice was erected in 1780, but suffered greatly in the Gordon Riots of that year, when 300 prisoners, felons as well as debtors, were let loose on the public. (See DICKENS' 'BARNABY RUDGE'). As late as 1850 prisoners were kept in herds like cattle, with no cleaners to attend to them. Proper sanitation or even decent ventilation was unknown in Newgate even up to the date of its demolition, and no attempt at all was made to separate the sexes until the early part of the 19th century.

Prisoners arrested by the king's warrant were the first inhabitants of Newgate. Then came Jew child-murderers and debtors. Thieves and other criminals were in due course locked up there, where they mixed with debtors, and owing to slackness of administration it became a great school of crime. Up to 1818 prisoners cooked their own meals. New "clients" were compelled to pay "garnish" or "footing" to their fellow-prisoners. If they could pay they could secure luxuries. If they were poor, they had to beg even for food. Prisoners were tortured at Newgate in the days of religious persecution. Many of them stayed for years and died there without ever having their cases heard in any court. Condemned criminals, during several reigns, were sent to Newgate, where Dick Turpin was incarcerated and others of his contemporaries. With an eye to their "edification," prisoners under sentence of death were at one time seated in the "condemned pew" around a

coffin at the chapel services. The building was gradually disused after 1877, and it was demolished in 1904 to make room for the Middlesex Sessions House. Consult Griffith's 'Chronicles of Newgate.' (1884).

NEWHALL, nū'hāl, Charles Stedman, American author: b. Boston, Mass., 4 Oct. 1842. He was graduated at Amherst in 1869 and at Union Theological Seminary in 1872. He held the pastorate of various churches and for a time served as teacher and college professor. In 1897 he was appointed United States assistant special forest agent and a little later superintendent of the United States Forest Reserves of central and northern California. He continued in the United States Forestry Service until 1905. He has written 'History of Fall River' (1862); 'Ruthie's Story' (1888); 'Vines of Northeastern America' (1897); 'Fire and the U. S. Reserves' (1902); 'Joe and the Howards' (1869); 'Harry's Trip to the Orient' (1885); 'Trees of Northeastern America' (1890); 'Shrubs of Northeastern America' (1893); 'Sheep and the U. S. Reserves' (1901); 'Lumbering and the U. S. Reserves' (1905), etc.

NEWHAVEN, England, town in Sussex, 56 miles south of London and eight miles east of Brighton. It was the ancient port of the Ouse and is now the well-known place of embarkation for Dieppe, between which place and Newhaven large and fast steamers ply daily in connection with the *Chemin de fer de l'Ouest*. The tidal harbor is enclosed by two piers and a breakwater, and Newhaven is one of the finest roadsteads on the English coast. The area is about 30 acres. The port is protected by fortifications. The shipping was of great importance in the 18th century; then it declined, and of late years it revived again. The harbor was first granted in 1713. Saint Michael's is a beautiful Norman church of the 12th century with a square Norman embattled tower and small semi-circular apse, curiously like that of Yainville-sur-Seine. At Bishopstone, one mile distant, is an interesting church with a Saxon porch and dial. Newhaven has a large coasting trade of coal and provisions, and France sends here wine, spirits, silk, fruit and vegetables. Considerable ship-building is also carried on. In the Bridge Hotel, Louis Philippe, a refugee from France, stayed in 1848 under the name of "Mr. Smith." Pop. 6,665.

NEWLANDS, Francis Griffith, American senator and legislator: b. Natchez, Miss., 28 Aug. 1848; d. Washington, D. C., 24 Dec. 1917. He studied at Yale, in the Columbian Law School (now George Washington University) in Washington, D. C., and was admitted to the bar in the District of Columbia in 1870. He practised law in San Francisco until 1886, when he became a trustee of the estate of his father-in-law, William Sharon, once United States senator from Nevada. In 1889 he removed to Nevada, settling in Reno. Here he became an ardent advocate of free silver coinage. He also took a vital interest in irrigation development and other matters of western interest. He was elected to the House of Representatives as a Democrat in 1893 and continued by re-election until 1903, when he became United States senator succeeding J. P. Jones. In 1909 and in 1914 he was re-elected. He framed the

Newlands Reclamation Act (1902); was member of the committees of ways and means, foreign affairs, etc.; was chairman on interstate commerce, prominent in rate legislation, internal improvement measures, regulation of industrial combinations and tariff bills. Yale gave him the degree of M.A. in 1901. For years Senator Newlands' chief interest had been in America's railway transportation lines and in the development of national waterways, both for transportation and for greater fertility of land. He was regarded as the pre-eminent expert on these matters. As author of Newlands Act, which provided a plan of land improvement in the arid West by development of waterways, he gained celebrity. For a long time he pressed legislation for the expenditure of many millions of dollars for waterways and irrigation improvement. In his railroad legislative work Senator Newlands enjoyed the closest confidence of President Wilson and was regarded as the administrative spokesman on such matters in the Senate. He was an earnest Democrat, but he regarded himself wholly as a public servant, and was one of the staunchest supporters of President Wilson in the Senate. On 24 Dec. 1917 he went to the Capitol to take up work in connection with an investigation by the Senate Interstate Commerce Committee, of which he was chairman, and was stricken in his office, dying shortly afterward.

NEWLANDS ACT. See **ARBITRATION, INTERNATIONAL.**

NEWMAN, Albert Henry, American Baptist clergyman and educator: b. Edgefield County, S. C., 25 Aug. 1852. He was graduated at Mercer University, Georgia, in 1871, and from the Rochester Theological Seminary in 1875. He became a college professor, and in 1881-1901 filled the chair of church history at McMaster University, Toronto, Ont., and 1901-07 held a professorship at Baylor University, Waco, Tex. From 1907 to 1913 he was professor of church history and dean of the faculty of the Southwestern Baptist Theological Seminary. He was professorial lecturer in the University of Chicago, 1905-12. Since 1913 he has been professor of church history in Baylor University. He was a contributor to the third edition of the 'Hauck-Herzog Realencyklopädie für Protestantische Theologie und Kirche' and to 'Der Protestantismus am ende des 19 Jahrhunderts,' to Hastings 'Dictionary of Christ and the Gospels' and 'Dictionary of Religion and Ethics,' etc. He has written 'The Baptist Churches in the United States' (1894); 'A Century of Baptist Achievement' (1901); 'Manual of Church History' (1900-03). He also translated and edited Immers' 'Hermeneutics of the New Testament' (1877). He was department editor for church history of 'The New Schaff-Herzog Encyclopedia of Religious Knowledge,' etc.

NEWMAN, Allen George, American sculptor: b. New York, 28 Aug. 1875. After receiving his education in the City College of New York and at the National Academy of Design in the same city, he devoted himself to sculpture. Among his numerous works are 'Night and Day' for the Harriman Bank, New York; 'Henry Hudson Monument,' erected by Colonial Dames of America at 72d street and Riverside Drive, New York; 'Joel Chandler

Harris Monument,' Atlanta, Ga.; 'Monument to the Women of the South,' Jacksonville, Fla.; 'General Philip Sheridan Monument,' Scranton, Pa.; 'General Oates, ex-Governor of Alabama,' Montgomery, Ala., and 'General Stirling Price,' Keytesville, Mo. He also made a bronze group, 'The Triumph of Peace,' Atlanta, Ga., and 'The Hiker,' a Spanish-American War soldier, Providence, R. I. Mr. Newman is a member of the National Sculpture Society, the Architectural League, the Union Internationale des Beaux Arts et des Lettres, and many other societies and clubs.

NEWMAN, Francis, English colonial governor in America: b. England, about 1600; d. New Haven, Conn., 18 Nov. 1660. He emigrated to New Hampshire in 1638, settled later in New Haven; was one of the committee which waited upon Peter Stuyvesant in 1653 to demand compensation for injuries received at the hands of the Dutch, and in 1654 became a commissioner for the united colonies. In 1658 he became governor of the New Haven colony, which office he held until his death.

NEWMAN, Francis William, English scholar: b. London, 27 June 1805; d. Weston-super-Mare, Somerset, 4 Oct. 1897. He was graduated at Worcester College, Oxford, in 1826; was Fellow of Balliol in 1826-30. Unable to subscribe to the 39 articles he withdrew and went to Bagdad as a missionary; became professor of classical literature in Manchester New College, York, in 1840; was professor of Latin at University College, London, 1846-69, and was made principal of University Hall, London, in 1848. A brother of Cardinal Newman (q.v.), the thought and faith of the two wholly diverged, the former accepting and the latter rejecting the entire historic basis of Christianity while retaining deistic belief. Francis made important contributions to the religious thought of his time. His 'Phases of Faith' (1850), an autobiographical narrative of his religious changes, excited much controversy and was undoubtedly his best-known writing; but 'The Soul: Its Sorrows and Aspirations' (1849), a singularly penetrating analysis of man's relations with God, shows him at his best. In 1876 he joined the British and Foreign Unitarian Association, of which he became vice-president in 1879. His further writings show the remarkable versatility of this liberal-minded but crotchety man, and treat of education, politics, religion and social questions. An interesting experiment was his 'Hiawatha Translated into Latin' (1862). Consult his 'Memoir and Letters,' edited by Sieveking (1909).

NEWMAN, John Henry, English author, theologian, preacher and cardinal in the Roman Catholic Church: b. London, England, 21 Feb. 1801; d. Edgbaston Oratory, Birmingham, England, 11 Aug. 1890. Newman was the eldest of six children of John Newman, a London banker, from whose family Newman inherited the taste for music which distinguished him. The family was of Dutch origin and had come to England in the latter part of the 17th century. Newman's mother, Jemima Foudrinier, was of French Huguenot origin. From her he received a religious training of Calvinistic tendency, and was early brought up with a thorough knowledge of the Bible, which it is

said he almost knew by heart. Newman, who was a precocious boy and wrote much verse and prose, describes himself in the 'Apologia' as an imaginative and superstitious child. From the writers who most influenced him in his youth—particularly Law and Thomas Scott—he obtained two important beliefs that clung to him through life, the idea of eternal punishment and a belief in the necessity of dogma. When about 16 he became convinced that it was the will of God that he lead a single life.

Newman entered Trinity College, Oxford, in his 16th year, took his degree in 1820, and was elected a Fellow of Oriel in 1822. Here he came under several distinct influences, which had a good deal of effect on his career. From Bishop Butler's 'Analogy,' which he read about this time, he gleaned the principles, which ever after characterized his work and on which he wrote much, that revealed religion as manifested in outward institutions is the symbol of the natural religion underlying—an idea that was in accord with his boyish dreams—and that "probability is the guide of life." The strong personal influences were Dr. Hawkins, Provost of Oriel, to whose teachings Newman says he owed the habit of caution in statement and the weighing of words, and, among other doctrines, that of the value of tradition; Dr. Whately, who for a time somewhat arrested Newman's spiritual growth and developed his reasoning power; and his intimate friends, John Keble and Hurrell Froude, spiritual enthusiasts and haters of liberalism. His studies for 'The Arians of the Fourth Century' (pub. 1833) which he began at Oriel, tended to confirm his belief that "antiquity was the true exponent of the doctrines of Christianity and the basis of the Church of England," and stimulated his innate belief in the existence of spirits, good and evil, which he regarded as the causes of physical phenomena. These studies also undoubtedly laid the foundation for the course of reasoning which subsequently led him into the Church of Rome. Meanwhile, his progress in his profession had been rapid. In 1824 he took orders and was ordained curate of Saint Clement's Church, Oxford. The following year he became vice-principal of Saint Alban's Hall under Dr. Whately, a position which he gave up in 1826 to become tutor at Oriel. In 1828 he was appointed vicar of Saint Mary's, his only permanent position while a member of the Anglican Church; for in 1829 he broke with Whately because of his dislike for the tendency of the latter toward liberalism, and a year or two later retired from his tutorship at Oriel, for the reason that Dr. Hawkins, who then came into power, looked upon him and his friends, Keble and Froude, as too extreme in their views regarding the need of conformity to a more rigid order of things.

Throughout this period Newman was gradually becoming alive to the conviction that he had a special mission to perform, and further stimulus was added by the French Revolution of 1830 and the struggle in England which culminated in the Reform Bill of 1832. These tendencies toward liberalism he viewed with growing distrust. Not, however, till the close of his voyage with Froude to the south of Europe in the winter and spring of 1832-33 (during which he wrote many poems, including 'Lead Kindly Light') did the conviction be-

come urgent. Taken so very ill in Sicily on his return voyage that his servant despaired of his life, he was nevertheless convinced that he should not die; he kept saying to himself "We have work to do in England." Hurrying thither as soon as his health permitted, he and his friends at once began the Oxford Movement (q.v.).

The object of this movement was in general the upholding of the ideal of primitive Christianity against the assaults of liberalism. It was pursued with great earnestness by Newman and his friends, Froude, Keble, Pusey, Rose and others, and the means were the 'Tracts for the Times,' of which Newman was chief editor and author. He speaks of himself as occupying a modest position, but he was in reality the head of the movement. He himself held confidently to three principles which he endeavored to inculcate: the necessity of dogma in combatting liberalism; the existence of a visible church, "with sacraments and rites which are the channels of invisible grace"; and the belief that the Roman Catholic Church and the Pope were evil and anti-Christian. The first two of these beliefs he retained till the end of his life; it was in regard to the last that his views were completely altered and upon that belief his subsequent history turned. For Newman the Tractarian movement had two phases: up to 1839 he wrote in the spirit of full conviction and confidence; from then till the publication of the famous Tract 90 in 1841 there was a growing consciousness of the unsoundness of the arguments that he had been using against Catholicism. The chief task in the first period was the definition of the so-called '*Via Media*' in which the Tractarians endeavored to establish the true position of the church between Romanism and Liberalism—to construct, in Newman's words, "a possible road between a mountain and a morass, to be driven through formidable obstacles, if it is to exist, by the boldness and skill of the engineers." The principal book in which the doctrine is expounded is 'The Prophetical Office of the Church Viewed Relatively to Romanism and to Popular Protestantism' (1837). By 1839 the soundness of his position seemed to be established; but his studies had, unconsciously to himself, laid the train for the overthrow of what he had been advocating, and these doubts took shape during the next two years. The argument from Antiquity with which he had supported the *Via Media* turned out to be an equally good argument for the Catholic Church. He also made the discovery that in church history there had been *via medias* before; the various early sects of heretics had in his new view occupied much the same position as the Anglican Church. He was impressed by the fact that the early fathers whom he invoked in support of his effort at true compromise would inevitably, if alive, have sided with Rome, and his imagination—always a strong influence in his reasoning—was haunted by the words "*Securus judicat orbis terrarum*," which seemed to make nugatory all schism. The result was that he grew far less hostile to the Catholic Church, and with Tract 90 the movement against it came to an end. The main point of that tract was that the Thirty-nine Articles of the Anglican Church had originally been framed for political rather than religious

purposes: they were designed to allow good Catholics to become members of the Anglican Church with mere loss of their allegiance to the Pope. If that was the case, then the Anglican had no better doctrinal support than the Roman Church.

From that time Newman regarded himself as practically dead to Anglicanism. In the storm of indignation which the tract evoked he did not, however, immediately retreat. Preferring to think the matter over carefully, he kept his living at Saint Mary's till 1843, and in that same year retracted the many hard things he had said about Rome. Two years later, in October, he entered the Roman Catholic Church, and early in 1846 left Oxford for good. After over a year in Rome (1846-47), he founded the Oratory of Saint Philip Neri, at Edgbaston, Birmingham, where, with the exception of four years (1854-58) spent in Dublin as rector of a new Catholic University, he remained until his death.

Though condemned as an apostate by common Anglican consent, and though living a very secluded life, Newman almost at once benefited by the change. Not only did he feel the peace of security, but his literary genius is said to have ripened wonderfully. Heretofore he had written somewhat tentatively, as one groping; now he expressed himself with sureness and an unwonted command of expression. His writings during the first 18 years after his conversion, nearly all in support of Catholicism, include such various types as his 'Discourses Addressed to Mixed Congregations' (1849); 'Lectures on Anglican Difficulties' (1850), and 'Lectures on Catholicism in England' (1851); various of the essays collected in 'Historical Studies'; two novels, 'Loss and Gain' (1848) and 'Callista' (1855); and what is in many respects his masterpiece of treatment, 'The Idea of a University,' a series of discourses which he delivered at Dublin in 1852 on the founding of the Roman Catholic University.

In 1864 occurred the controversy with Kingsley, which marks an epoch in Newman's life and in the position of the Catholics in England. Kingsley had said that the Roman clergy had little regard for truth, and had cited Newman as an advocate of cunning. Newman naturally asked for his evidence. Kingsley, in *Macmillan's Magazine*, where his first article had appeared, replied that he had mistaken Newman's tone, and apologized. Newman, reasonably dissatisfied with Kingsley's failure to produce the specific evidence, published the whole correspondence. Kingsley thereupon replied in a vigorous pamphlet entitled "What, then, Does Dr. Newman Mean?" in which he charged Newman with equivocation and cited all the instances he could find in Newman's life and works to prove his point. The merits of the controversy are as yet unsettled, though now of only historical interest; views would probably still range from extreme support of Newman to such words as those of Huxley, "That man is the slipperiest sophist I have ever met with. Kingsley was entirely right about him." ('Letters,' II, p. 240.) The effect of the controversy was the publication by Newman of the 'Apologia pro Vita Sua.' This, which appeared serially between 21 April and 2 June, gave the key to Newman's life as an internal state

The effect of the 'Apologia' was to temper in a great measure the feeling between the Catholics and the Anglicans, and it gave Newman the honorable position of peacemaker. From that time on he occupied a high place in England and received many dignities. In 1877 he was elected honorary fellow of Trinity College, Oxford, and two years later was created cardinal by Pope Leo XIII. Two works are to be especially noted, 'An Essay in Aid of a Grammar of Assent' (1870), in which Newman attempted to expound systematically the logic of belief aside from exact proof, and 'The Dream of Gerontius,' written shortly after the 'Apologia,' in which he delineated in poetical form the yearning of a soul toward certitude and truth.

These three books indicate where the place and power of Newman lie. His position is probably to be determined not by his intellectual contributions but by his personality which is of a high, noble and persuasive type, and which is expressed in a style of unsurpassed skill and delicacy. As a contributor of ideas and new truth, he is not so important. As a theologian, his life-long beliefs and teaching—that the world is controlled by the powers of darkness, that God is the only holy thing, that the Church is the only true revealer of God—in no wise differ from good Catholic opinion. The great argument on which he ultimately based all his claims, that of probability, that we act not from certainty but from states of certitude, that personality which can induce states of certitude is a better guide than strict reason—the basis of this he got from Bishop Butler, nor did he take into consideration the fact that his argument would allow anybody to believe anything at all, provided he could summon enough certitude in support of it. Doubtless the mass do use just such sanctions, and Newman has certainly, both in life and in work, put the argument as well as it has ever been put, but the method is wholly opposed to scientific proof, and it is easy therein to see the reason for the view of such men as Huxley. The truth of the matter probably is that Newman, with all his training in logic, really had little regard for strict evidence; his course during the Oxford movement shows that he argued from predispositions and predilections, and his conversion was in part at least the result of evidence supplied solely by his imagination. But as a gracious and winning personality his place is of the highest, as is his power of expression. See APOLOGIA PRO VITA SUA; DREAM OF GERONTIUS; IDEA OF A UNIVERSITY.

Bibliography.—The chief sources of information are, among Newman's many works, the 'Apologia,' and 'The Letters and Correspondence of J. H. Newman,' edited by his sister, Mrs. Anne Mozley. The best 'Life' is that by Wilfred Ward (1912), and it is based on his private journals and correspondence. Lives and studies are those of H. J. Jennings ('Cardinal Newman, The Story of His Life'); R. H. Hutton ('Cardinal Newman'); William Barry (in 'Literary Lives'). Materials for a complete study are scattered in various books as Church's 'The Oxford Movement,' Mark Pattison's 'Memoirs,' Abbott's 'Philomythus' and 'The Anglican Career of John Henry

Newman,) and a score of others (consult a long list in the 'Dictionary of National Biography.') The more recent works, Brémond's 'The Mystery of Newman'; Sarolea's 'Cardinal Newman and his Influence on Religious Life and Thought,' and Thoreau-Dangin's 'English Catholic Revival,' may be recommended. The 'Index' to Newman's works, by Joseph Rickaby (1914), is valuable not only as an index, but for the illustrations it affords of his intellectual and spiritual development. There is an excellent short study of the conversion and the theology of Newman by R. M. Lovett (*Harvard Monthly*, Dec. 1892, Jan. 1893).

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NEWMAN, John Philip, American Methodist bishop: b. New York, 1 Sept. 1826; d. Saratoga, N. Y., 5 July 1899. He studied for the ministry and in 1849 was ordained. After filling various charges he preached in New Orleans in 1864-69; held three times (1869-72, 1876-78, 1885-87) the pastorate of the Metropolitan Methodist Church in Washington, D. C., and was chaplain of the Senate for three sessions. He was appointed by President Grant inspector of United States consulates in Asia in 1873, in 1879 was called to the Central Church, New York, and from 1882-84 was pastor of Madison Avenue Congregational Church. In 1888 he was elected bishop. He delivered the funeral oration on General Grant. His eloquence was of a highly ornate kind. He wrote 'From Dan to Beersheba' (1864); 'The Thrones and Palaces of Babylon and Nineveh from the Persian Gulf to the Mediterranean' (1876); 'Christianity Triumphant' (1884); 'Evenings with the Prophets on the Lost Empires' (1887); 'The Supremacy of the Law' (1890); 'Conversations with Christ' (1901).

NEW MARKET, Canada, town in York County, Ontario, 34 miles north of Toronto on the Holland River, the Grand Trunk Railroad and the Trent Canal extension. It is connected to Toronto by an electric railroad. Places of interest are the Park, the Fairy Lake and 'David's Temple' in the suburb of Sharon. The Friends' College is situated here. Newmarket is an enterprising manufacturing town and produces flour, lumber, office fittings, leather, clothing and wooden-ware. Pop. 2,996.

NEW MARKET, England, a market town in Cambridgeshire, 14 miles northeast of Cambridge on the Bury branch of the Great Eastern Railway. A part of the town is in Suffolk. Newmarket, called the "Metropolis of the Turf," has been celebrated for its horse-races from the time of James I when there was hawking also. Charles I instituted the first cup race, and a fine palace was built on the site of the lodge of James I for the use of Charles II when he came to the races. The market-house and the celebrated Jockey Club are the chief buildings. The town is full of residences belonging to patrons of the turf and racing and training stables. The racecourse lies southwest of the town over Newmarket Heath. It has a full extent of four miles, but is divided into various lengths to suit the different races. The course is intersected by the great earthwork called the Devil's Ditch (also Saint Edmund's Dyke). It is five miles long—the largest of the four im-

portant dykes or entrenchments which marked, at different periods, the boundary lines between the kingdoms of East Anglia and Mercia. Eight race-meetings are held every year, the best known of which are the "Thousand Guineas" (April) and the "Cesarewitch" (October). On the outskirts of the town, toward Bury, is the Fairstead, or exercising ground, where the trial gallops of young horses take place daily. Near this is the well-known Warren Hill. In the neighborhood of Newmarket, Roman ruins have been found. Of its two churches, Saint Mary's, perpendicular style, is the most interesting. It is in Suffolk. Pop. about 10,482. Consult Hore, J. P., 'History of Newmarket and Annals of the Turf' (2 vols., London 1886).

NEWNAN, nū'nān, Ga., city, county-seat of Coweta County, on the Central of Georgia and the Atlanta and West Point railroads, about 38 miles south by west of Atlanta. It is in a productive agricultural region in which cotton and fruits are extensively cultivated. The principal industrial establishments are cotton mills, grain elevators, cottonseed-oil mills, machine shops, flour mill, tannery, fertilizer works, a large plant for manufacturing boilers, engines, presses and mill machinery, fertilizer works and an ice factory. There is a fine courthouse and a Carnegie library. The city owns the waterworks and electric plants. Pop. 7,037.

NEWNES, nūnz, SIR **George**, English journalist: b. Matlock, 13 March 1851; d. Lynton, Devonshire, 9 June 1910. He was educated in London and entered journalism. He was the founder of *Tit-Bits*, a very successful weekly, the nature of which is indicated by its title; and he also founded the *Strand Magazine* and was proprietor of the *Westminster Gazette*. He was member of Parliament (Liberal) for the Newmarket division of Cambridgeshire, 1885-95, was created a baronet in 1895 and returned to Parliament from Swansea 1900-10. He applied much of his wealth to public purposes.

NEWNHAM (nūn'am) **COLLEGE**, England, an institution for the higher education of women at Cambridge, founded in 1871 and incorporated in 1880. Ordinarily no students are admitted under 18 years of age; the course of study corresponds with that of Cambridge University. There are a number of exhibitions and scholarships connected with the college, which is conducted on the same lines as Girton (q.v.). The faculty numbers about 26 and there is an average attendance of over 200 students.

NEWPORE, Fort, a former Revolutionary fortification on Ward Creek, near Oneida Lake, N. Y.

NEWPORT, nū'pōrt, **Christopher**, English sea captain: b. about 1565; d. 1618. In 1592 he commanded a ship in the West Indian expedition; sailed to Virginia in 1606, 1607, 1609 and 1611, was wrecked on the Bermudas in the third of those voyages, but made his way to Virginia after many adventures recounted by Jourdain in the 'Discovery of the Bermudas,' which Shakespeare may have used in writing the 'Tempest.' In 1612 he entered the employ of the East India Company, for whom he made several very successful voyages.

NEWPORT, George, English naturalist: b. Canterbury, 4 July 1803; d. London, 7 April

1854. He was educated at the London University and became a surgeon, but devoted much time to entomology, in which science he made valuable discoveries. He wrote 'Observations on the Anatomy, Habits, and Economy of *Athalia Centifolia*' (1838); 'Catalogue of the Myriapoda in the British Museum' (1856), etc.

NEWPORT, Ark., city and county-seat of Jackson County, 85 miles northeast of Little Rock, on the Chicago, Rock Island and Pacific, the Saint Louis, Iron Mountain and Southern, and on the White River railroads. It is situated in a cotton-growing district and its industries are connected mostly with this crop, consisting of cotton and oil mills, lumber mills, iron foundry and stave and handle works. Pop. (1920) 3,771.

NEWPORT, England, a town of Monmouthshire, on the Usk, 134 miles by rail west of London. It is one of the great trading ports communicating with the Bristol Channel. As one of the principal outlets for the produce of extensive collieries and iron and steel works in the vicinity, it has extensive dock accommodation covering over 126 acres, railway and ship-building plant, and a transporter bridge across the river. Its public buildings are all of modern erection and include town hall, market hall, county offices, public baths, museum, art gallery and technical institute. Its most ancient buildings are the remains of a 12th century castle and the church of Saint Woollos, a large edifice partly of Norman date. Pop. 83,691.

NEWPORT, Ky., city in Campbell County, at the confluence of the Ohio and Licking rivers and on the Louisville and Nashville and the Chesapeake and Ohio railroads. Cincinnati, on the Ohio, and Covington, on the Licking, are opposite Newport. The city was settled in 1791, in 1795 was incorporated and in 1850 was granted a city charter. It is a popular residential city for Cincinnati business men. It is in an agricultural region and farm products are among its most important shipments. The chief manufacturing establishments 'are sheet-iron works, carriage works, watch-case factory, steel plant, fly-screen works, lithographing plant and airchrome decorating works. It has large coal and brick yards and considerable river trade. Fort Thomas, a government military post, is on an elevation near the city. Some of the prominent buildings are the city hall courthouse, post office, the banks, a Masonic temple, the churches and schools and the library. It is the seat of Mount Saint Martin's and Immaculate academies and it has good public and parish schools and a public library. The city now has commission government. It was formerly under the charter of 1894, which provided for a mayor who held office for four years and a council. The mayor appointed the police and firemen and the members of the water commission, and, subject to the approval of the aldermen, the superintendent of public works and the city auditor. The council elected the bridge commissioners. The board of education is elected by the people and the members hold office two years. The waterworks is owned and operated by the municipality. Pop. 29,317.

NEWPORT, N. H., town, county-seat of Sullivan County, on the Sugar River and on the Boston and Maine Railroad, about 35 miles

in direct line northwest of Concord and 45 miles northwest of Manchester. Its scenery and climate make it a favorite summer resort. It is in an agricultural and grazing region and the good water power contributes to its industrial prosperity. Its chief manufactures are woolen goods, agricultural implements, shoes, lumber and lumber products, clothing and dairy products. The Richards Library and Museum, the Carrie F. Wright Memorial Hospital and a high-class modern hotel are notable buildings. It is within six miles of Lake Sunapee, one of the most beautiful lakes in the world, and within three miles of the famous Corbin's Blue Mountains Forest Park. "Good roads" is one of the town's slogans and its streets and sidewalks are among the best for a town of its size in the State. The city owns and operates the waterworks. Pop. 4,400. Consult Wheeler, 'The History of Newport, N. H.' (Concord 1879).

NEWPORT, R. I., city, port of entry, county-seat of Newport County, in Rhode Island, on Narragansett Bay, and on the New York, New Haven and Hartford Railroad, about 30 miles south of Providence. It has daily steamer communications with Providence, New York, Fall River and other ports. It is a famous summer resort and in the season its facilities for transportation are much increased. Its beautiful scenery, equable climate, ease of access by land and water from New York, Boston and other large cities, make it a favorite watering place. Its occupancy by people of great wealth, who have built summer residences costing millions of dollars, has made it fashionable and exclusive. In 1639 Newport was settled by Roger Williams and later Anne Hutchinson and other refugees, who for religious convictions had been expelled from Massachusetts by the Puritans, came to Newport. At first Newport was independent in government, but in 1644 Roger Williams obtained a patent from the British Parliament under which all the colonies in what is now the State of Rhode Island were united under the name of "The Incorporation of Providence Plantations in the Narragansett Bay in New England." The charter gave much dissatisfaction and in 1663 was changed to a charter that continued in force until 1843. (See DORR'S REBELLION). A public school was established in Newport in 1840. From the beginning the place was a trading port of importance; its commerce was greater than that of New York in 1769-70. One of the first acts of resistance against Great Britain took place at Newport when the British sloop *Liberty* was destroyed here, while engaged in enforcing obnoxious smuggling laws. The British took possession of Newport 6 Dec. 1776 and held it for two years. The shipping of the place and the general trade were nearly destroyed during the Revolution. The British soldiers burned in all about 475 houses. In 1780 Rochambeau and his troops from France made Newport their headquarters. In 1784, the year after the Revolutionary War had closed, Newport was incorporated; but in 1786 it surrendered its charter and was not reincorporated for 77 years.

It is claimed by some historians that Newport and other parts of the United States were discovered by Northmen as early as the 11th

century. The "Old Stone Mill" in Touro Park is pointed out as a relic of the days of the Northmen; but it is now generally believed that this mill was built in the 17th century. Newport was one of the capitals of the State until 1900. Bishop Berkeley lived in Newport from 1729 to 1732 and here wrote his ode on Western progress and part of his 'Alciphron.' William Ellery Channing and Commodore M. C. Perry were born in Newport. Some of the historic places are the State House built in 1742; the city hall built in 1763; Redwood Library, 1748; Trinity Church (P. E.), 1725; the headquarters of the British army (Sayer House), in 1780. One of the oldest newspapers in the United States still in existence is the *Newport Mercury*, established by James Franklin in 1758. The oldest part of the city is around the harbor; the modern part, with its magnificent mansions, surrounded by well-kept lawns, is toward the ocean. Overlooking and guarding the harbor are Fort Greble and Fort Adam. Some of the attractions other than those mentioned are the long beaches, the bathing places, the "Hanging Rocks," the 12-mile Ocean Drive, Purgatory (a rocky fissure 50 feet in depth), the Cliff Walk and the Spouting Rock (when the water is disturbed by a storm it is forced through an opening in this rock). It has a United States torpedo station on Goat Island and a United States Naval Training Station and War College on Coaster Harbor, also a naval hospital (1897). The city has many parks, fountains and monuments which are works of art. It is the seat of Saint George's and Cloyne House schools and Saint Mary's Academy. A valuable collection of relics are in the Newport Historical Society building; there are several libraries, the People's, Redwood and others.

It still has a large fish trade, but the city is now known for its society life and its industries and commerce are of little value. Pop. 30,472. Consult Arnold, S. G., 'History of the State of Rhode Island' (2 vols., New York 1860); 'Rhode Island Colonial Records'; Brooks, 'The Controversy Touching the Stone Mill'; Greene, 'The Providence Plantation'; 'Newport in the Revolution,' an article in the *New England Magazine*; Mason, G. W., 'Reminiscences of Newport' (Newport 1884); Stone, E. M., 'Our French Allies' (Providence 1884).

NEWPORT, Vt., village, county-seat of Orleans County, on Lake Memphremagog, and on the Boston and Maine and the Canadian Pacific railroads, about 50 miles in direct line north by east of Montpelier. In the summer season it has regular steamer communication with all the villages and towns on the lake. It is a favorite summer resort on account of its climate, the scenery in the vicinity and the opportunities for fishing. Its trade is chiefly in farm products; its manufactures are lumber veneer of all kinds, large overall factory and creamery. It has fine church and school buildings and the Goodrich Memorial Library which contains 9,000 volumes. Pop. 4,976.

NEWPORT NEWS, Va., city and port of entry in Warwick County, on the James River and Hampton Roads, and at the terminus of the Chesapeake and Ohio Railroad, situated 70 miles southeast of Richmond and 14 miles north of Norfolk. The city lies in the centre of a

rich vegetable and fruit country. It is connected with Hampton and Old Point Comfort by electric railways. In the heart of the city facing the James River is Casino Park, which has become a popular resort. With several foreign and coast lines of steamships sailing hence, and with a fine harbor and excellent shipping facilities, Newport News has very recently become an important port and the centre of large commercial interests. The foreign trade in 1916 amounted to about \$79,000,000; the exports amounting to about 90 per cent of the above. The foreign commerce of the port is largely carried on by the Chesapeake and Ohio Railroad and the United States Shipping Company, making direct connection with England and the Continent. The city has become fourth in the United States in the shipment of grain. Here is an extensive shipbuilding plant, one of the largest in the world, giving employment to over 10,000 workmen; three dry-docks, 600, 700 and 900 feet long; two grain elevators with a capacity of 2,850,000 bushels; wood-working mills, ice factories, lumber mills, iron works, shoe factory, coal wharves, shirt factory and brewery. Newport News is governed, under its original charter of 1896, by a mayor, elected every four years, common council, consisting of 16 members, and a board of eight aldermen. The city has an improved system of waterworks and electric light and gas plants. Newport News is a young town practically lacking in history. It was first laid out in 1882 and incorporated in 1896. Its growth has been very rapid; the population in 1890 was 4,449; in 1917 it was 23,674; in 1920 it was 35,596.

NEWRY, nŭ'ri, Ireland, seaport and parliamentary borough in County Down and Armagh, on the Newry River, 38 miles southwest of Belfast and 73 miles north of Dublin by the Great Northern Railway. It is also on the Newry Canal at the head of Carlingford Lough and is connected also by canal with Lough Neagh. The place dates from 1131. In 1175 an abbey was founded here by Maurice McLoughlin, king of Ireland, and in 1543 this abbey was converted into a collegiate church for secular priests. It was dissolved by Edward VI, who granted it to Sir Nicholas Bagenal, marshal of Ireland. Bagenal made it his residence and laid the foundations of the town's prosperity. The castle, erected by De Courcey, was taken by Edward Bruce in 1318. In 1689 Newry was set on fire by the Duke of Berwick retreating before Schomberg. James I and James II granted charters to the town. Newry is handsomely built and the situation is striking as it lies in a narrow valley surrounded by mountains. The western part, called Ballybot, is connected with the older town by four bridges over the canal and four over the tidal water. Newry is one of the most important ports of the province of Ulster. It admits vessels of 2,000 tons to Victoria Docks, three miles from town. Vessels drawing 15 feet can ascend the canal to the Albert Basin. In connection with several sub-ports further down the Newry River it is the outlet for a large trade, particularly with Liverpool and Glasgow, in cattle and agricultural produce. Flax-spinning, weaving, tanning and granite polishing are the chief industries. The town possesses rope and sail-works, breweries, distilleries, tanneries and

hour-mills. Fine granite is quarried in the neighborhood. Pop. 12,587.

NEWS-LETTER, a popular name applied to the printed sheets or letters issued weekly in the early part of the 17th century, the news for which was collected in the coffee-houses. Originally they were literally letters of news written by professional newswriters and sent by them to their employers weekly. Many early printed newspapers took *News-Letter* as a title, as the *Boston Newsletter*, etc.

NEWSPAPER, a publication devoted primarily to daily sheets publishing the news as to current events. The term is also construed to cover semi-weekly and some weekly papers of the same class. Along with the news, newspapers customarily print comment, criticism or discussion of such events by editors and contributors. As such, the newspaper has become one of the most powerful factors in modern existence. Not only does it serve as a distributor of every form of knowledge, but it also guides the opinion of great masses of people, and more important still, it becomes the voice of the people; so that the demands of a newspaper with a large clientele are listened to attentively by all public officials from the highest to the lowest.

As a rule, newspapers are conducted for the money to be obtained by their publication. In a few cases they are operated by their owners as organs of their individual expression, or in the special interest of some political movement.

The cost of making a newspaper is prodigious. There are heavy charges for cable and telegraph news; a large staff of local newsgatherers must be maintained; special correspondents at points of great activity must be provided; the office forces must necessarily be of high-grade minds—not to mention the intricate and expensive machinery required to actually produce the printed sheet in the briefest possible period. The great weakness of the newspaper is its dependence upon its advertising patronage for its livelihood, the price at which it is sold to readers being scarcely more than the cost of distribution. Under these conditions it is not likely that the newspaper will print material which would tend to injure the business of the advertisers which support it, so that to some degree at least the advertising may be said to control the policy of the paper.

The larger daily morning papers usually publish two editions; the first for suburban distribution, the second for city circulation. The larger evening dailies print several editions, the first about noon, or even before, and three or four later editions, the last leaving the press about six o'clock. Later news of great importance or interest is handled in an "Extra." The principal dailies issue a Sunday edition made up of six or eight classified sections—News, Editorial, Dramatic, Sports, Household, Special Articles, etc.

Much of the general news, foreign and domestic, is gathered and transmitted to the individual papers by press associations. This service is distributed to a large number of subscribing members of the association, and the cost of gathering it is thus minimized. In addition to this association service, most of the larger papers have their own correspondents

at centres of important news and receive daily a very considerable special service by telegraph.

Making the Newspaper.—In the making of a newspaper the fundamental work is literary. The control of the character of the material prepared is vested in the editor-in-chief, who is in some cases also the principal owner. Upon him is laid the responsibility for the heads of the departments who are immediately in charge of the production of the literary material of the paper. The editorial writers are directly under the editor-in-chief and do their work in accordance with his suggestions or instructions. The managing editor is an executive. He directs the make-up of the paper, deciding what shall go in and the space it shall occupy. He calls upon the several editors for the material he may need to fill out the vacant spaces. In the actual construction of the paper, he or his assistant is on duty until the last page form is complete. In some instances the managing editor and the editor-in-chief are one. The city editor is in charge of the collecting of local news through his staff of reporters, who may number from 10 to 50. He assigns certain reporters to particular tasks, so as to "cover" all events likely to be of public interest. In the case of a morning paper the city editor is usually succeeded by a "night editor" who remains on duty until the forms are on the press. In the larger newspaper offices there is also a news editor, who receives and edits the telegraph and cable news. There may also be a political editor, whose province it is to write editorials in the interest of the political party with which the paper is affiliated; and a financial editor who records and comments upon the fluctuations in market values of stocks, bonds, etc. There must be also a sport editor, a dramatic editor and a musical editor, whose duties are sufficiently indicated by their titles, the two latter holding as well the positions of critics. The literary editor has charge of the strictly literary articles, book reviews, etc.

All the copy passes from the various editors to the "desk" where it is read by responsible assistants to the editor-in-chief, corrected as to character of statement, form and, if need be, spelling, punctuation, etc. From the desk it goes to the composing-room and is then under the direction of the superintendent or foreman. He is essentially a mechanic, whose duty it is to construct in type the literary material furnished him. In the city offices and in many of the larger country offices typesetting machines are in use, though a great deal of type is still set by hand. The typefounders report a continually increasing demand for their product despite the spread of the typesetting machines. The type as set, by whatever means, is assembled into page forms by the foreman under the direction of the managing editor. When the page is satisfactorily filled, the printing may be done directly from the type for a small issue. In the offices of the large papers the page forms are stereotyped and the printing done from the plate thus made. The pages are assembled for one side of the sheet on which the paper is printed in one part of the press and for the other side in another part, the web of paper passing first one set of page forms and then the other. When printed on both sides it passes to the folding machinery which folds and cuts apart

the individual papers and counts them at the delivery shelf. They are then delivered to the circulation manager whose business is to sell as many of them as possible. He has his force of delivery automobiles which hasten out on their various routes, leaving the bundles with news dealers or distributors.

The business department of the paper attends to the financial part of the combination, and with this department is associated the advertising editor, whose copy also goes independently to the composing-room, or to a separate jobroom, coming back in the form of type to the superintendent and the managing editor. With all its seeming complexity the various operations are carried on at top speed with perfect accord and with rarely a serious hitch.

Various commercial enterprises have arisen in connection with newspaper making. Some of these are known as "syndicates" who buy literary material from authors and sell it to newspapers in that form; or they may stereotype it and sell the "plate-matter," as it is called, ready for placing it on the press. Other syndicates or co-operative bureaus make up and sell newspaper sheets printed with items of general interest on one side. These are known as "patent insides" and are used very largely by country papers, which by their use have their typesetting reduced to half. The "patent insides" generally carry sufficient advertising to cover their cost and therefore are sold at little more than the cost of the paper they are printed on.

The total number of newspapers and periodicals published in the world at present is estimated at about 60,000, distributed as follows: United States and Canada, 26,360, of which about 2,600 are dailies and 650 semi-weeklies; Germany, 8,000; Great Britain, 8,000; France, 4,300; Japan, 2,000; Italy, 1,500; Austria-Hungary, 1,200; Asia (exclusive of Japan), 1,000; Spain, 850; Russia, 800; Australia, 1,000; Greece, 600; Switzerland, 450; Holland, 300; Belgium, 300; all others, 1,000. Of these more than half are printed in the English language. These figures were correct before the war. Since that outbreak many publications have ceased, but it may be presumed that they will generally resume upon the return of normal conditions. A detailed history of the newspaper in America will be found under **NEWSPAPERS, AMERICAN**.

Early Roman Bulletins.—The newspaper had its origin several centuries before the Christian era. The Romans published the *Acta Diurna*, the *Acta Publica*, the *Acta Senatus* and other journals. The *Acta Diurna* was a bulletin in which accounts were given of the progress of the imperial arms. The intelligence was communicated by the generals who received it from the officers under their command, and thus the contents became known throughout the army. The *Acta Diurna*, however, recorded other than military matters, such as trials, punishments, deaths and sacrifices. The *Acta Senatus* contained accounts of the various matters brought before the Senate, the opinions of the chief speakers and the decisions of the house, published regularly by command of Julius Cæsar, as part of the government gazette. The *Acta Publica* was a still nearer approach to the true newspaper form. During the later times of the republic, and

under the empire, it was published daily at Rome by the authority of the government. It contained a register of the births and deaths in the city; an account of the money paid into the treasury, from the provinces and everything relating to the supply of corn, and a kind of court circular, containing an account of the births, deaths, festivals and movements of the imperial family. Such details of public affairs as it was deemed expedient to publish were also included in it. The speeches in the Senate and the public assemblies were taken down by the early Roman short-hand writers called *actuarii*. These, assisted by clerks and notaries, drew up the *Acta* under the superintendence of censors, quæstors and other magistrates. The publication consisted in posting them in some public place, that any one who pleased might read them.

First Printed Journals.—"Ti Chau," better known as *The Peking Gazette*, was probably the first printed newspaper, and is the oldest daily journal in the world. It was first issued about 1340 A.D. The *Gazette* is still in existence, and is an official journal, forming a pamphlet of 20 to 40 pages of coarse paper, printed from wooden types on one side only, and having a colored paper cover. Toward the close of the 15th century, soon after the invention of printing, small sheets, usually in the epistolary form, appeared in Augsburg, Vienna, Ratisbon and Nuremberg. They were called *Relationen* and the *Neue Zeitung*, and gave accounts of the discovery of America and of other important public events, and like modern newspapers they chronicled the more interesting and startling local incidents. The *Notizie Scritte*, published monthly in Venice, in 1562, is said to have been the first Italian newspaper. Its price was a small coin called gazetta; hence the word gazette which came to be the popular name for the modern newspaper. The war which Venice waged in Dalmatia gave rise in 1563 to the custom in Venice of having military and commercial information read at a particular place by those desirous to learn the news, who paid for this privilege. A file of these Venetian papers, covering a period of 60 years, is still preserved in the Magliabecchi Library at Florence.

English Newspapers.—A printed bulletin entitled *Relations* was published in England as early as 1462, and in 1527 there was one called *New Tidings*, but neither of these presented more than a single piece of intelligence. A pamphlet called *The Neues from Spaine* made its appearance in the reign of Queen Elizabeth in order to convey to the people the tidings of the approaching armada from Spain, and the various counter-movements on the part of the British army and fleet. The first newspaper printed in English was published in Amsterdam, 2 Dec. 1620. It was a folio sheet printed both sides; and was issued by the Dutch bookseller Petrus Keerius, and his printer, Joris Veseler. A more pretentious journal was issued in 1622, under the title *The Weekly News from Italy, Germany, etc.*, published by Nathaniel Butter, Nicholas Bourne and Thomas Archer, and this may be regarded as the first specimen of the regular newspaper in England. Numerous other news journals followed, but it was not till the beginning

of the parliamentary wars that the newspaper first acquired political influence. One of these, published in November 1641, under the title of *Diurnal Occurrences, or the Heads of Several Proceedings in both Houses of Parliament*, is noticeable as the first which furnished a report of the proceedings in Parliament. The other papers which followed this were the *English Post*, *England's Memorable Accidents*, *The Kingdom's Weekly Intelligencer*, *The Spy*, *The Parliament's Scout*, *The London Post*, *The Country Messenger*, and were most of them published weekly. In Cromwell's time the principal journals were the *Mercurius Politicus* and the *Public Intelligencer*. The publication of newspapers without license was prohibited in the reign of Charles II, and an office was created called Licenser of the Press. Advertisements first appeared in English newspapers in 1652. The first copy of the *London Gazette* was issued 7 Nov. 1665 at Oxford, whither the court had retired in consequence of the plague then raging in London. It has since been uninterruptedly published twice a week as an official court circular. The first London daily paper was published in 1709 under the name of the *Daily Courant*. At this time appeared Defoe's journal, the *Review*. The first number of the *Tatler* was published on 23 April 1709, and of the *Spectator*, on 1 March 1711. Though not properly newspapers in the modern sense of the term, their early numbers contained general news in addition to their other literary matter. In 1712 a tax or stamp-duty was imposed by the government of a half-penny on papers of half a sheet or less, and a penny on papers of a single and above a half sheet. The *London Daily Advertiser* first appeared in 1726, and became afterward celebrated by the publication of the famous "Letters of Junius" (q.v.). The *Morning Chronicle* appeared in 1769 and the *Morning Post* in 1772. The *Times* was first commenced 18 Jan. 1785, under the name of the *London Daily Universal Register*, which was afterward superseded by that of the *Times* on 1 Jan. 1788. It was ably conducted from the first by Mr. Walter, who in 1803 transferred the management to his son. The *Daily News* appeared in 1846, the *Daily Telegraph* in 1855, and the *Daily Standard* in 1857. Others of later establishment are the *Echo*, *Graphic*, *Mail*, *Pall Mall Gazette*, *Westminster Gazette*, etc. The provincial English press began with the *Norwich Postman*, published in 1706, and followed by the *Norwich Courant* in 1714, and the *Weekly Mercury, or Protestant's Packer* (at Norwich) in 1720. The *Worcester Postman* appeared in 1708, the *Newcastle Courant* in 1711, the *Kentish Post* in 1717 and the *Leeds Mercury* in 1718.

Ireland and Scotland.—The first newspaper published in Ireland was the *Dublin News-Letter*, in 1685, followed by the *Dublin Intelligencer* in 1690. The *Belfast News-Letter*, still flourishing, first appeared in 1737. The *Freeman's Journal* commenced in 1763. In Scotland, on 31 Dec. 1660, appeared at Edinburgh the first number of the *Mercurius Caledonius*, which had an existence of only three months. The *Edinburgh Evening Courant* was started in 1718. The *Caledonian Mercury* commenced in 1720 and existed 150 years. The *Edinburgh Gazette* dates from 1699. The first paper published in Glasgow was the *Glasgow Courant*, on

11 Nov. 1715, followed by the *Glasgow Journal* in 1729. The *Edinburgh Scotsman* was first issued in 1817 and the *Glasgow Herald* in 1782.

France.—The first French newspaper, the *Gazette de France*, appeared in 1631, edited by Theophraste Renaudot, a physician, who had been in the habit for some time previously of presenting to his patients a printed account of the various occurrences of the day. The *Gazette* had a most successful career and existed until 24 Aug. 1848, when it was suspended. Two weeks later it was resumed under the title of *Le Peuple Français*, which title was again altered to *L'Etoile de la France*. The *Gazette Burlesque*, a newspaper in verse, was commenced in 1650, under the management of the poet Jean Loret. The *Mercure Galant* was started by Donneau de Visé in 1672 and under the title of the *Mercure de France*, to which it was changed in 1717, continued to exist until 1853. After the Revolution a host of new papers appeared. Among these were the *Chronique de Paris*, the *Orateur du Peuple*, Herbert's *Père Duchesne* and *Ami du Peuple*. Of all the newspapers, however, commenced at this eventful period, the only ones which have survived are the *Journal des Débats* and the *Moniteur*. Under Napoleon the press was subjected to a rigid censorship, which was continued until 1819. During the reign of Louis Philippe appeared *La Presse* and *Le Siècle*, both of which commenced in 1836. Since that date the growth of the newspaper press in Paris has been rapid. In 1903 over 1,400 newspapers were regularly published in Paris alone, some 60 of these being daily political organs. The most important of all is the *Temps*, with politics of moderate republicanism. *Le Petit Journal*, a cheap popular journal, has a circulation of over 1,000,000 daily.

Germany.—Egenolf Emmel, sometimes called the father of journalism, established at Frankfort in 1615 *Die Frankfurter Oberpost-amszeitung*. A second journal was commenced at Hildesheim in 1619 and a third at Herford in 1630. At the end of the 17th century there were at least 30 daily newspapers in Germany. The *Hamburgischer Correspondent* appeared in 1714 as a continuation of the *Holsteinische Zeitungscorrespondance*, established in 1712. It was the first German newspaper which received news of foreign affairs from correspondents resident abroad. The *Allgemeine Zeitung* was published in 1798, and soon rose to the highest position in German journalism. Other important journals are the *Norddeutsche Allgemeine Zeitung*, the *National Zeitung*, the *Neue Preussische Zeitung*, the *Volks-Zeitung*, the *Vossische Zeitung*, the *Kölnische Zeitung*, etc.

Russia.—The first journal in Russia appeared in 1703, and was followed by several others during the first half of the 18th century. The press in Russia is under very strict supervision and thus naturally has but little influence in public affairs. The *Journal de Saint Petersburg*, in French, has a considerable circulation outside of Russia.

Holland and Belgium.—The pioneer newspaper of Holland was first published in 1656. The early Dutch newspapers were distinguished by the accuracy of the information furnished by them. It was not until 1830 that they began to comment on public occurrences, their crit-

icism having been previously directed to items of commercial intelligence. The principal Dutch journals are the *Allgemeene Handelsblad* of Amsterdam, the *Haarlemsche Courant*, the *Journal de la Haye* and *Staats-Courant*, the two latter published at The Hague. Among Belgian papers the *Indépendance Belge*, the *Journal de Bruxelles* and the *Etoile Belge* are distinguished for the ability with which they are conducted.

Australia.—There are nearly 1,000 papers published in Australia. The daily issues are excellent imitations of the London newspapers. The *Sydney Gazette* was established in 1803.

India.—The first Indian newspaper in the English language appeared in Bengal in 1780. There are upward of 300 newspapers published in the various vernacular tongues.

In Turkey the first newspaper appeared in 1795 in French and the first daily journal in Spain was published in 1704. The modern newspapers of Norway, Sweden, Denmark, Italy, South Africa, Switzerland, Portugal, Greece, China, Japan and South and Central America, are of less importance than those of the other countries heretofore mentioned, being largely local in character.

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NEWSPAPER SYNDICATE, an association for the furnishing of special news features, generally of a literary nature, to daily and weekly newspapers. See **PRESS ASSOCIATIONS**.

NEWSPAPERS, American. The history of the printing of newspapers in America properly begins on 25 Sept. 1690, for it was upon that date that Richard Pierce, of Boston, issued the first number of what was to have been a periodical publication. Strange as it may seem, however, this first American journalist was endowed with a sense of originality of which even the makers of the modern sensational newspaper might find reason to be proud, for, in his salutatory, he stated that as there were many false rumors being circulated in the town of Boston which were constantly doing a great deal of harm, he requested his readers to furnish him with a list of those persons who were starting such stories that he might advertise them in the succeeding issues of his paper. In other words, his plan was to print a regular weekly list of all the liars in town, a scheme which would certainly have sold many copies of the sheet had not the authorities put an end to the project by promptly suppressing the newspaper. This journal was to have borne the name of "Public Occurrences, both Foreign and Domestic."

As only one issue of this strange newspaper appeared, the historians of journalism have usually failed to mention it, but, instead, have given the credit for the publication of the first periodical to John Campbell, a Scotchman, and

the postmaster at Boston, who issued the first number of *The Boston News-Letter*, on 24 April 1704. It was printed on half a sheet of pot paper, $7\frac{1}{2} \times 12\frac{1}{2}$ inches, with a small pica type, and its entire contents consisted of several extracts from *The London Flying Post*, in relation to the Pretender; the queen's speech to Parliament regarding that subject; a few items of local news; four short paragraphs of marine intelligence from New York, Philadelphia and New London, and a single advertisement—that of the proprietor. This was just 82 years after the appearance of the first English newspaper in London and 99 years after the first newspaper in France. Germany had antedated all other countries, having made several short-lived attempts to establish periodical journals as early as the latter part of the 16th century.

For more than 15 years Campbell had the journalistic field entirely to himself, but, in the latter part of 1719, another paper, called *The Gazette*, was started in Boston and, in 1721, a third was established by James Franklin under the name of *The New England Courant*. In the meantime there had appeared at Philadelphia the first newspaper published outside of New England. It was called *The American Weekly Mercury*, and its first number was issued by Andrew Bradford, the son of William Bradford, 22 Dec. 1719. The first paper to be printed in New York was *The New York Gazette*, established in October 1725, but by 1740 the number of newspapers in the English colonies in America had increased to 11, three of which had been established in Pennsylvania—one being printed in German—one in New York, one in Virginia, one in South Carolina and the remaining five in Boston.

In the beginning the American newspaper was a very small affair, being little more than an abstract of such papers as might chance to arrive from Europe on or about the date of publication. In fact, little change was made in them until after the time of the Revolution when the political agitators found it convenient to make use of them in presenting their appeals to the people. It was largely for this purpose that the first daily newspaper, *The American Daily Advertiser*, was established in Philadelphia by Benjamin Franklin Bache, in 1774. During the time that the seat of government was at Philadelphia, it was this paper that was used by Jefferson to oppose the Federal section of Washington's administration as well as all measures which originated with Hamilton or his friends. In 1802 Zachariah Poulson became its proprietor and the name which he gave to it, *Poulson's Advertiser*, was retained until 1839, when it was consolidated with *The North American*.

The second daily newspaper was *The New York Daily Advertiser*, first issued on 1 March 1785, by Francis Childs and Company. About a year later, 20 July 1786, the first newspaper appeared west of the Alleghany Mountains. It was published at Pittsburgh, Pa., and was called *The Gazette*. During the early post-Revolutionary days, Alexander Hamilton's special organ was *The United States Gazette*, a paper established in New York in 1789, by John Fenno, of Boston.

The territory comprised within the New England States had no permanent daily newspaper until 3 March 1813, when the Boston

Daily Advertiser was started by William W. Clapp. Prior to that time two distinct attempts to establish such papers had been made. As early as 6 Oct. 1796, Alexander Martin, an Irishman, started *The Polar Star*, which lived about six months. It was followed, 1 Jan. 1798, by Caleb P. Wayne's *Federal Gazette*, which ceased publication in less than three months. Of the hundreds of papers started in New York between 1725 and 1827, when the first number of *The Journal of Commerce* appeared, only two now survive, *The Commercial Advertiser*, now better known as *The Globe and Commercial Advertiser*, and *The Evening Post*.

The history of the penny newspaper dates from 1830, the idea having been suggested by the *Illustrated Penny Magazine*, first issued in London during that year. During the next few years, therefore, several similar attempts to introduce cheap papers were made in the United States, notably at Philadelphia and Boston. As these publications were always as small as they were cheap, however, they were but short-lived, and it was not until 1 Jan. 1833, when the price of *The Morning Post* was reduced to one cent by its publishers, Dr. Shepard, Horace Greeley and Francis V. Story, that any pretentious effort was made to print a cheap newspaper. Although this experiment was not a success its failure was due to causes other than that of the price, so, when Benjamin H. Day established the *New York Sun*, 3 September of the same year, he also fixed its price at one cent and the day of the cheap press had come.

DEVELOPMENT OF AMERICAN JOURNALISM FROM 1775 TO 1915.

YEAR	Daily	Weekly	Semi-weekly	Monthly	Semi-monthly	Quarterly	Total
1775.....							37
1830.....							150
1810.....	27	282	37	*15			361
1828.....							861
1840.....							1,403
1850 (U.S.)..	254	1,902	31	100	95	19	2,526
1860 (U.S.)..	387	3,173	79	280		30	4,051
1870 (U.S.)..	574	4,295	115	622	96	49	5,871
1880 (U.S.)..	971	8,633	133	1,167	160	122	11,314
1880 (A.)...	909	7,811	134	929	110	68	10,100
1885 (A.)...	1,207	10,241	146	1,284	189	96	13,304
1890 (A.)...	1,662	13,562	202	1,772	260	99	17,712
1895 (A.)...	1,988	15,196	329	2,150	249	158	20,217
1900 (A.)...	2,200	15,681	515	2,328	261	256	21,235
1905 (A.)...	2,377	16,152	600	2,550	262	180	22,312
1910 (A.)...	2,470	16,269	620	2,767	264	197	22,587
1915 (A.)...	2,494	16,001	605	3,064	341	†445	23,040

(A) Ayer's American Newspaper Annual.

* Tri-weekly.

† Includes bi-monthlies and tri-weeklies.

Following are the 10 oldest newspapers of the United States which remain in existence in 1916:

Portsmouth, N. H., <i>New Hampshire Gazette</i> , established.....	1756
Newport, R. I., <i>Mercury</i>	1758
Windsor, Vt., <i>Journal</i>	1763
Hartford, Conn., <i>Courant</i>	1764
New Haven, Conn., <i>Journal-Courier</i>	1766
Philadelphia, Pa., <i>North American</i>	1771
Baltimore, Md., <i>American</i>	1773
Alexandria, Va., <i>Alexandria Gazette</i>	1784
Augusta, Ga., <i>Chronicle</i>	1785
Hudson, N. Y., <i>Gazette</i>	1785

The colonial newspapers devoted most of their small space to foreign affairs, copying from and reflecting the style of the London papers. Local matters were considered too well known to be worthy of mention. The arriving and sailing of vessels and sometimes the comings and goings of stagecoaches, with a few advertisements, mostly about slaves and apprentices, are about the only sort of local chronicles that can be found in the papers prior to 1750. Sometimes letters or parts of letters from people in adjoining towns were printed, but the rule seems to have been to regard as most important the things that were farthest away.

Between 1750 and 1760 there developed a style of vituperative journalism that prevailed largely until about 1833. The idea of freedom of the press had taken strong root in the American mind, and the early disposition was to use the newspapers to ventilate all sorts of animosities, but mainly political squabbles growing out of the competitions of office seekers. The press in the early days of the Republic was mainly partisan and secured most of its support from politicians. Advertising had not yet developed, and subscribers were few. Paper and printing were expensive, so that there was little to be made by running a newspaper. In fact, most of the journalists of the early days seem not to have depended upon their papers for a living, but to have run them as side issues. Under such conditions it is not surprising that space came to be given up largely to minor political squabbles and windy communications from writers hiding under such *nom-de-plumes* as "Vox Populi," "Veritas," etc.

There were no systematic attempts at news-gathering. Editors took their choice of what interested subscribers sent in, with never a thought of reporting important gatherings or conventions. It was not until 1833 that the first real American newspaper appeared in the *New York Sun* and the success of its policy of publishing the news instead of devoting its columns to the editor's personal and often eccentric opinions upon political matters was so immediate that it was soon followed by many rivals. Most notable of these was *The Herald*, first issued by James Gordon Bennett in 1835, which promptly took the lead. There had previously (1801) been established in New York *The Evening Post* (which William Cullen Bryant began to edit in 1828), and *The Journal of Commerce*, which dates from 1827.

Bennett was a natural reporter and gathered two or three times as much news as the *Sun*, and really laid the foundations of the modern school of American journalism. He was the first to print financial news, to discuss theatres and plays, to write up the happenings in clubs and social life and to give the talk of the street. He was also the first to attempt a prompt report of a big fire, with a picture of the burning building in 1836. Dana and Bryant showed themselves great editors, but Bennett outclassed all his contemporaries in business management, gathering the most news, both local and foreign, and getting it quickly on the street. He was also the first to develop a considerable line of advertising. He was the first to demand larger and faster printing presses and to issue the "triple sheet" of 12 pages, the progenitor of the modern multiple page newspaper.

In 1841 *The Tribune* entered the New York field, with Horace Greeley as editor, and if Bennett taught the others how to do business, to Greeley, Dana and Bryant must be awarded the credit of establishing the strong editorial utterances which have ever since been characteristic of the American press. Abandoning the vituperation of earlier journalists, these men, all gifted scholars, taught the growing newspaper editors of America how to write and how to edit newspapers so as to command the respect of their fellow-men, even when they disagreed with the editorial policy or conclusions.

The New York *Times* came in 1851, with Henry J. Raymond, an admirable reporter and able writer, worthy of his colleagues.

Other great newspapers and editors of the antebellum days were: The Springfield (Mass.) *Republican*, started as a weekly in 1824 and made a daily in 1844 and attaining national celebrity through the genius of Samuel Bowles. In 1830 The Boston *Transcript* appeared and the Detroit *Free Press* in 1831. The Philadelphia *Inquirer* dates from 1829. The Philadelphia *Public Ledger* was first issued in 1836 and under the management of George W. Childs easily led the press of Pennsylvania. The Baltimore *Sun*, New Orleans *Picayune* and Milwaukee *Sentinel* were all born in 1837. The Brooklyn *Eagle* first saw the light in 1841. The Cincinnati *Enquirer* in 1842 and the Cleveland *Plain Dealer* in 1843. The career of the Boston *Herald* began in 1846. The Chicago *Tribune* and Milwaukee *Wisconsin* were founded in 1847 and in 1848 the Cleveland *Leader* appeared and was brought into prominence by Edwin Cowles. The Saint Louis *Post-Dispatch*, over which Murat Halstead presided, was born in 1851, the same year as the New York *Times*. The first great paper founded on the Pacific Coast was the San Francisco *Call*, dating from 1856. The New York *World* did not appear until 1860 and it was along in the eighties before it received the inspiring guidance of Joseph Pulitzer, great editor and keen business man.

Prior to 1810 the circulation of the most widely read daily newspaper did not exceed 900 copies, while there were few publications, either weeklies or semi-weeklies, that could boast of a larger circulation than that of 600 copies. There were about 25 dailies in 1810, issuing 310 times a year; 36 semi-weeklies; seven tri-weeklies and 290 weeklies, the aggregate circulation for the

when the total products of the newspaper and periodical industry of the country was stated to be \$232,993,094, and when there were 108,672 persons employed in this business. During this year the amount received from advertising was \$148,534,392, while the amount from subscriptions and sales was \$84,438,703. The above table is interesting as showing the steady development in number and circulation of the industry of daily paper making in America.

Newsgathering.—To attempt to tell the story of the growth of the American newspaper without relating some particulars in regard to the wonderful feats which it has from time to time performed would be to give but a superficial view of the subject. Prior to the days of the telegraph the daily press had great difficulty in obtaining its information about current events in other parts of the country. To offset this disadvantage they adopted three methods of quick communication. One was by pony express; another was by carrier pigeons, and, when steam had been sufficiently developed to make fast traveling by rail or steamboat possible, special trains and boats were frequently chartered for special occasions. The New York *Herald* and the New York *Journal of Commerce* were the first papers to own swift sailing yachts which were used to obtain early information from incoming European vessels, while A. S. Abell, of the Baltimore *Sun*, established his own overland express between New Orleans and Baltimore. This consisted of 60 blooded horses, housed at conveniently located relay stations, and the project was so successful that, during the Mexican War, he not only beat all the other newspapers in getting news, but he secured his information so far ahead of the government's own dispatches that he was able to advise the officials at Washington of important events sometimes more than 30 hours before the reports of the happenings had been received at the War Office. Another instance of conspicuous enterprise was shown by Henry J. Raymond. While a reporter for the New York *Tribune*, he was sent to Boston to report a notable speech by Daniel Webster. Returning by boat, he arranged to have the necessary composition frames and cases erected in his room, that, as fast as he could write, the sheets might be put into type, so that all were ready for publication the instant he reached the office.

In 1846, when the entire country was so greatly excited over the Oregon boundary dispute with Great Britain, several of the newspapers combined to send a swift pilot boat to England. There all the important news was obtained; the boat returned as quickly as it went, and the American people were provided with the information they craved many days before it could possibly have arrived if it had come by the ordinary channels, the slow-sailing vessels of that day.

As so much enterprise was shown by newspaper publishers at a time when the means of quick communication were few and costly, it was but natural that they should have hailed the steam railroad and the electric telegraph with delight. During the 10 years between 1840 and 1850, the period in which these inventions were first generally extended, the circulation of the American papers increased more than two-fold.

YEAR	Number of daily papers published	Total circulation per issue
1850.....	254	758,454
1860.....	387	1,478,435
1870.....	574	2,601,547
1880.....	971	3,566,395
1890.....	1,610	8,387,188
1900.....	2,235	15,102,156
1910.....	2,470	*23,000,000
1915.....	2,494	*29,000,000

* Estimated.

year being estimated at considerably less than 2,000,000 copies, while the value of the paper used could not have been in excess of \$45,000. Compare those figures, therefore, with these from the last available United States census,

Samuel Toplift of Boston was the first systematic gatherer of foreign news in the United States. For 30 years, beginning about 1820, he met the European boats in Boston harbor, and brought the news to the Exchange Coffee House, whence it was forwarded to New York by pony express. In 1848 seven of the large New York daily paper owners combined forces for gathering news outside of the New York field, and the Associated Press was thus formed. In the course of time smaller news-gathering associations were formed by groups of newspapers in various localities. The New York Associated Press gathered the foreign and Washington news, and exchanged its budget of news with these smaller associations, thus covering the entire field. They dominated the news field for many years, and sometimes refused to serve newspapers, and did not serve other-newspapers to their satisfaction. Competition arose in the United Press and the Western Press Association. A few of the more wealthy owners of the Associated Press then purchased a controlling interest in the United Press, and thus stopped competition, except that of the Western Association. These two associations ran in opposition for a few years, and then Melville E. Stone, manager of the Western Association, convinced all parties that conditions were wrong, and that there should be no private ownership of newsgathering. Thereupon the present Associated Press was born, as a New York corporation, in 1900, with conditions that enable any newspaper to come in, and exercise a vote in the control. It had, in 1916, a membership of about 900 newspapers, and expended in the vicinity of \$4,000,000 a year for news.

Owing to the high rates at first charged for telegraph and cable messages the papers of those days did not get the almost unlimited news service which they receive to-day. Even as late as 1879 the night rate from California to Boston was 10 cents a word; between Chicago and Boston it was five cents a word, and between Washington and Boston, two cents a word. Since that time the rates have been reduced fully 75 per cent. The original cable rate was \$100 for 20 words, whether served to newspapers or to the general public, while the rate to newspapers is now but 10 cents a word, either for day or night service.

The result of the high tolls was shown in the compact dispatches published by the newspapers of that day. For example, when the *America* won the international yacht race, 22 Aug. 1851, no report of the event was received by any American paper until 4 September, when the news came in the form of a dispatch from Halifax. On this day the report in the *New York Sun* contained about 500 words, the *Tribune* used but 250 words about the contest and the *Evening Post* was content with 200 words. So, too, when Brooks assaulted Sumner, the senator from Massachusetts, in 1854, the longest report sent to any Boston paper comprised less than half a column, and this was printed quite inconspicuously at the bottom of the page. In 1860, when Lincoln was nominated for the Presidency, at Chicago, one operator was able to send out all the press matter that was offered to him, while, at recent conventions, the hundred and more operators

have had all they could do to handle the millions of words of descriptive matter filed with them by correspondents representing every newspaper of prominence in the country. When these facts are remembered, however, it does not seem so strange that the aggregate number of words of press matter that went over the Western Union wires in 1879 was but 28,000,000, whereas the total number of words contained in press specials handled by the same company in recent years has been no less than 10 times as great.

Scarcely more than 40 years ago some of the most progressive journals in this country depended solely upon boys to carry their papers to their subscribers, while larger lots, the papers intended for dealers, were trundled through the streets on wheelbarrows. To-day all the newspapers have their own systems of fast delivery wagons, and the most progressive publishers charter "special" trains, not only for their Sunday editions, but frequently for other occasions during the year.

The growth of the Sunday newspaper dates from the Civil War, but it was many years after the conclusion of that struggle before the large Sunday editions began to make their appearance. In fact, it was only in 1870 that one of the leading papers in Boston increased the size of its Sunday issue from four to eight pages, and, strangely enough, the change met with all kinds of adverse criticism. During the next few days many of the subscribers to this journal called at the office, to protest that the new paper was much too large, and this same criticism has continued as the great Sunday papers have steadily increased in size.

In 1916 there were 10,929 cities and towns in the United States having newspapers. New York City led with 981, and New York State with 2,121; Illinois had 1,826, Pennsylvania 1,358, Ohio 1,128 and Texas 1,081; New York State had 208 dailies and 1,100 weeklies, Illinois 181 dailies and 995 weeklies, Pennsylvania 212 dailies and 840 weeklies, Ohio 172 dailies and 715 weeklies, Texas 98 dailies and 864 weeklies. No other State had as many as 1,000 newspapers. The Southern States had 4,131, the Mid-Western States 5,013, the Western 6,349, and the Pacific Slope States 2,079.

Classification of Papers.—While the newspaper directories and census reports class all sorts of publications together, and they are included in all the totals here given, it should be understood that many of the publications referred to are no longer generally known as newspapers, the title magazine being chosen by many monthlies and periodicals, by many weeklies, bi-monthlies, monthlies, etc. The first United States newspapers were mostly weeklies, and scarcely entitled to be called newspapers, because they did not begin to systematically gather news until after 1830. When the public came to appreciate what real news was, the daily newspapers experienced a rapid growth, and in 1916 there were 2,494 of them, more than in any other country on the globe. Their issues of six times a week represent a much greater volume of circulation advertising and general business than the 16,000 weeklies, the majority of which are what are termed country newspapers, retailing the minor happenings of the small towns, with their social gossip, interesting mainly to

after the dissolution, it was given to Sir John Byron the Little, and is celebrated in connection with Lord Byron, the poet, who made the semi-ruinous edifice his home in 1808, but sold it in 1818. The abbey has since been restored, and has many carefully preserved relics of the poet. Consult Irving, 'Abbotsford and Newstead.'

NEWT, nūt, a small tailed batrachian of the genus *Diemyctylus*, *Triton*, or a related genus, usually classed under the *Salamandrinae*, but sometimes considered to constitute a distinct family, under the name *Pleurodelidae*. Newts are sometimes also called elfs or tritons, and the name is often loosely applied to salamanders of other genera not closely related. Among technical characteristics of the newts in general are the bony carpus and tarsus, the bony ball-and-socket joints of the vertebræ, the bony post-frontal-equamosal arch of the skull and the narrow bands of palatine teeth. The tongue is generally very small. The species are more strictly aquatic than most salamanders, and the males of most species undergo remarkable seasonal changes in the development of high dorsal crests, papillæ or other appendages on the arms and elsewhere, and of brilliant colors. About 20 species belonging to this group of genera are known, of which more than half are European, several Asiatic and only two North American, while none have been found elsewhere. The eastern American species (*Diemyctylus viridescens*), of which a quite distinct variety occurs in Texas and Mexico, is abundant throughout the Eastern States, and extends into Canada. It may be distinguished by the rather narrow arched head marked with a pair of longitudinal keels, and the handsome greenish red color of the back, the pale yellow below and the row of conspicuous scarlet, black-bordered spots on each side. In the adult stage just described this animal is about three and one-half inches long and completely aquatic. A terrestrial form is somewhat smaller, lacks the dorsal crest altogether, has a rougher skin and a bright vermilion color. This is the pretty little creature common in Eastern woods, which later returns to the water and assumes the greenish garb. Newts are chiefly nocturnal, and when abroad swim actively, not merely crawling on the bottom in the manner of most salamanders. They feed on all kinds of aquatic larvæ, worms, small mollusks and crustaceans, and are very voracious. During the breeding season in the spring the male develops a broad cutaneous fin, richly provided with sense organs on the back and tail, and becomes otherwise modified. The fertilized eggs are deposited singly, each in a gelatinous capsule whose adhesive nature permits of their attachment to water-plants, some of the leaves of which are drawn about each egg. The larvæ are strictly aquatic and possess three pairs of external gills, but after metamorphosing, leave the water and assume the red terrestrial phase, when they live in the woods under stones and logs, appearing at night or during rain. This stage lasts for several years, when they seek the water either in the spring or fall and soon acquire the adult color and characteristics. Whether or not they can again enter the red phase by leaving the water is not certainly determined. Like frogs, newts swallow the skin after molting, which appears to take place most readily while the animal is immersed in water.

The Pacific newt (*Diemyctylus torosus*) is nearly twice as large, and is further distinguished by the wide, flat keelless head, and brown, unspotted color. It is very abundant in California, and ranges from the southern part of that State to Alaska. Its habits are essentially similar to those of the Eastern species. It feeds on earthworms, snails, slugs, insects, and its own sloughed skin, eggs and young. In this species the eggs are deposited in clumps.

The numerous European species present many interesting differences in detail in habits, especially in the mode of reproduction. Some of them live habitually away from the water and migrate long distances to it in the spring, and one species is remarkable from the fact that the ribs penetrate the skin. All of the newts make very interesting and satisfactory aquarium pets.

J. PERCY MOORE,
University of Pennsylvania.

NEWTON, nū'ton, Alfred, English ornithologist and zoologist: b. Geneva, 11 June 1829; d. London, 7 June 1907. He was educated at Magdalene College, Cambridge, of which he was travelling Fellow 1854-63, Fellow in 1877 and till his death professor of zoology and comparative anatomy. He took a prominent part in urging bird protection by legislation; traveled in Lapland, Iceland, West Indies, North America, the Pacific and Spitzbergen; edited *The Ibis* (1865-70) and the *Zoological Record* (1870-72); contributed the ornithological articles in the 9th edition of the 'Encyclopædia Britannica'; and greatly advanced the study of the comparative anatomy of birds. He wrote 'The Zoology of Ancient Europe' (1862); 'Ootheca Woolleyana' (1864-1902); 'Zoology' (1894); and a 'Dictionary of Birds' (1893-96).

NEWTON, Sir Charles Thomas, English archæologist: b. Bredwardine, Wales, 16 Sept. 1816; d. Margate, 28 Nov. 1894. He was educated at Shrewsbury School and at Christ Church College, Oxford, and was assistant in the department of antiquities in the British Museum, 1840-52. He became vice-consul at Mytilene in 1852 and acting consul at Rhodes in 1854; discovered the tomb of Mausolus at Halicarnassus and the famous bronze serpent of Delphi at Constantinople and after a year as consul at Rome in 1861 became keeper of Greek and Roman antiquities in the British Museum, being the first incumbent of this post and holding it until December 1885. During this term he furthered archæological excavations in Ephesus, Priene, Smyrna, Sicily, Cyprus, Cyrene and Rhodes and procured for the British Museum the Farnese collection, the two Castellani collections and those of Pourtales and Blacas. From 1880 to 1888, Newton (who was knighted in 1887) was professor of classical archæology in University College, London; to his work there and in the British Museum is largely due the revival of English interest in classical antiquities. He wrote 'Method of the Study of Ancient Art' (1850); 'History of Discoveries at Halicarnassus, Cnidus and Branchidæ' (1862-63); 'Travels and Discoveries in the Levant' (1865); and 'Essays on Art and Archæology' (1880).

NEWTON, Gilbert Stuart, English painter: b. Halifax, Nova Scotia, 20 Sept. 1794; d. Chelsea, England, 5 Aug. 1835. His mother was sis-

ter to Gilbert Stuart, the American portrait-painter, his father an officer in the British army and he went eventually to England after visiting Italy and France (1817). After studying at the Royal Academy he exhibited regularly both in the Royal Academy and the British Institution from 1818 to 1833. He was elected Royal Academician in 1832. The last three years of his life he was confined in a private asylum for the insane. His pictures, which are finely colored, are mostly domestic scenes, are anecdotic in motif and he especially excelled in the portrayal of feminine beauty of the English type. His best works include 'The Gentle Shepherd'; 'The Dutch Girl' (both of which were engraved); 'Porcelain and the Doctors'; 'The English Girl'; 'Olivia's Return'; 'The Forsaken.' Specimens of his work are in the possession of the New York Historical Society and the Metropolitan Museum, New York. Sir Walter Scott, Tom Moore and Washington Irving sat for portraits to him.

NEWTON, Henry Jotham, American manufacturer and chemist, inventor of the dry-plate photographic process; b. Hartleton, Pa., 23 Feb. 1823; d. from street railroad accident, New York, 23 Dec. 1895. At 20 he was a partner in the firm of Wittlesey Brothers, piano-makers, Salem, Conn., whom he left six years later to form the New York firm Light and Newton; this new company greatly improved the manufacture of pianos. Newton was later connected with the Bradburys in the piano trade; in 1884 he became president of the Henry Bonnard Bronze Co. His invention of a permanent colloid emulsion and of the other details of the dry-plate process in photography dates from 1875. Educated a Presbyterian, Newton joined the Methodist Church, then the Unitarian and finally allied himself with the Spiritualists. A society formed by him in 1875 for psychical research and of which he was president was, he claimed, the first Theosophical Society, from which Mme. Blavatsky and Henry S. Olcott took the ideas which they falsely proclaimed to be of Indian origin.

NEWTON, Hubert Anson, American astronomer and mathematician; b. Sherburne, N. Y., 19 March 1830; d. New Haven, Conn., 30 Aug. 1896. He was graduated at Yale in 1850 and in 1855 became professor of mathematics there. He spent one year in foreign study and for the rest of his life lived quietly in New Haven. He was far better known as an astronomer than as a mathematician because of his remarkable researches as to meteors and meteoroids, undertaken to verify Olmsted's hypothesis that meteors were the more visible portions of a great stream of bodies with a fixed orbit about the sun and this hypothesis he proved correct by a brilliant and painstaking series of mathematical computations. In 1861 he superintended the work of the Connecticut Academy of Arts and Sciences in relation to the meteors of August and November and prepared a celestial map for the use of the investigators. He wrote on meteors for several encyclopædias and published most of his original papers on that subject in the 'Memoirs' of the National Academy and in the *American Journal of Science*, of which he was long editor. The National Academy awarded him the Smith gold

medal for his work on meteors. Newton did much to introduce the study of the metric system into the public school curriculum; was an authority on the theory of transcendental curves and wrote various tables for life insurance companies. He was a simple, genial, modest man and deeply interested in the material advancement of Yale College.

NEWTON, Sir Isaac, English mathematician and natural philosopher; b. Woolsthorpe, Lincolnshire, 25 Dec. 1642; d. Kensington, 20 March 1727. He was sent at an early age to the village school and in 1654 to the free grammar school of Grantham. He was entered at Trinity College, Cambridge, in 1660. He had the good fortune to find in the celebrated Dr. Barrow, professor of Greek (1660-63) and from 1663 Lucasian professor of mathematics, an able teacher and fast friend. He appears to have found particular interest in Wallis' treatise, 'Arithmetica Infinitorum.' He was graduated in 1665. While absent from Cambridge in 1665-66, during the plague, he discovered the binomial theorem (q.v.) and the direct and inverse methods of fluxions (q.v.)* (that is, differential and integral calculus); computed the area of the hyperbola; and first turned his attention to the subject of gravity. The familiar story, first given by Voltaire, is that the fall of an apple led him to reflect on the nature of that remarkable principle which attracts bodies to the centre of the earth. He considered that if the moon was retained about the earth by terrestrial gravity, the planets, which move round the sun, ought similarly to be retained in their orbits by their gravity toward that body. Having determined the law of the gravity of the planets toward the sun he endeavored to apply it to the moon, that is, to determine the velocity of her motion round the earth by means of her distance, as settled by astronomers, and of the intensity of gravity, as shown by the fall of bodies at the earth's surface. To make this calculation it was necessary to know exactly the distance from the surface to the centre of the earth but unfortunately at that time there existed no correct measure of the earth's dimensions. Newton was obliged to employ the imperfect measures then in use, and found that they gave for the force which retains the moon in her orbit a value greater by one-sixth than was allowed by observed facts. This small difference seemed to his cautious mind a strong proof against his bold conjecture, and, furthermore, Newton was then unable to show that a homogeneous attracting sphere behaved as if all its mass were situated at its centre. He imagined that some unknown cause modified, in the case of the moon, the general law of gravity indicated by the motion of the planets. Yet he did not abandon his leading notion, but determined to wait till study and reflection should reveal to him this supposed unknown cause. In 1667 he returned to Cambridge as Fellow of Trinity. In the year 1668 Mercator published his 'Logarithmotechnia,' in which he had obtained the area of the hyperbola referred to its asymptotes by expanding its ordinate into an infinite series, which was the main secret of Newton's method. Barrow showed this work to Newton, who im-

*It now appears that the main credit for the invention of the calculus should go to Dr. Barrow, Newton's teacher.

mediately gave him his own treatise, but did not yet publish.

In the course of 1666 his attention had been accidentally drawn to the phenomena of the refraction of light through prisms. His experiments led him to conclude that light, as it emanates from the radiating bodies, is not a simple and homogeneous substance, but that it is composed of a number of rays, endowed with unequal refrangibility and velocity and possessing different coloring properties. He made the mistake of supposing it to be impossible for a compound prism or lens to be achromatic. More than two years elapsed before he returned to his researches on this subject; but in 1669, having been appointed Lucasian professor of mathematics, and preparing to lecture on optics, he endeavored to mature his first results, and composed a complete treatise, in which the fundamental properties of light were unfolded, established and arranged by means of experiments alone, without any mixture of hypothesis—a novelty at that time almost as surprising as these properties themselves.

In 1672 Newton was chosen a Fellow of the Royal Society, to which he communicated a description of a new arrangement for reflecting telescopes, which rendered them more convenient by diminishing their length without weakening their magnifying powers, and soon after, the first part of his labors on the analysis of light, in which he advocated the material theory (that is, that light consists of small particles shot out by a luminous object), the society appointed three members to study it fully and report upon it. Hooke undertook to draw up the report. Instead of discussing the new facts as presented by the experiments of Newton, he examined them merely in relation to his own hypothesis—now known as the undulatory theory, and accepted as the true one—and concluded by allowing whatever appeared reconcilable with his own hypothesis, and by advising Newton not to seek any other explanation of the facts. Newton in reply adduced new experiments confirming his material (or corpuscular) theory and refuted the objections to the production of whiteness by the mixture of all the rays. He addressed another paper (1675) to the Royal Society, completing the account of his results and of his views on the nature of light. This treatise, united with his first paper on the analysis of light, afterward served as the base of the great work, 'Treatise on Optics' (1704) in which, however, the experimental investigation of the phenomena is more extensive and more strictly separated from all hypothesis. It is now known that Newton was wrong, and that light results from wave-motion in a pervading medium called ether. But Hooke's explanations were vague, and his theory remained untenable until the discovery, a century later, of the principle of interference (q.v.). In 1679 Newton had occasion to write to Hooke about a system of physical astronomy on which the Royal Society had asked his opinion. Hooke and Newton held conflicting opinions, and Newton, having examined by mathematical calculations a position maintained by Hooke, found that an attractive force, emanating from a centre, and acting inversely as the squares of the distances, would produce motions exactly resembling the planetary motions both in re-

gard to the form of the orbit and the velocity of the body at each point. This was the secret of the system of the world; but it still remained to account for the discordance of the moon's motion, which had before (1665) embarrassed Newton. But in 1684 he learned the results of a new measurement of the arc of a meridian. Two years were spent in following up the consequences of this discovery, and preparing his immortal work, 'Philosophiæ Naturalis Principia Mathematica'; but it was not till 1686 that he concluded to present his work to the society, and it was printed in 1687 at the personal expense of Halley, the secretary. Newton's teachings were introduced at Cambridge in 1699 and at Oxford in 1704, but were not admitted by the French scientists for half a century.

In 1687 Newton was one of the delegates sent by the University of Cambridge to maintain its rights before the High Commission Court when they were attacked by James II, and in 1689 he was elected by the university to the Convention Parliament, but never distinguished himself in that body. He had always taken great interest in chemistry, and constructed a small laboratory for prosecuting his investigations, and seems, after the publication of the 'Principia,' to have devoted almost his whole time to them.

In 1696 he was appointed warden of the mint, a general recoinage having then been undertaken. In this office he rendered essential service, and in 1699 was made master of the mint. In 1701–02 he again sat in Parliament for his university; in 1703 he was chosen president of the Royal Society; and in 1705 was knighted by Queen Anne. In 1704 he gave to the world his 'Optics,' which contains all his researches on light. Later works were his 'Arithmetica Universalis' (1707; more complete 1712); 'Methodus Differentialis' (1711); and his 'Analysis per Equationes Numero Terminorum Infinitas' (1711); 'Chronology of Ancient Kingdoms Amended' (1728); and 'Observations or Daniel and the Apocalypse' (1733), an attempt to show the fulfilment of the prophecies. In 1705–12 he was involved in a controversy with Flamsteed; and in 1705–24 in one with Leibnitz as to priority in the discovery of fluxions. The splendid genius of Newton has often been testified to, among many by Macaulay, who declared that in no other person did the demonstrative and inductive faculties ever exist in such perfect co-ordination. His statue, by Roubiliac, stands in Trinity College, Cambridge. Horsley's edition of his works (1779–85), with the 'Opuscula,' collected by Castillon (1744), and his 'Letters,' inserted in the 'Biographia Britannica,' contain nearly all his printed works. Three editions of the 'Principia' were published in his own lifetime; the last reprinted at Glasgow in 1871 by Sir W. Thomson (Lord Kelvin) and Professor Blackburn. The standard 'Life of Newton' is that by Sir David Brewster, who had full access given him to the great mass of Newton's papers (1855; 2d ed., 1860). Consult also Ball, W. W. R., 'Essay on Newton's Principia' (London 1893); De Morgan, A., 'Essays on the Life and Work of Newton' (reprinted Chicago 1914). This latter work contains a bibliography.



SIR ISAAC NEWTON

NEWTON, John, English astronomer and mathematician: b. Oundle, Northamptonshire, England, 1622; d. Ross, Herefordshire, England, 25 Dec. 1678. He was graduated from Oxford University in 1641 and engaged in mathematical and astronomical work, remaining loyal to the king during the Protectorate. After the Restoration he was made king's chaplain in 1661 and became canon of Hereford in 1673. He wrote 'Institutio Mathematica' (1654); 'Geometrical Trigonometry' (1659); 'Introduction to the Art of Logic' (1671); 'Cosmography' (1679), etc.

NEWTON, John, English clergyman: b. London, 24 July 1725; d. there, 21 Dec. 1807. He made several voyages with his father before 1742, was impressed in 1743, deserted and was captured, and was exchanged into a slaver. A life of debauchery was followed by his conversion in 1748; in 1755 he left the sea and was surveyor of tides at Liverpool 1755-60. His religious experiences were deepened by the preaching of Wesley and Whitefield, and after a period of private study he was ordained priest in the Church of England in 1764. From 1764 to 1780 he was curate of Olney, Buckinghamshire, and then became incumbent of Saint Mary Woolnoth, London, where he preached until the year of his death. His evangelical influence was very strong there, and he preached to large congregations. He is best known, however, for his connection with the poet Cowper, who settled at Olney in 1767, and who was kept occupied by the good man in an almost unintermitted round of religious exercises. Newton seems to have foreseen the outcome, and endeavored to provide congenial occupation for the poet in seeking from him contributions to the 'Olney Hymns' which, published in 1779, attained great popularity. Newton received his D.D. from the College of New Jersey (Princeton) in 1792. His sermons were characterized by unction and intensity, but they have no literary value. One of his hymns is the well-known 'Glorious Things of Thee are Spoken.' Among his works are 'An Authentic Narrative of Some Particulars in the Life of John Newton' (1764), an evangelical classic; 'Olney Sermons' (1767); 'Cardiphonia' (1781); 'Apologia' (1789), and the beautiful and touching 'Letters to a Wife' (1793). His memoir edited by Cecil was published in 1808. See COWPER.

NEWTON, John, American military engineer: b. Norfolk, Va., 24 Aug. 1823; d. New York, 2 May 1895. He was graduated from West Point in 1842 and was appointed to the engineering corps. At the beginning of the Civil War he was chief engineer of the Department of Pennsylvania and in September 1861 was made brigadier-general of volunteers. He served with distinction through the war and in 1865 was promoted brigadier-general and major-general in the regular army. He was mustered out of the volunteer service in 1866 but continued in the regular army, and in 1884 was made chief of engineers. He engineered the removal of the obstructions at Hell Gate Channel in the East River, New York; was commissioner of public works in New York, and in 1886 was retired at his own request. In 1887-88 he served as commissioner of public works of New York City,

and in the latter year became president of the Panama Railroad Company.

NEWTON, Richard Heber, Protestant Episcopal clergyman: b. Philadelphia, 31 Oct. 1840; d. 19 Dec. 1914. He was son of the rector of Saint Paul's, Philadelphia, studied in the Philadelphia Divinity School, was assistant to his father (1860-62) and, after a short time in a church at Sharon Springs, N. Y., succeeded his father in Philadelphia, leaving this charge in 1869 to go to All Souls' Church, New York. In 1903 he was appointed preacher to Leland Stanford, Jr., University but soon resigned this position. He was a broad-churchman, and was several times threatened with trial for heresy for the free expression of his views. He took a prominent part in the Congress of Religions held at Chicago in 1893 and was vice-president of the organization of this congress. He wrote 'The Morals of Trade' (1876); 'Womanhood' (1880); 'Philistinism' (1885); 'Social Studies' (1886); 'Church and Creed' (1891); 'Christian Science' (1898); 'Parsifal' (1904); 'The Mysticism of Music' (1915).

NEWTON, Robert Safford, American surgeon: b. Gallipolis, Ohio, 12 Dec. 1818; d. New York, 9 Oct. 1881. After receiving a preliminary education at Gallia College, Ohio, he went to the University of Kentucky, where he received the degree of M.D. in 1841. He practised in Gallipolis until 1845, when he removed to Cincinnati where he made a reputation as physician and surgeon. From 1849 to 1851 he was professor of surgery in the University of Memphis, Tennessee, and in the latter year was called to a similar chair in the Eclectic Medical Institute in Cincinnati. He resigned in 1862 and in 1863 went to New York City. There he helped found the Eclectic Medical College, in which he was professor of surgery from 1865 until his death and of which he was also president from 1875 till his death. Dr. Newton was a successful operator and the inventor of several surgical instruments. He was also engaged in the investigation of cell pathology and made a specialty of cancerous diseases. From 1851 to 1861 he edited and published the *Eclectic Medical Journal* and after he settled in New York he edited the *Eclectic Medical Review* until 1874, when it was merged into the *Medical Eclectic*. He published several books with D. B. Powell, including 'An Eclectic Treatise on Diseases of Children' (New York 1854 and 1880), and was the sole author of 'Pathology of Inflammation and Fever' (1861; new ed., 1867); 'A Treatise on Antiseptic Surgery' (1876) and 'Explorations in Cell Pathology' (1877).

NEWTON, Ill., city, county-seat of Jasper County, on the Embarras River and on the Illinois Central Railroad, about 100 miles in direct line southeast of Springfield. It is in a productive agricultural region, and in the vicinity of large coal fields. The chief manufactures are dairy products, flour, brick, tile, lumber products, woolen goods, brooms, ice cream and candies, and it has a large cold storage plant. The city carries on an active trade in farm and dairy products, fruit, coal and its manufactures. Pop. 2,108.

NEWTON, Iowa, city, county-seat of Jasper County, on Chicago, Rock Island and

Pacific and the Minneapolis and Saint Louis railroads, about 30 miles, direct line, east by north of Des Moines the capital of the State. It is the commercial centre of a rich agricultural section in which considerable attention is given to stock-raising. There are 28 factories, their annual volume of business amounting to \$4,575,000, with a monthly pay-roll of \$100,000. Newton is commonly known as the "Washing Machine Centre of the World." Besides this and worthy of mention are the following manufactured products: flour, agricultural implements, gas engines, tractors, advertising novelties, toys, tile and brick. The city is a beautiful home city, 11 fine churches, six schools, among the finest in the State. Nearly 20 miles of paved streets. The trade is chiefly in manufactured articles, farm products and livestock. The city owns and operates the waterworks, light, power and gas plant. Pop. 6,800.

NEWTON, Kan., city, county-seat of Harvey County, on the Atchison, Topeka and Santa Fé and the Missouri Pacific railroads, about 201 miles southwest of Kansas City and 115 miles southwest of Topeka. It is in the south central part of the State, in the valley of the Arkansas River, one of the most fertile sections of Kansas. It was settled in 1871 and incorporated a city in 1880. The chief manufacturing establishments are flour mills, drill factory, separator factory, creamery, large ice plant and stock yards. It is a division point of the Santa Fé Railroad and has repair shops. The number of railroad employees who are residents of Newton is about 750, and about 200 men are employed in the manufacturing establishments mentioned. There are 15 churches for white people and two for the colored. It is the seat of Bethel College, the only college in America under the auspices of the Mennonite Church (1904). It has a high school, good public and parish schools and a Carnegie library. The three banks have a combined capital of \$175,000. The government is vested in a mayor, who holds office two years, and two commissioners also elected biennially. The majority of the people are native born; the foreign born are Germans, Irish and French. Pop. (1920) 9,781.

NEWTON, Mass., city in Middlesex County, on the Charles River, and on the Boston and Albany Railroad, six miles west of Boston. The area is 18 square miles; the city includes 13 villages. It was settled in 1631 and was part of Cambridge until 1688, when it was incorporated as a town under the name of New Cambridge, which name it retained until 1692; the city charter was granted in 1873. Newton is a beautiful residential city; within its limits is a part of the Metropolitan Park; its own city parks cover an area of about 170 acres. A large cemetery, in a prominent part of the city, contains the graves of many people noted in history. Newton has some manufacturing establishments, chief of which are silk mills, fire-alarm supply works, rubber works, paper-box and curtain factories, printing works, worsted mills and cordage factory. It has the Lasell Seminary for women (1851), the Allen School for boys (1853), Mount Ida School for young women, Boston College (Catholic), Saint John's Industrial School, the Newton Theological Seminary, opened in 1825 under the auspices of the Baptists, and a public library which con-

tains about 94,000 volumes. The prominent public buildings are several beautiful churches, the classical and technical high schools, the elementary and parish schools. Near the site of Waban's Wigwam, where John Eliot began to preach to the Indians, 28 Oct. 1646, stands the Eliot Memorial.

The annual municipal expenditures for maintenance and operation are about \$1,500,000. The chief items of expense are for public schools, \$400,000; for streets, parks, sewers, \$300,000; interest on debt, \$169,000; police department, \$105,000; fire department, \$96,000; municipal lighting, \$61,000; health department, \$43,402; charity, \$38,000. The government is administered under a revised charter of 1902, which provides for a mayor who holds office two years and a board of aldermen consisting of 21 members, three from each ward. The mayor and aldermen appoint or elect the administrative officials, except the school board, which is chosen at a popular election and for a term of three years. The city owns and operates the waterworks. Pop. 46,054. Consult Smith, 'History of Newton.'

NEWTON, N. J., town, county-seat of Sussex County, on the Delaware, Lackawanna and Western Railroad, about 40 miles northwest of Newark. It is in an agricultural region, and in the vicinity are slate quarries. The chief manufactures are roofing slate, silk, paper boxes, shoes and dairy products. It is the seat of the Newton Collegiate Institute and it has the Dennis Library, which contains about 9,000 volumes. Newton is known as a summer resort. The town owns and operates the waterworks. Pop. 4,700.

NEWTON-ABBOT, England, a market-town of Devonshire, 15 miles south of Exeter by the Great Western Railway. It is beautifully placed at the head of the Teign estuary where the Lemon enters. Newton-Abbot was given to the abbot of Tor by William, Lord Brewer, founder of the monastery, in 1196, whence the town gets its name. Newton-Abbot contains some ancient monuments the oldest of which is a tower of the 14th century chapel of Saint Leonard. Two churches, Saint Mary's in Wolborough and All Saints in Highweek, are of Perpendicular style. Saint Mary's, however, contains a Norman font and some heraldic ornaments of the 15th century. Forde House, a valuable Tudor mansion, belonging to the Earl of Devon was visited by Charles I and William of Orange, who was proclaimed king being here in 1688 and who first read his declaration to the people of England at Newton-Abbot market-cross. The town-hall and markets are also interesting. There are important Roman remains in the vicinity. The establishment of large engine works by the Great Western Railway greatly developed local industry, and there is much shipping trade. Fine china and pipe clay are worked near the town and exported to the potteries. Lignite and tin ore are mined. Large agricultural fairs are held here. Pop. 12,500.

NEWTON-IN-MAKERFIELD, England, a town in Lancashire, 15 miles east of Liverpool and 15 miles west of Manchester. The barony belonged to Edward the Confessor and was held by the Banastres from the Conquest to 1286. The township of Newton-in-Makerfield

(Newton-le-Willows) gave its name in Saxon times and in the reign of William the Conqueror to one of the hundreds of Lancashire. There was a market here in 1558. A party of Highlanders were taken prisoners near the town by Cromwell in 1648 and hanged in the woods which is still called Gallow's Cross. Newton is an important railway junction and manufacturing centre. The chief industries are paper making, printing, iron foundries, glass, sugar refining, wagon making, brick making and coal mining. It has a mechanics' institute, a grammar school and a town-hall. Near the town is a fine race course. Races and horse and cattle fairs are held here every summer. A beautiful lake in the town called Newton Mere is covered with pleasure boats in the spring and summer. Newton returned two members to Parliament from 1558 to 1832, when it was disfranchised. Coal is mined in the neighborhood. Near the town is a moated Elizabethan half-timbered house and an ancient barrow. Pop. 16,699.

NEWTON THEOLOGICAL INSTITUTION, theological school founded 1825 at Newton, Mass., under the auspices of the Baptist bodies of New England. Its course covers three years and at its completion the degree of bachelor of divinity is conferred. The library contains 34,000 volumes and the institution has 10 members on the faculty and 81 students. The buildings and grounds are valued at \$400,000; other property controlled by the institution is valued at about \$1,400,000, not including an endowment fund of \$800,000.

NEWTONIAN PHILOSOPHY. See NEWTON, SIR ISAAC.

NEWTON'S RINGS. This is the name given to those colored rings seen when between the surfaces of two plates of glass a thin film of air intervenes. This phenomenon takes its name from its discoverer, Sir Isaac Newton (1642-1727), who describes it in his work on 'Optics' (London 1704). He took two lenses, one convexo-plane, its convex side having a radius of 14 feet, the other equi-convex, with the radii of its surfaces 50 feet, and laid the first with its plane downward on the top of the second, thus producing a thin film of air between the lenses, the film being thinnest near the centre and becoming gradually thicker outward. On slowly pressing the upper lens against the under one a number of concentric colored rings, having the point of contact of the lenses for their centre, appeared and increased in size when the pressure was increased. These rings, or more properly systems of rings, are in this form of the experiment seven in number, and each of them is composed of a number (ranging from eight in the first or smallest ring to two in the outermost) of rings of different colors, the colors, though different in each of the systems of rings, preserving the same arrangement as the colors of the spectrum. Thus, in the second ring the color is violet and the outside scarlet. The colors are very distinct in the first three systems of rings, but become gradually confused and dull toward the outside, till they almost fade away in the seventh system. The centre is deep black. The thickness of the air-film in the centre is about half a millionth of an inch and increases gradually, to nearly one one hundred and

thirty thousandths of an inch, when the colors disappear. Consult Newton, 'Optics' (London 1704); Preston 'Theory of Light' (New York 1894).

NEWTOWN, Conn., town in Fairfield County, 20 miles north of Bridgeport on the New Haven and Hartford Railroad. It owns waterworks and the Beach Memorial Library. Farming is the chief occupation. It is a rich agricultural country and there are many beautiful drives in the vicinity. A fire hose factory is situated here. Pop. 434.

NEWTOWN, N. Y., since 1898 a part of the borough of Queens in New York City; formerly a separate town in Queens County. It was settled in 1652 by people from New England and first called Middleburgh. In 1664 it became a part of Connecticut and was then called Hastings. The following year it came into possession of New York and the name was changed to Newtown. Consult Riker, Jr., 'The Annals of Newtown.'

NEWTOWN, Battle of (29 Aug. 1779), won by Gen. John Sullivan (1740-95). While waiting in the summer of 1779 for the promised return of D'Estaing from the West Indies to co-operate against Canada, Sullivan, commanding 4,000 men, entered the Iroquois Country, or Country of the Six Nations (Mohawks, Oneidas, Onondagas, Cayugas, Senecas and Tuscaroras), to punish and prevent the devastations of the Indian tribes and their English allies. In the little settlement of Newtown, now incorporated in the city of Elmira, New York, a battle of considerable importance was fought on 29 August. General Sullivan defeated several bands of Indians, including a force under Joseph Brant and Sir John Johnson (son of Sir William Johnson), and drove out of the country thousands of Indian warriors and destroyed their villages and crops. Next morning General Sullivan began his march toward Catherine Town, near the southern extremity of Seneca Lake. A monument to General Sullivan now marks the historic spot of the battle. (See SULLIVAN, JOHN; BRANT, JOSEPH). Consult 'Journals of the Military Expedition of Maj.-Gen. John Sullivan against the Six Nations of Indians in 1779, with records of centennial celebrations, prepared by order of the State government' (Auburn, N. Y., 1887), and 'Life of Gen. John Sullivan,' by Oliver W. B. Peabody, in Spark's 'American Biography,' Vol. XIII, p. 135.

NEXT FRIEND, in law, an adult, other than a guardian, who represents in an action another person not legally competent to maintain a suit in his own behalf. The practice originated in England in the time of Edward I. A next friend is not a party to an action but acts solely for another and is considered an officer of the court. In some States a minor may sue through a next friend to compel an accounting by his guardian in case there is some ground for belief that the latter has been guilty of a breach of trust. An action begun by a next friend cannot be terminated or settled otherwise than by consent of the court.

NEY, nā, Michel, Duke of Elchingen, Prince of the Moskva, French soldier: b. Sarre-Louis (Moselle), 10 Jan. 1769; d. Paris, 7 Dec. 1815. He was the son of a cooper and became a

non-commissioned officer of hussars in 1787. He soon attained great distinction for bravery as well as for military capacity, was quarreled over by Kleber and Jourdan as to who should have his services, contributed greatly to the victory of Hohenlinden and obtained the marshal's baton in 1804. He opened the campaign of 1805 against Austria by a brilliant victory at Elchingen, 14 October (whence his title Duke of Elchingen) and brought about the capitulation of Ulm. He occupied the Tyrol and marched on to Carinthia, when stopped in his career by the Peace of Presburg. In 1806 and 1807 he fought at Jena, and after the capture of Magdeburg at Eylau and Friedland, his conduct at the latter earning for him the title of "le brave des braves." In 1808 he maintained his high reputation in Spain. Napoleon recalled him, but kept him at a distance till the commencement of hostilities against Russia, when he received the chief command of the 3d division of the imperial forces. He commanded the centre at the battle of the Moskva, or Borodino, and so distinguished himself as to earn the title of Prince of the Moskva. In the conduct of the retreat, in which he commanded the rear guard, his ability, valor and devotion were conspicuously manifest, and he exerted himself to the utmost to save the wreck of the army. Napoleon and Murat had deserted. In 1813 he decided the victory of Lützen, assisted at Bautzen and Dresden, but was defeated by Bernadotte at Dennewitz. He was now obliged to retire to Torgau, but soon took the field again; chased the Swedes from Dessau and fought at Leipzig and Hanau. When the enemy entered France he disputed every step of their progress. Brienne, Montmirail, Craonne and Châlons-sur-Marne are shining names in the history of his battles.

After Napoleon's abdication, Ney took the oath of allegiance to the king, was made a peer and received the cross of Saint Louis. He enjoyed marked distinction at court and appeared to be entirely devoted to the Bourbons, but was the object of bitter hostility on the part of the returned émigrés. When Napoleon landed on his return from Elba Ney collected a large force, was appointed its commander and with many assurances of his zeal and fidelity to the king marched against the invader. But noticing the desertion of his soldiers and their inclination for Napoleon, he regarded the cause of the Bourbons as lost. He joined Napoleon at Lyons on 13 March and thus opened his way to Paris. Napoleon gave him the command of his left wing, which engaged with the British at Quatre Bras. At Waterloo he led the last charge of the Old Guard and had five horses shot under him. His clothes were full of bullet holes and he fought on foot till night in the midst of the slain. He kept in hiding for a time after the new restoration but was captured, the ultra-loyalists demanded his life and he was tried for treason, sentenced (5 December) to death and shot in the Luxembourg garden. "After the execution," says Lamartine, "bitter shame seized on every soul." It was universally regretted that Ney, the brave, had been chosen to suffer. Consult 'Mémoires du Maréchal Ney' (1833); 'Lives,' by Bonnal (1910) and Rouval (1833); Johnston, C. L. H., 'Famous Cavalry Leaders' (1908); Nollett-Fabert, 'Eloge historique' (1852).

NEYMARCK, nā'märk, **Alfred**, French economist: b. Châlons-sur-Marne, France, 4 Jan. 1848. He was engaged in the banking business in his early years in his native city and was in Berlin in 1866-67. In 1869 he went to Paris and edited a political paper. He soon acquired fame for his knowledge of statistics and economical subjects, became president of the Statistical Society, vice-president of the Society of Political Economy and a member of many important commissions. He was a delegate to the Saint Louis World's Fair in 1904 and was made a Commander of the Legion of Honor. His books include 'Les milliards de la guerre' (Paris 1875-77); 'Colbert et son temps' (2 vols., 1877); 'Turgot et ses Doctrines' (2 vols., 1885); 'Les valeurs mobilières en France' (1888); 'Un centenaire économique, 1789-1889' (1889); 'Vocabulaire manuel d'économie politique' (1898); 'Finances contemporaines' (2 vols., 1903); 'L'Année de l'entente cordiale et de l'arbitrage' (1904); 'La banque de France de 1880 à 1905' (1905); 'L'Obsession fiscale' (5 vols., 1902-07); and 'Que doit-on faire de son argent' (1913).

NEZ PERCÉ (nā pēr-sā') **INDIANS**. See CHOPUNNISH.

NGAMI, ngā'mē, **Lake**, Africa, in western Rhodesia, north of the Kalahari Desert, a portion of a great prehistoric inland sea, when first visited by Livingstone and Oswell in 1849, about 20 miles long, 10 miles broad and very shallow. Its only feeder was the Teoge or Kubango and its outlet the Botletli or Zuga. In the rainy season the water was fresh, but in the dry season the lake became a mere brackish marsh. Since 1890 the waters have gradually disappeared, the site of the lake now being marked by an extensive reedy marsh-land, some portions of which are utilized for growing corn. It is believed that formerly it had an outlet to the Limpopo Basin.

NGAN-HUI, n-gän-hwē', or **NGAN-HWEI**, n-gän-hwā'ē, China, an eastern inland province, intersected by the Yang-tse-kiang, separated from the ocean eastward by the provinces of Che-kiang and Kiang-su, and bounded northwest by Ho-nan, west by Hu-peh and south by Kiang-si. The principal river is the Yang-tse-kiang, giving water communication to the interior. The province is fertile; there are great areas under forest; coal and iron ore are the principal minerals. Area, 54,826 square miles; pop. about 17,300,000; capital, Nanking-fu (q.v.).

NGAN-KING-FU, n-gän' king' foo', China, a city and river-port, capital of Nganhui (q. v.), on the north bank of the Yang-tse-kiang, about 200 miles above Nanking; since 1897 open to foreign trade. It suffered severely during the Tai-ping Rebellion. Pop. about 40,000.

NGORNU, n-gör'noo, or **ANGORNU**, Africa, a town of Bornu, British Northern Nigeria, on the southwest shore of Lake Chad, 15 miles south of Kuka, the capital. It is on the trade route communicating with the interior and the coasts, and its fairs are of great commercial importance. The town is subjected to inundations from the lake during the wet season. Pop. 40,000.

NIAGARA, nī-ăg'-ă-ra, *Battle of*. See LUNDY'S LANE, *BATTLE OF*; also CHIPPAWA, *BATTLE OF*.

NIAGARA FALLS, Canada, a town of Welland County, Ontario, on the west bank of the Niagara Gorge, just below the Falls, and opposite Niagara Falls, N. Y. It communicates with the United States by three bridges, has electric and steam railroad service and is a station on the Michigan Central and on several lines linking with the Grand Trunk. It commands the best view of the Falls from Queen Victoria Niagara Falls Park, extending above and below the Falls for two and a half miles. Enormous electric power plants, larger than on the United States side, have been constructed to utilize the water power. Cereal foods, carborundum, graphite, cyanide, wire and steel chains, hosiery and automobile accessories are among the industries. The town was originally named CLIFTON or SUSPENSION BRIDGE, after its English prototype at the Severn Gorge, Bristol (q.v.). Pop. (1921) 11,789.

NIAGARA FALLS, N. Y., city in Niagara County, on the Niagara River, and on the New York Central and Hudson River, the Wabash, the Erie, the Michigan Central, the Grand Trunk, the West Shore and the Lehigh railroads, about 25 miles north by west of Buffalo. Until 1892 what is now the city constituted two separate villages, Niagara Falls, originally known as Manchester and Suspension Bridge, formerly Niagara City; they were consolidated in that year and chartered as a city. (For the New York State Reservation and the bridges connecting the city with the town of Niagara Falls (q.v.), Ontario, see NIAGARA). The manufacturing establishments have increased and are increasing since the utilization of the power of the river by the new methods. The chief manufactures are paper, flour, dressed lumber, wheat biscuit, electro-chemical products, foundry products, machinery, chemicals, metalurgical products, aviation materials, electric batteries and wood products. It has a public library, the building for which was donated by Andrew Carnegie, a high school, business schools, public and parish schools, the De Veaux College (Protestant Episcopal) and the Niagara University (q.v.).

On account of the Falls, one of the scenic wonders of the world, the city is visited annually by thousands of tourists. The government, administered under the city manager form, provides for a mayor, who holds office for four years, and a council. The administrative officers are appointed by the mayor and city manager. A recent assessed value of the real estate was about \$36,785,780. Pop. 42,257.

NIAGARA. Description and Geography.

—The course of the Niagara River runs a little west of north from Lake Erie, through a flat and fertile country for about 20 miles, carrying with it the drainage of Lake Erie and the Upper Great Lakes. At the end of this 20 miles the river, which has descended for the last half mile in a series of rapids and cascades, comes to an abrupt declivity, the Niagara escarpment, and the water makes a sudden plunge, dividing into two falls, the American Fall, 167 feet in height, with a comparatively straight crest of 1,060 feet, and the Canadian or Horse-

shoe Fall, 158 feet in height, with a deep curve in the centre, a crest of about 2,500 feet and running at right angles to the river. The Canadian Fall carries much the larger volume of water, it having been estimated that only about 10 per cent of the water flows over the American Fall. The apex of the Horseshoe Fall is accepted as the boundary line between the United States and Canada, thus placing the islands at or near the Falls except Cedar Island and the Dufferin Islands in the United States. Behind the Luna Fall, a small section of the American Fall, is the Cave of the Winds, a natural rocky chamber eroded by the water, approximately 100 by 75 feet and a favorite resort for tourists desiring to experience the full force of the cataract.

From the Falls the river descends in a series of rapids between rocky cliffs of from 200 to 350 feet in height, for about three miles, until it reaches the Whirlpool, a "circular excavation in the westerly bank of the river, the boundaries of which are rocky cliffs 300 feet high for two-thirds of its circumference, while the other third, its northerly bank, is made of an accumulation of sand, gravel and clay." The river rushes into this elbow with tremendous force in a northwesterly direction, but has to turn and leave it in a northeasterly direction. The impact of these two currents meeting forms the rotary movement of the Niagara, called the Whirlpool, which with the Whirlpool Rapids below is second only to the Fall itself in beauty and fascination. From here the river flows through the deep gorge until it reaches the Lewiston escarpment, and on through a low plain to Lake Ontario, a total fall of 326 feet from the level of Lake Erie. The width of the gorge at the top varies from 700 feet at the Whirlpool to 1,700 feet opposite the centre of the American Fall. At the water line the width decreases. The depth of water on the crest of the American Fall measures from one and one half to four feet under usual conditions, but northerly and easterly winds have at times set the water back, until the Fall has been nearly dry. The depth of water of the Horseshoe Fall is not definitely known, although various attempts have been made to compute it.

Geology.—The life history of Niagara Falls has long been a fascinating and absorbing study for the geologists of the world. It is of supreme importance, as here, more completely than any other known place, are presented the evidences which give a measurement of the time which has elapsed since the disappearance of the northern ice sheet of the glacial period. The first geological survey of the Falls was made in 1842 by Prof. James Hall and from that time to the present day geologists have attacked the problem of the age of the Falls, with varying results, according to their standpoints and the theories of their respective ages. The age of the Falls has been variously estimated at from 5,000 to 50,000 years, a wide margin, which shows that the subject is still fruitful for study.

Modern students accept certain fundamental theories regarding the geological history of Niagara. It is believed that the valley of the present Niagara was determined in general outline in pre-glacial times when the American continent stood at an elevation of from 2,000 to

5,000 feet higher than at present. By study of the erosion of smaller streams in the vicinity under similar conditions, the pre-glacial Niagara Valley may be reconstructed as beginning at the northerly part of Buffalo, draining northward by way of the Whirlpool and Saint David's Channel, recognized by Hall and Lyell, early in the 19th century, while the lake basin to the south of the Buffalo watershed was at least 150 feet below the top of the limestone



Pre-glacial Drainage.

(Dotted lines, present drainage; black lines, preglacial drainage.)

terrace and drained to the west. With the advent of the Ice Age, the whole drainage of the North American continent underwent a change. The ice filled the basin of the Ontario Valley, and the streams flowing into it had to find an outlet to the south. This was probably the period when the Tonawanda and Chippawa creeks overflowed their southern boundaries at Buffalo into the valley of Lake Erie, which overflow finally eroded the present inlet. With the gradual recession of the ice sheet northward, and the constant increase of water masses, the outlet of the drainage flowed at different times in different sections of the divide to the south into the Mississippi or the Mohawk valleys. As the level of these glacial lakes lowered, the continent itself lowered, until finally the level of Lake Erie was about 30 feet higher than at present, and drained through the present valley of Niagara. As the level of Lake Ontario fell, the waters found the lowest point

in the escarpment at Lewiston, and the Niagara we know was born.

It is inaccurate to speak of the beginning of the Falls at Lewiston, as the thin layer of limestone on the top of the escarpment, with masses of soft shale underneath, did not offer sufficient resistance for the formation of a fall, but made the work of erosion so easy that it is probable that a series of rapids were formed, as Lake Ontario became lower. This gorge eroded its way southward until it met the ancient channel of the Tonawanda and the Chippawa at the whirlpool, and then began the erosion of the present gorge south of the whirlpool. Geologists differ greatly as to the age of the gorge south of the whirlpool, one school maintaining that it is pre-glacial and another that it is entirely post-glacial. The middle ground between the two is that the pre-glacial stream did not cut deeply, and that the erosion of the gorge from the whirlpool southward is largely post-glacial. It is accepted that originally the Falls were undivided, but as the work of erosion and recession proceeded, until the fall reached the northern end of the American Fall, Goat Island and the other small islands on the American side came into existence, and the Falls divided, the larger volume of water remaining in the deepest channel, west of Goat Island, and the lesser volume forming the American Fall. The Horseshoe Fall, owing to its larger volume of water and deeper channel, recedes much faster than the American. A geologic section of the Niagara region from Lake Erie to Lake Ontario exposes the following strata of the Silurian: The Medina series, sandstones and shales, distinguished in this section by their bright red color; the Clinton series, shales and limestone; the Niagara, shale and limestone; the Salina series, gypsum and shales in varying thickness; the Water Line group. Of the Devonian: the Corniferous and Helderberg limestone. From north to south may be successively met all the series from the Medina group to the Niagara limestone, up the gorge along the cut of the New York Central Railroad. At Lewiston may be seen at the water's edge about 230 feet of shales and sandstones of the Medina series of red color; above this 32 feet of Clinton limestone and shale of greenish and white color, overlaid by 70 feet of gray-colored Niagara shale and 20 feet of drab-colored Niagara limestone. There has been considerable speculation on the part of geologists as to the probable future of the Falls. Observation and investigation have shown that rapid changes are taking place in the crest and contour of the Horseshoe Fall. In 1890 the crest of the Canadian Fall measured 3,010 feet. It now measures approximately 2,500 feet. A certain portion of this change is due to erosion and recession. In 1904-05 the crest of the Fall was further narrowed by the artificial filling of the channel on the Canadian side. Consult Dow, C. M., 'A Bibliography and Anthology of Niagara Falls' (chapter 7), which contains a full bibliography of the geology of Niagara, with many extracts and quotations from the leading geologists of the different periods.

History.—When we speak of the Niagara frontier we mean the region bordering the river of Niagara from its beginning at Buffalo to its termination at Fort Niagara on Lake Ontario. The most striking feature in connection

NIAGARA



Wide World Photos

Airplane view of Niagara Falls taken from an American Army Airplane showing the Canadian or Horseshoe Falls, the American Cataract, etc.

with the history of this region is its antiquity. We are not accustomed to think of the Niagara in the same breath with the Atlantic Coast, but the fact remains that Niagara was known even before Jamestown and Plymouth Rock. Through all the early history of our continent this region played a large part in the affairs of nations, and to-day the Falls are known the world over as a marvelous scenic spectacle, and the source of a tremendous power in the industrial development of the two great English-speaking nations. Father Hennepin was long credited with the honor of being the first white man to see and describe the Falls, but later researches have revealed that several French missionaries and explorers, among them Champlain, preceded him to the Niagara region and wrote of the Falls, although the evidence goes to prove that they did not explore the river, and received their accounts of the Falls from the Indians. La Salle made his first expedition to the Niagara in 1669, and on his second visit in 1678 he was accompanied by Father Hennepin. Hennepin's earliest and most trustworthy account of the Falls was published in his 'Description de la Louisiane' in 1683, and his famous picture of the Falls appeared in the edition of 1697. Whatever his claims, it may be truthfully said that Hennepin was the first European to see, to describe and to depict the Falls. Through the French missionaries and explorers friendly relations were established with the Indians of the Niagara region. Various trading posts were built, and in 1725-26 Fort Niagara was erected at the mouth of the river and became the centre of a broad French influence. The French domination of the region lasted until 1759, when Fort Niagara and its dependencies were surrendered to the British. In 1763 occurred the massacre of a British force near Fort Schlosser by a band of Indians under Pontiac. Many of the victims were thrown or driven alive into the Devil's Hole Ravine on the banks of the Niagara. This was the last rebellion of the Indians against the British rule. A strong garrison was maintained at Fort Niagara, and the region was controlled by the British until 1796, 13 years after the close of the Revolutionary War. In this locality were planned the Indian raids against the settlers of western New York and Pennsylvania which were a feature of Revolutionary times, and which resulted in Cherry Valley, Wyoming and other massacres. In 1812 Niagara became the scene of land conflict between the British and the Americans. Various engagements were fought, with success first to one side and then the other, until the siege of Fort Erie by the British was ended by a brilliant sortie of the Americans in September 1813. With the Treaty of Ghent 1814, began the Hundred Years' peace on the Niagara.

The general development of the Niagara region was slow. In 1802 the American side was opened for settlement by the Holland Land Company, but the opening of the Erie Canal in 1825 gave the whole region its first great impetus toward permanent establishment and development. The city of Niagara Falls, formerly Manchester, while still maintaining its tourist aspect, especially in summer, is a thriving community with unusual opportunities for manufacturing and industrial development owing to the great reservoir of power at its doors. Fort

Niagara is maintained as a United States military post, and there are still standing on this site several structures left from the French and British periods of occupancy.

New York State Reservation at Niagara and Queen Victoria Niagara Falls Park.

In 1879 Governor Robinson in a message to the New York State legislature advocated the purchase by the State of land along the Niagara River and Falls to be used as a State park and reservation. After public interest in the matter had been aroused, a bill passed the legislature of the State of New York in 1883 authorizing the purchase of the present reservation, a tract of 412 acres, 300 of which are under water, and placing this reservation under the control of five unsalaried commissioners to be appointed by the governor. The control of this territory is still vested in New York State, and is administered by an appointive commission. The province of Ontario, under the leadership of Lord Dufferin, very promptly took similar steps for the preservation of the scenery on the Canadian side, and by successive purchases and grants the Canadian government acquired a strip of land along the river from Lake Erie to Lake Ontario comprising 1,178 acres and known as Queen Victoria Niagara Falls Park. The Canadian Park is administered by a board of seven commissioners, who are appointed by order of council and who serve without compensation. The policy of the two governments has been to preserve for the future all the surroundings, as well as the natural beauty of the Falls, and where by the vandalism of previous generations the scenery had been marred in any way, to restore it so far as possible to its original setting. Such buildings, bridges and other structures as the New York State Commission has deemed it necessary to build have been planned with a view to the harmony of the landscape. The commission has also been zealous in protecting the cataract from any unbridled use of power which would destroy its beauty. Consult Dow, C. M., 'A History of the State Reservation at Niagara' (Albany 1914), which contains the complete story of the establishment of the reservation, its administration, the policy of the commission and its achievements and an account of the power situation.

From the city of Niagara Falls, N. Y., down through the gorge along the brink of the Niagara River past the turbulent rapids and whirlpool, forming an unrivaled scenic route, an electric trolley line runs and connects by the Queenstown bridge with the Canadian heights above the edge of the gorge. The line extends beyond the Horseshoe Falls to Chip-pawa and stop-offs allow sightseers to visit the parks and all points of interest. The railway and other bridges spanning the gorge also afford airviews of the entire length of the gorge, of the falls and their attractive natural and other features.

Power.—The history of industrial Niagara is the story of one of the most vital economic developments of the age. The first application of Niagara power was that in the saw mill built by the French in 1725 on the New York bank of the river near the rapids. Augustus Porter built a mill on the New York bank of the upper river in 1805, and two years later Porter and Bacon erected a grist mill near the

same location. Other mills and one dynamo for arc lighting purposes were established before 1885, when the State took over the property where these mills stood. The total capacity of the mills operated before that date by the American Falls was about 100 horse power. The first diversion of water from above the cataract for power purposes was proposed in 1842 by Augustus Porter, but it was not until July 1861 that the canal for carrying the water from above the Falls to a point near the top of the gorge was completed. The Civil War checked the development of this power for a time, but in 1877 the canal and the river frontage at both ends of it were purchased by the Niagara Falls Hydraulic Power and Manufacturing Company, and the power thus diverted was utilized. The water rights of this company are limited to the capacity of the canal. The possibilities unfolded by the generation of water power into electric energy and the transmission of this electric energy to distances unthought of, comparatively few years ago, have exerted a strong influence upon the power development at Niagara. In 1885 Thomas Evershed proposed a plan which contemplated the diversion of water at a point more than a mile above the Falls. This water was to be conducted beneath the city of Niagara Falls with a system of canals and wheel-pits for the purposes of power production. The Niagara Falls Power Company was organized to carry out this plan in a revised form and electric distribution of power was to take the place of branch canals and tunnels. The construction of this work was begun in 1890, and the first electric energy was sold to the Pittsburgh Reduction Company for the manufacture of aluminum in 1895. The Niagara Falls Hydraulic Power and Manufacturing Company constructed a generation equipment at the foot of the cliff in 1895, and these two are the only power companies actually in operation on the American side, although two other companies not operative claim rights under old charters granted by the State of New York. On the Canadian side four power companies following in construction the plan of the American plants are in operation. The policies of the governments of Canada and the United States toward the utilization of the Niagara power afford an interesting contrast. The power companies on the American side divert the water under legislative grant for commercial purposes entirely free from any rental or revenue charge by the government for the use of this power. The Canadian government, on the other hand, far-seeing in its policy, has, as a condition for each permission to divert the waters of Niagara for power purposes, required an adequate yearly rental from the power companies, this rental being based on the amount of horse power generated. Before 1913 the amount of water diverted from Niagara may be summed up as follows, the figures being the number of cubic feet diverted each second.

Niagara Falls Hydraulic Power and Manufacturing Co.	6,500
Niagara Falls Power Co.	8,600
Canadian Niagara Power Co.	9,500
Ontario Power Co.	12,000
Electrical Development Co.	11,200
Electric Railway Co.	1,500
	34,200
Total	49,300

With the lapsing of the Burton Act of 1913 the amount diverted has materially increased, the Burton Act having been designed to protect the natural scenery of the Falls by keeping within bounds the use of power on the American side and by restraining the sale and transmission of power from the Canadian side to manufacturing establishments operating in the United States. The tremendous demand for electrical power brought into being by war industries during 1914-18 again increased the diversion of water for power purposes. Niagara power is used in Syracuse 165 miles from its source for manufacturing purposes and for the operation of electric railways and also in Windsor, Ontario, 240 miles away. This achievement of science and technical skill which has harnessed one of the great forces of nature for the use and benefit of man is indeed one of the marvels of our age.

Bibliography.— Besides the works quoted in the text consult also Cumberland, F. B., 'Century of Sail and Steam on the Niagara River' (Toronto 1913); Gilbert, G. K., 'The History of the Niagara River' (in *Annual Report* for 1890, Smithsonian Institution, Washington 1891), and 'Niagara Falls and their History' (New York 1895); by several authors, 'The Niagara Book' (Buffalo 1893); Grabau, A. W., 'Guide to the Geology and Palaeontology of Niagara' (New York 1901); Harrison, J. B., 'The Condition of Niagara Falls' (New York 1882); Hennepin, L., 'New Discovery of a Vast Country in America' (ed. by Thwaites, G. R.; 2 vols., Chicago 1903); Holley, G. W., 'History of the Falls of Niagara' (New York 1882); Hulbert, A. B., 'The Niagara River' (New York 1908); Kibbe, *Seventh Annual Report of the Commissioners of the New York State Reservation at Niagara* containing a full account of the various surveys and maps of the falls (Albany 1891); Knielle and Taylor, 'Niagara Folio' (Washington 1913); Severance, F. H., 'Studies of the Niagara Frontier' (Buffalo 1911); Spencer, J. W. W., 'Outline of the Evolution of the Falls of Niagara' (Washington 1913).

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NIAGARA FORT. See FORT NIAGARA.

NIAGARA INTERNATIONAL PARK, on both sides of Niagara River at Niagara Falls, a reservation for public purposes established by the joint action of the legislature of the State of New York and the Parliament of the Dominion of Canada. See NIAGARA.

NIAGARA-ON-THE-LAKE, Canada, a town of Lincoln County, Ontario, at the mouth of Niagara River, on the west bank, 12 miles below Niagara Falls, and 36 miles by water from Toronto. It is a pleasant summer resort. It was burned down in midwinter 1813, by the Irish-American General McClure during his retreat, an unnecessarily savage action that was deplored by both sides and led to cruel reprisals. Pop. 1,318.

NIAGARA SERIES, in geology, the earliest strata of the Upper Silurian era, following the Oswegan Series and preceding the Onondaga Series and the lower Helderberg Series. It, in turn, is subdivided into the strata of the Clinton group and those of the Niagara formation. Neither is continental in extent, but both are important, are very rich in fossils and

NIAGARA



A View of the Falls taken from a boat

NIAGARA



Niagara Falls in winter

consist of sandstones, limestones and shales. The Clinton formation, shaly sandstone in New York and Pennsylvania, and more completely limestone further west, occurs in Ohio, Indiana, Wisconsin, Tennessee, Kentucky, Alabama, Missouri and Georgia; and is marked by the occurrence of oolitic argillaceous hematite. The Niagara formation is a thick limestone, underlaid with shale; the wearing away of the latter undermines the limestone as at Niagara Falls. The Niagara group occurs in New Hampshire, Connecticut, Ohio, Illinois, southern Michigan, New York, Ontario, Indiana, Iowa, Missouri, Maine and the Maritime Provinces, western Tennessee, northern Kentucky, Missouri, Arkansas and (scantly) in the Rockies. The fossils of the series are mollusks, corals, crinoids, etc.; apparently there are no land or fresh-water animals.

NIAGARA UNIVERSITY, Niagara County, N. Y., a Catholic educational institution founded by the Rev. John J. Lynch of the Congregation of the Mission in 1856. The imposing buildings occupy a prominent position on the American bank of the Niagara River 250 feet above water level, between the Falls and Lake Ontario, commanding a full view of the rapids, the gorge and the country for a radius of several miles. The grounds cover an area of 300 acres. The high school, college and seminary departments with their various courses lead to the degrees of B.A., B.S., Ph.B. and M.A. The institution not only enjoys the powers and privileges of a university granted by State legislature but is numbered by the State Board of Regents among the approved colleges of high standard, and her degrees placed in the same class as those of leading educational institutions of the country. Her alumni have become prominent in Church and State, in public and professional life. The faculty numbers 22; the annual enrolment of students who come from all parts of the country averages 400. The university library contains over 20,000 volumes. The grounds and buildings are valued at \$500,000.

NIAM-NIAM, nē-ām' nē-ām'. See NYAM-NYAM.

NIANTIC (Naiantukquia, "the point at the river's mouth"), an Algonquian tribe at one time prominent in American history. When first historically known it occupied the coast of Rhode Island from the region of Narragansett Bay to Connecticut. The Niantic spoke the same dialect as the Narragansett and the two tribes are often confounded with one another. They seem to have looked upon themselves as practically one people; and their interests were closely united, yet they always remained, in organization at least, distinct tribes. This is seen in the fact that when the Narragansett threw all their energies and resources into King Philip's War, the Niantic refused to have any part or share in it. After the destruction of the Indian power the Narragansett, as they surrendered to the government in small bodies from time to time, were sent to live with the Niantic, who had by their foresight preserved their independence, their land and their tribal organization. Curiously enough, however, they lost their tribal designation to the newcomers, owing to the fact that the Narragansett, though utterly defeated, scattered and

broken, had so impressed the terror of their name upon the imagination of the people of the Rhode Island coast and neighboring country that the more peaceful and less historic Niantic were lost sight of in the face of a tribal combination in which the warlike Narragansett formed a prominent part. Henceforth the fused tribes were known as Narragansett, though they were, as a matter of fact, more strongly Niantic than Narragansett. See NARRAGANSETT.

NIAS, nē-ās', Dutch East Indies, an island in the Indian Ocean, off the southwest coast of Sumatra, from which it is separated by a strait 60 miles wide. It is about 70 miles long, 20 miles average breadth, area, 2,100 square miles. The surface is mountainous, attaining a maximum altitude of 1,970 feet. In 1857 when the Netherlands took possession of the island, the population was reckoned at 17,000. The Niasers are of the Malay race, but fairer than the usual type. They are industrious and frugal, expert handicraftsmen, temperate and regular in their habits, but inclined to be avaricious, vindictive and sanguinary. The chief vegetable products are rice, coconuts, bananas, tobacco, sugarcane, etc., and annually about 110,000 pounds of pepper. Hogs are reared, and there is a domestic export trade with Sumatra in rice, yams, beans and poultry. Pop. about 200,000. Consult Modigliano, 'Un viaggio a Nias' (Milan 1890); Sundermann, H., 'Kleine niassische Chrestomathie' (in 'Bijdragen voor de taal-landen volkenkunde van Nederlandsch Indie,' Vol. VII, 5th series, The Hague 1892); id., 'Kurzgefasste niassische Grammatik' (Mörs 1892); id., 'Deutsch-niassisches Wörterbuch' (Mörs 1892).

NIATA, or **NATA**, a breed of Argentine cattle, which long ago started among the Pampas Indians, and is now nearly or quite extinct. They were really deformed, the parts of the face being so out of proportion as to give the face a queer pug-like appearance. They were very interesting to the students of evolution as an example of a variant which maintained its peculiarities through a long period, breeding "true," and showing no reversion to the normal type. Consult Darwin, Charles, 'A Naturalist's Voyage Around the World' (new ed., New York 1908).

NIBELUNG, nē'bē-loong, in Scandinavian mythology, a monarch whose subjects are called Nibelungs and territory the Nibelungenland. There were two contemporary kings in this realm, against whom Siegfried, Prince of the Netherlands, fought. He slew the 12 giants who formed their paladins with 700 of their chiefs. Siegfried's warriors then became known as the Nibelungen, but after the assassination of Siegfried, when the treasure he had amassed passed into the hands of the Burgundians, these latter appropriated the name and were known by it in the heroic poems and tales of the Middle Ages. The word Nibelungen is from *nebel* (darkness), and means the children of mist or darkness.

NIBELUNGEN RING, The. A group of four operas by Richard Wagner, who also wrote the librettos, calling the entire work a "Stage Festival Play for Three Days and One Preliminary Evening," first produced in its en-

tirety at Bayreuth, 13, 14, 16 and 17 Aug. 1876. The names of the separate music dramas, as Wagner preferred to have them called, are 'Rhinegold' ('Das Rheingold'), 'The Valkyrie' ('Die Walküre'), 'Siegfried' and 'Dusk of the Gods' ('Die Götterdämmerung'). They are commonly spoken of collectively as a trilogy and sometimes as a tetralogy. 'Rhinegold' was first performed separately (against Wagner's wish) at Munich, on 22 Sept. 1869, and 'Walküre' on 26 June 1870, the others receiving their first performance at the Bayreuth production. Although too lengthy to be given in less than four evenings and, in fact, more often heard piecemeal than as a single opus, the "Ring" was conceived by Wagner as a unit and for an intelligent understanding of its artistic purpose must be studied as such. Originally, Wagner planned a drama on "Siegfried's Death," that part of the story now told in 'Götterdämmerung,' taking his material from the Norse Eddas and the Germanic "Niebelungen-Lied," and modifying it to suit his own ideas; and then, as he found that the origins of many of the incidents required elaboration, he worked backward through the tale of the young Siegfried and that of Siegmund and Sieglinde, his parents, and Brunnhilde, to the initial crime of Alberich's rape of the gold from the Rhine-maidens and the consequent train of events that involved Wotan and the rest of the gods of Walhalla. The poem in its entirety was completed early in 1853 and the music was at once commenced, this time in chronological sequence. It was more than 20 years, however, before the last notes were written. Wagner, despairing of an opportunity for its production, stopped half-way through 'Siegfried' to write 'Tristan und Isolde,' 'Die Meistersinger' was also composed in the interim. The story of the rescue of Wagner's hopes by the king of Bavaria and the establishment of the Festival Theatre at Bayreuth has been often told. Consult Finck, Henry T., 'Wagner and His Works.'

In turning for his dramatic material to the poetic myths which were familiar household tales to the German people, Wagner was consciously trying to follow where the Greeks had led; and his great canvas, depicting the figures of the legendary gods and heroes in a dramatic sequence was quite in the Greek manner. On the primitive conceptions, of the old Skalds Wagner imposed a whole modern philosophy which does not at all points rest easily on the foundation stones; but the power of his genius has reared a structure of such imposing grandeur that the imperfections seem to shrink to small proportions. To what extent the "Ring" dramas would stand without their musical environment might be an interesting, but hardly a fair, inquiry, since Wagner's avowed purpose was to create an art work that should be judged, not as music or drama, but as a combination of the arts.

With the composition of the "Ring," Wagner developed most extensively his system of leading motive or leading motives (guiding themes is perhaps a better equivalent), short, delineative, musical phrases, woven through the music and designed as a sort of running commentary on the stage-play. While the musical enjoyment of those works, of the closely-knit, elaborate symphonic development of musical ma-

terial that unifies them from first page to last, is in no sense dependent upon a study of the handbooks describing and tagging the themes, familiarity with the composer's intention greatly increases the listener's artistic pleasure. Wagner was not only a great composer. His was a remarkable intellect; and a careful study of his leading motive system, showing the meticulous care with which text, situation and music are joined, the many alterations to which the motives are subjected to express new shades of meaning, the constant development and expansion of the themes to serve the dramatic requirements, the ramifications of this most intricate machinery of dramatic expression cannot fail to become a rare intellectual treat. One of the most telling instances of the employment of leading motive occurs in the last act of 'Götterdämmerung,' where Siegfried narrates his life story, which is eloquently mirrored in the orchestral accompaniment. In the death-march and Brunnhilde's final apostrophe, the familiar themes are brought together in a web of contrapuntal texture and color, a veritable musical apotheosis that has no equal in the whole range of music. Saint-Saëns has written that "from the elevation of the last act of 'Götterdämmerung' the whole work appears in its almost supernatural grandeur, like the chain of the Alps seen from the summit of Mont Blanc." (Lavignac's 'Music Dramas of Richard Wagner,' translated by Esther Singleton, contain an excellent comprehensive analysis of the leading motive system in all of the Wagnerian operas).

The first of the "Ring" operas produced in America was the 'Walküre,' at the Academy of Music, New York City, on 2 April 1877, under the direction of Adolf Neuendorff, who was early identified with the Wagnerian gospel. 'Siegfried' was not heard here until 9 Nov. 1887, when it was given at the Metropolitan Opera House in New York, and 'Götterdämmerung' and 'Rheingold' followed in the same season. These three performances were under the baton of Anton Seidl who did more than any one else to acquaint America with the finest traditions of Wagnerian performance. The first American presentation of the "Ring" in its entirety and without cuts took place at the Metropolitan Opera House January 1899.

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NIBELUNGENLIED, The, the most famous of the mediæval epics, was written in all probability in the decade between 1190 and 1200. It is based on earlier individual ballads, but in its present form is the work of some minstrel who gave it its courtly form. It belongs to the type of the folk epic, as the author is unknown, and it is written in four-lined strophes instead of the rhyming couplets of the courtly epics. A veneer of chivalry has been flung over it, but the elemental natures of the old Teutonic heroes are continually breaking through with uncontrollable force. Its great popularity is attested by the large number of manuscripts that have come down to us. We possess in all 28 more or less complete ones, preserved in 31 fragments. Only nine of these, however, can be considered fairly complete, and only three, designated as A, B, C, are considered of primary importance. A battle royal has been fought to prove that each one of these in turn stands nearest to the original. It is now generally considered that C, the longest, is

a later redaction, but opinions are still divided as to whether the priority should be given to A or B, the probabilities, however, being that B is the more original, and A merely a careless copy.

The *Nibelungenlied* is the best portrayal of the ancient Germanic ideal of *Treue* (faithfulness), faithfulness to death and even beyond the grave. Its theme is also "How pleasure ends at last in pain." It tells the story of the love of the youthful knight Siegfried for the Princess Kriemhild, the sister of King Gunther of Worms. After a year's wooing, during which time Siegfried defeats the Saxons, the couple are happily married, Siegfried also helping Gunther to win the hand of the warlike maiden Brunhild. The mutual jealousy and distrust of the rival queens finally culminates in a dramatic quarrel in front of the portal of the church, in which Kriemhild is triumphant. Brunhild in her blind fury now plans the death of Siegfried and has him foully murdered by the gloomy Hagen, as he is quenching his thirst in a woodland spring. For a long time Kriemhild nurses her revenge. Finally she marries Etzel (Attila), the king of the Huns, has her brothers invited to a great festival and killed in a series of exciting combats, with which the second part of the poem is largely taken up. Nemesis, however, overtakes her in the person of old Hildebrand, the armor bearer of Dietrich of Berne. Furious that such brave heroes should fall at the hands of a woman, he cuts her in two with his sword, leaving Dietrich and Etzel to mourn over the bodies of the slain.

In a certain sense the poem is only a torso, as it relates almost nothing of Siegfried's early life, his encounter with the dragon, the curse pronounced upon the possessor of the *Nibelungen* treasure, Siegfried's awakening of Brunhild from her magic slumber within the charmed wall of flames. Nor is the poem entirely homogeneous; furthermore, it contains not a few contradictions. In spite of these defects, however, it is undoubtedly the finest product of Middle High German epic poetry. It is imposing through its very simplicity, through the grandeur of the story which it in no way seeks to adorn or decorate. The account given of Siegfried's youth is related in Scandinavian sources such as the 'Edda,' the 'Volsungasaga' and the 'Thidreksaga' and forms the theme of Wagner's musical dramas the 'Nibelungen Ring.' Still, the legend is supposed to be of German origin and to have been taken to Scandinavia early in the 6th century by German traders, or, as Mogk thinks, by the Heruli on their return to Norway after the defeat of the Longobardi.

Notwithstanding the popularity of the *Nibelungenlied* during the Middle Ages it was soon forgotten by the mass of the people with the decay of chivalry. The figures of the old legend, however, lived on and were embodied in a popular ballad, 'das Lied vom hürnen Seyfried,' preserved for us in a print of the 16th century. It was dramatized by Hans Sachs, the shoemaker poet of Nuremberg, and related in prose form in a chapbook of the 18th century. The poem itself was rediscovered by a German physician, J. H. Obereit, who found the manuscript C at the castle of Hohenems in the Tyrol 29 June 1755. The scientific study of the poem began with Karl Lachmann, who in 1816 read

an epoch-making paper on it before the University of Berlin. He published also a critical text of A, now in its fifth edition (Berlin 1878). K. Bartsch and later Paul Piper published editions of B, Fr. Zarncke of C (6th ed., 1887). Useful works on the legend are Lichtenberger, N., 'Le Poème et la Légende des Nibelungen' (Paris 1891); Holz, G., 'Der Sagenkreis der Nibelungen' (Leipzig 1907); Kettner, E., 'Die österreichische Nibelungendichtung' (Berlin 1897); Fr. von der Leyen, 'Die deutsche Heldensage' (Munich 1912); Weston, Jessie L., 'Legends of the Wagner Drama' (London 1896); Genung, C. H., 'The Nibelungenlied' (in Warner's 'Library of the World's Best Literature,' Vol. XVIII, New York 1897). The best German translation is probably that of Karl Simrock published by G. Holz, 1909. Good English translations in verse have been made by G. W. N. Lettson, 'The Fall of the Nibelungers' (London 1874); Needler, G. H. (1904), and Way, Arthur S., 'The Lay of the Nibelung Men' (New York 1912). Alice Horton has retold the story in modern prose, 'The Lay of the Nibelungs' (London 1898), and D. B. Shumway has made an exact prose rendering 'The Nibelungenlied' (Boston 1910). Full bibliography is given by Th. Abelung, 'Das Nibelungenlied und seine Literatur' (Leipzig 1907); and by F. E. Sandbach, 'The Nibelungenlied and the Gudrun in America' (New York 1905).

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NIBLACK, Albert Parker, American naval officer: b. Vincennes, Ind., 25 July 1859. He was graduated from the United States Naval Academy in 1880; served with an expedition of survey and exploration to Alaska in 1884-87; was inspector of naval militia in 1895-96; and writer and lecturer on signaling and naval tactics at the Naval War College in 1893-96. He was then naval attaché at Berlin, Vienna and Rome till the Spanish-American War; during this war he served on the blockade of Cuban ports, being engaged in the battle of Nipe Bay. In 1898 he was transferred to the Philippines, took part in the suppression of the native insurrection, in the Boxer Campaign in 1900 in China, and in 1901 was appointed secretary of the naval commission in the Philippines to locate a naval station. Inspector of target practice 1902. Sea service Pacific station 1903-07. Promoted to commander 1 July 1907, and commander ships, Naval Academy and in Central American waters three years, going in July 1910 as naval attaché to Argentine, Brazil and Chile, and then to Berlin and The Hague. He commanded the third seaman regiment at the American occupation of Vera Cruz, 21 April 1914. Commanded the United States ship *Michigan* of the Atlantic fleet, and attended the Naval War College, 1916. He has written 'The Coast Indians of Alaska and Northern British Columbia' (1889).

NICÆA, nî-se'a, or **NICE**, Asia Minor, an ancient city, capital of Bithynia, on the east shore of Lake Ascania, 45 miles southeast of Byzantium, its site now occupied by the village of Isnik. As Ancore or Hellicore, it is said to have been colonized by Boeotians, and destroyed by the Mysians. Antigonus rebuilt it 316 B.C., and named it Antigoneia; but Lysimachus, having conquered this part of Asia,

changed its name to Nicæa, in honor of his wife, Nicæa, daughter of Antipater. Under the Roman Empire it retained long an exalted rank among the Eastern cities, and is renowned in ecclesiastical history for the famous councils held here in the reign of Constantine (325 A.D.); and by desire of the Empress Irene 785 A.D. In the year of the first council Nicæa was overthrown by an earthquake; it was restored by Valens in 368. After the foundation of the Latin Empire in Constantinople in 1204 the Greek Emperor Theodorus Lascaris made Nicæa the capital of his empire, which it continued to be until in 1261 the Greek emperors recovered Constantinople. It was finally taken by the Turks in 1330.

NICÆA, or NICE, The Councils of.

(1) An ecclesiastical council held at Nicæa, in Nicomedia, in 325. Of the method of summoning the first ecumenical council Gibbon says, "The archbishop or metropolitan was empowered by the laws to summon suffragan bishops of his province, to revise their conduct, to vindicate their rights, to declare their faith, and to examine the merit of the candidates who were elected by the clergy and people to supply the vacancies of the episcopal college. The primates of Rome, Alexandria, Antioch, Carthage and afterward Constantinople, who exercised a more ample jurisdiction, convened the numerous assembly of their dependent bishops. But the convocation of great and extraordinary synods was the prerogative of the emperor alone." Constantine before his conversion convened a council at Arles (314 A.D.). The object of the Council of Nice, likewise convened by him, was to settle the controversy which had risen in regard to the divinity of Christ, and to contradict and condemn the views of Arius. The bishops who attended the council are variously estimated: Gibbon gives 318; Eusebius, 250; other early authorities, 300 and 320. The Eastern bishops attended in person; the Western Church was represented by seven delegates, the most important of whom was Hosius of Cordova, who attended and presided as the Pope's delegate. The number of ecclesiastics of all kinds present was over 2,000. The session lasted about two months. It was frequently attended by the emperor in person. According to some accounts the earlier sittings were very stormy, and Constantine had to use much address to reconcile the disputants. Finally the council declared it to be and to have ever been the teaching of the church Catholic, in conformity with the apostolic tradition in all the churches, that Jesus Christ, the Son of God, is "consubstantial" — of the same substance or nature — with the Father; and accordingly in the creed called of Nice (otherwise the Nicæo-Constantinopolitan creed) are the words, predicated of the son of God *consubstantialis patri*, the word consubstantial being a rendering of the Greek word of precisely the same meaning and of analogous formation, *Homooúsios*. (See COUNCIL). (2) The second Nicene Council, the seventh ecumenical council of the Church, was summoned by the Empress Irene and her son Constantine, and met in 787 A.D. under Tarasius. The chief question was the reconsideration of the subject of images, the use of which successive emperors had forbidden; but the traditional view of the

Church was maintained at the council, canons were published on non-residence of the clergy, etc., double monasteries were forbidden and regulations adopted for the ordering of the lives of clerics and nuns.

NICANDER, nī-kān'dér, Greek physician and poet of the 2d century B.C. He was born in Claros, near Colophon in Ionia; was hereditary priest of Apollo in his native city, and may have spent part of his life in Italy. He wrote various didactic poems now lost; one of these was Virgil's model for the 'Georgics,' and another, the 'Heterœumena' or 'Transformations,' suggested Ovid's 'Metamorphoses.' 'Theriaca,' on dangerous wild animals, and 'Alexipharmaca,' on antidotes, his two extant works, were edited by Schneider (1816 and 1792). Consult Vollgraff, 'Nikander und Ovid' (1909).

NICANDER, Karl August, Swedish poet: b. Strengnäs, Sweden, 20 March 1799; d. Stockholm, 7 Feb. 1839. He was educated at the University of Upsala, and with a poem on Tasso took a prize at the Swedish Academy in 1826. In 1827-29 he traveled in Italy, and, returning to Sweden, lived in want all the rest of his life. He wrote poems, tales and dramas. 'Lejonet i öknen' (1838), a eulogy of Napoleon, is considered his best poem. His other works include 'Runesvärde' (1821), a drama; 'Hesperider,' poems and tales (1838), and 'Minnen från Södern,' recollections of Italy (1831-39). A collection of his poems was published in Stockholm (4 vols., 1839-41; 5th ed., 1883).

NICARAGUA, nē'ka-rā'gwā, a country of Central America, bounded on the north by Honduras, on the east by the Caribbean Sea, on the south by Costa Rica and on the southwest and west by the Pacific Ocean. It has 200 miles of seacoast on the Pacific and about 300 miles on the Caribbean. Its area, according to conservative estimates, including Mosquitia, is 49,200 square miles, total population 703,540.

Political Divisions. *Departments.*—Bluefields (formerly Zelaya), cap. Bluefields; Managua, cap. Managua; Granada, cap. Granada; León, cap. León; Carazo, cap. Jinotepe; Rivas, cap. Rivas; Chinandega, cap. Chinandega; Esteli, cap. Esteli; Jinotega, cap. Jinotega; Nueva Segovia, cap. Ocotal; Matagalpa, cap. Matagalpa; Río Grande, cap. Río Grande; Chontales, cap. Juigalpa.

Districts.—Cabo Gracias, Prinzapolca, Río Grande, Siquia, San Juan del Norte.

Physical Features.—The Sierra de los Morabios, running from the Gulf of Fonseca to the western shore of Lake Managua, appears to be the centre of volcanic energy in Nicaragua. It has the following vents: Cosigüina (famous on account of the terrific explosion of 2 Jan. 1835), Chonco, El Viejo (quiet since 1684), Santa Clara, Telica, San Jacinto, Rota, Las Pilas (eruption in 1850), Asososco and Momotombo (eruptions in 1870 and 1886); and though only two of these may be described as active, the others are dormant, rather than extinct. This ridge is near the Pacific Coast, and its southeasterly trend is continued by the isolated volcanoes Masaya (active), Apoyo (extinct), Mombacho, Ometepe and Madera (extinct). The two last are on an island near the western shore of Lake Nicaragua, and but a few miles

from the nearest point in Costa Rica. In other words, practically the entire Pacific Coast range is intensely volcanic; the only exception being found at Brito and the neighborhood southwest and south of Ometepe and Madera, where, according to the views of some geologists, the "internal fissure in the earth's crust that gave rise to the several volcanic vents of Central America" is "completely built up and healed. Hence the low gap in the grand American cordillera found at that place, which has a mean height of about 150 feet above sea-level, the lowest gap from Alaska to Tierra del Fuego." Through this gap, over this "healed fissure," the Nicaragua Canal (q.v.) was to have been cut. The volcanic characteristics are not found far inland, but are restricted almost entirely to the western border; nevertheless the principal cities are built in this narrow strip of land between the Pacific and the lakes. Chinandega, near the coast in the northwest, has about 11,000 inhabitants; León, 63,000; Managua, capital of the republic, 35,000; Masaya, 13,000, and Granada, on the west shore of Lake Nicaragua, 17,000. Of these the largest and most beautiful city, León, contains the cathedral of Saint Peter which, it is said, was built at a cost of \$5,000,000 when labor was valued at 25 cents a day. From the roof of this great church can be seen in one view 13 volcanoes. In the central region the largest town is Matagalpa (15,000 to 16,000). The western strip, despite its insecurity and oppressive climate, has been preferred as a place of residence by the majority of the Nicaraguans on account of its facilities for communication and transportation—among which are to be reckoned the great lakes, Nicaragua (92 miles long by 34 miles wide) and Managua (32 miles long by 16 miles wide), connected by a river which could, without difficulty, be rendered navigable. The greater part of the republic, stretching eastward from the lakes to the department of Zelaya, is of a different geologic formation. It is covered with a chain of mountains of moderate height, and transverse spurs which are not volcanic extrusions but Antillean folds. (See article CENTRAL AMERICA). The strip of Caribbean Coast "annexed" in 1894 by President Zelaya was formerly the Mosquito Reserve, or Mosquitia, a British protectorate; but Great Britain gradually withdrew in Nicaragua's favor her claim to exercise jurisdiction there. This eastern coast is now regarded as one of the most valuable parts of the republic and the "Atlantic Slope"—the Caribbean side in general—contains placer mines, its fruit industry is profitable, large plantations of rubber trees are being cultivated and rosewood, cedar and mahogany are taken from its forests.

Many parts of the central uplands are comparatively cool and well watered, with very rich soil and nearly untouched treasures in forest and mine; but they have remained undeveloped hitherto chiefly on account of the lack of good roads. The earthquake shocks of Nicaragua are less severe than those of Guatemala and Salvador, and dangerous fevers prevail chiefly, though not exclusively, in the lowlands or near stagnant water. The large rivers, rising in the central mountains and emptying into the Caribbean Sea, are the Segovia, also called Coco or Wanks, which forms the boundary with Honduras, the Grande, the Kurringwas and the

Bluefields or Mico. The San Juan flows from Lake Nicaragua to the Caribbean, and in part forms the boundary with Costa Rica on the south. The route of the Caribbean section of the canal, for which the waters of the San Juan would have been utilized, included a cut through Costa Rican territory west of Ochoa.

Fauna and Flora.—The fauna includes the puma, deer, jaguar, monkeys, alligators, armadillos, ant-eaters, guatuso, peccaries or wild hogs and many species of reptiles, some very poisonous. There are large herds of cattle. Prominent among avifauna are macaws, parrots, buzzards, wild turkeys and humming-birds. Insect life is super-abundant. Great trees extend over the eastern plain and the ground beneath them is covered with a dense network of vines and bushes. There are over 70 varieties of fruit trees, of which about 55 receive a measure of cultivation. About 50 varieties furnish various gums, resins, balsams, oils, spices, fibres, used in the industries and in medicine, and about an equal number of varieties furnish hardwood lumber. Citrus fruits abound in the western portion, and rubber also is plentiful. The forest resources have been utilized but little. Most tropical crops such as bananas, coconuts, plantains, oranges and pineapples, coffee, sugar, corn and beans, are grown and the area of cultivation is on the increase and would extend more rapidly but for the scarcity of labor.

Mineral Resources.—Among Central American republics, Nicaragua ranks second (Honduras being first) in respect to mineral wealth. Gold and silver are found in the departments of New Segovia, Chontales, Zelaya, León, Matagalpa and Jinotega; copper in León, New Segovia and Matagalpa; lead and iron in New Segovia and Matagalpa; mercury, salt, sulphate of lime, sulphur and combustible minerals in León; tin in New Segovia; nickel and zinc in Matagalpa. More than 500 mines are registered in the National Bureau of Statistics, and 494 of these are set down as producers of gold. Antimony, arsenic and other metals have been found but in unimportant quantities. In the 16th and 17th centuries great quantities of silver were produced and rich deposits of this metal are known to exist.

Industry and Commerce.—The forests contain mahogany, ebony, cedar, quebracho, light rosewood, mora, brazilwood, vanilla, sarsaparilla, vegetable wax, ipecacuanha, quinquina, copaiba, balsam, rhubarb, etc. In many parts of the republic—near both coasts, in the valleys, on the slopes and plateaus near the lakes and rivers—soils of exceptional value for agricultural purposes are found; and though the system of cultivation is rudimentary, extraordinary results are sometimes achieved. Thus, it is said on good authority that sugarcane produces at least two annual crops, and sometimes three; cotton planted in October is picked the following February on all the western lands; the virgin soil of the eastern slope yields four crops of maize in a year; and indigo can be cut three times before replanting becomes necessary. Coffee thrives best at elevations between 2,000 and 3,000 feet above sea-level. In the highlands of the northwest coffee is extensively grown. In a recent year 11,192,908 kilos, valued at \$5,004,449, were

exported. Rice produces abundantly on central and eastern slopes. The systematic cultivation of rubber has been undertaken recently. Bananas are grown in the west, principally in the departments of León and Managua, for home consumption; in the east, on a large scale, for export. The annual yield of cacao is insufficient to supply the local demand; in quality, however, it is so excellent that it brings a higher price in the home market than the imported chocolates. The selling price is from 20 to 25 cents gold per pound. Tobacco and aguardiente (made from sugarcane) are government monopolies. Tobacco is grown in several districts, the best being produced on the island of Omötepe, in Lake Nicaragua. Cotton, corn, breadfruit, black beans and sweet potatoes are produced in large quantities in the western part of the republic, and occasionally small quantities of beans, corn, cheese, lard and sugar are exported to the neighboring republics. In the upland regions the vegetables of the temperate zone are produced. Cattle raising is becoming an important industry in the northwest, and quantities of hides are exported. There are 1,200,000 cattle in Nicaragua. Horses and swine are reared.

Cigars are produced in large quantities. There are few manufacturing enterprises and these are engaged in turning out articles of a cheap grade for domestic consumption. Thus coarse cotton fabrics, boots and shoes, candles and soap are manufactured and also a cheap grade of furniture. Roofing tiles and pottery are also produced and the Indian population turns out hammocks, straw hats, gold and silver jewelry and carvings. For the better grades of manufactures the main reliance is upon the country's imports.

Exports consist principally of coffee, rubber, bananas, gold, hides, sugar, fine woods, cacao, coconuts, cotton dyes and dye-woods and silver. The imports are cotton goods, iron and steel manufactures, flour, chemicals, drugs and medicines, etc. In a normal year, imports amounted to \$5,770,006 and exports \$7,712,047. The principal exports consisted of 11,192,908 kilos of coffee, valued at \$5,004,449; gold to the value of \$1,063,007; bananas, 1,393,026 bunches, value \$429,802; hides and skins, 684,082 kilos, value \$326,559; 7,734 tons of wood, value \$321,869; rubber, 221,432 kilos, value \$278,763; cacao, 65,086 kilos, value \$39,828; dyewoods and dyes, 3,984,053 kilos, value \$39,455; sugar, 497,217 kilos, value \$31,805; 864,857 coconuts, value \$18,741; silver, 508 kilos, value \$17,137. In the same year the principal imports were: Cotton goods, \$1,417,032; food products, \$890,017; iron and steel manufactures, \$786,901; liquors, beer, wines, etc., \$238,881; hides and skins, \$223,205; chemicals, drugs and medicines, \$231,959; silk goods, \$149,905; vegetable fibres and manufactures, \$135,008; petroleum, \$106,377; woolen goods, \$95,797; paper and manufactures, \$81,776. In a recent year with the total value of Nicaragua's imports as \$3,159,218 and of exports \$4,567,202, her imports from the United States were \$3,159,218 and of exports to the same country \$3,079,810.

Shipping, Railways, Etc.—Corinto, the principal western port, has the advantage of the Pacific Coast lines of steamships, American, Chilean, British, etc. Bluefields, on the eastern

coast, has regular communication with the United States by means of the vessels of New Orleans and Mobile steamship companies. The Pacific Railroad of Nicaragua is the only line in the republic, in connection with which steamers ply on the lakes. San Juan del Sur is another important port on the Pacific Coast, while on the east coast in addition to Bluefields are the ports of Cape Gracias a Dios, Las Perlas, and Greytown (San Juan del Norte). There is now a continuous line connecting the port of Corinto with Chinandega, León, Managua, Masaya, Granada and Diriamba, with branches to El Viejo and Momotombo; and several other branch lines are projected. The total system in operation is 171 miles long. There are 20 miles of private railway on the Atlantic Coast near the Rio Grande, and, on the west side of Lake Nicaragua, three private steam tramways aggregating three miles in length. The steamers running on the San Juan River and on the lakes now belong to the government, as well as steamers for traffic on the Atlantic and Pacific coasts. The national railways were leased to a company for 15 years and the steamers for 25 years from 1 Jan. 1905. In 1901 an American syndicate undertook the construction of cart roads to supply communication with Matagalpa, New Segovia and other points in the interior. There are in operation about 3,637 miles of telegraph lines with 130 offices, also 805 miles of telephone lines and 29 telephone stations. The number of post offices was about 135 in 1915. The government maintains wireless telegraph stations at Managua, Granada, San Carlos, San Juan del Norte and Castillo.

Monetary System, Weights and Measures.

—The metric system of weights and measures is in use, and the present monetary system has the gold standard as its basis, the theoretical unit being the córdoba, divided into 100 centavos. The weight of the theoretical gold unit is 1.6718 grammes of gold .900 fine, or say 1.50464 grammes of fine gold, and its value in terms of United States currency is \$1.00. The circulation consists of silver coin and bank notes guaranteed to be payable in gold. Until 24 March 1913 the monetary unit was the silver peso with a nominal value of \$0.435, but the actual currency was inconvertible paper, and the exchange rates ranged from 1,000 per cent to 1,700 per cent premium for sight bills on New York. After the establishment of the National Bank of Nicaragua, Inc., certain New York capitalists undertook, through the medium of that bank, the rehabilitation of Nicaragua's finances, with the result that the present monetary system, provided for under the act of 20 March 1912, went into effect 24 March 1913. Under this system the old paper peso circulation is being retired at the rate, now invariable, of one córdoba for 12.50 pesos. To maintain the córdoba at par, there is a "conversion fund" in the United States and Europe.

Banking and Finance.—A series of economic reforms designed to remedy the unsatisfactory economic situation of Nicaragua began with the effort to put the currency on a sound basis, as described in the foregoing paragraph, and with the establishment of the National Bank of Nicaragua, which has the exclusive privilege of issuing legal tender notes, subject to the provisions of the monetary law and

for the account of the republic only. The National government owns 49 per cent of its stock, 51 per cent being the property of American bankers. It has a special issue department for the maintenance of the national currency, and its capital, \$300,000, may be increased if necessary to meet the country's needs. There are two other banks—private credit institutions that do every kind of banking business except the issuing of notes. The public treasury has been and still is in difficulties, which are ascribed to the long period of inflation, the frequent recurrence of revolutions and former bad governments. To remedy this evil the present government of Nicaragua asked a helping hand from the United States; and through the good offices of the State Department Nicaragua was enabled to enter into such relations with two important American banking houses that, with their aid, it became possible to effect a reorganization of the national railway as well as the monetary reform and the establishment of the national bank. The government's income is only about \$2,500,000, and almost all of its debts (aggregating \$13,780,662) are described as past due or "pressing." The interior debt was given recently as \$6,670,662 and the foreign debt \$7,110,000. The government, having tried repeatedly but without success to obtain a foreign loan, now expects to apply the \$3,000,000 to be paid under the canal treaty with the United States (see NICARAGUA CANAL) to the payment of those debts which are more pressing, paying off the rest with bonds. The treaty is expected to encourage the investment of American capital in Nicaragua "by insuring a continuation of present stable and peaceful conditions." Summarizing the country's natural resources, the government committee reported that the lands in the various sections are adapted to the cultivation of coffee, cacao, bananas, cocoanuts, pineapples, citrus fruits, tobacco, sugar, cotton and rubber, "the success of which has been practically demonstrated, but in a crude and limited manner"; that large areas are well adapted to the raising of cattle, being covered throughout the year with natural grasses of remarkably high food value and watered by perennial streams; that the country is analogous geologically to the State of Nevada, producing both gold and silver in paying quantities, although the mines are operated in the crudest manner; that an extensive area is heavily wooded with primeval forests of mahogany, cedar and other valuable hardwoods, pine and dye-woods; and finally that the need of additional transportation facilities is emphasized by the fact that inhabitants of the one coast are under the necessity of importing articles which are actually produced in and exported from regions along the other coast, though the two littoral regions are only 200 miles apart.

Government.—The present constitution was promulgated 12 March 1912 and came into operation on 5 April 1913, with the exception of articles 168 and 170. The Congress, composed of two chambers, the Senate of 13 members and a Chamber of 40 deputies, meets annually at Managua, 15 December. Both senators and deputies are chosen by direct popular vote, and all male citizens over the age of 21 are entitled to vote, as are also "those over 18 years of

age who are married or who can read and write." (Pan-American Union Handbook, consult *Bibliography*). The Chamber of Deputies is renewed by halves and the Senate by thirds every two years. Senators are elected for six years and must be secular citizens over 40 years of age. Deputies are elected for four years and must be secular citizens over 25 years of age. Senators and Deputies are elected directly by the vote of the people, the departments of the republic being divided into electoral districts, there being one Deputy for each 15,000 inhabitants or fraction above 8,000. Each district elects one Deputy and one alternate. Each department elects one Senator and one alternate for each two Deputies to which it is entitled. The executive power is vested in a President and a Vice-President, who must be native citizens over 30 years of age, and who are elected by direct popular vote for a four-year term, with the express provision that the President is ineligible to succeed himself in office. There are five cabinet ministers, the departments being Government, Justice, Police and Charities; Foreign Relations and Public Instruction; Treasury and Public Credit; War and Navy; Promotion (Fomento) and Public Works. A supreme court of justice holds sessions at Managua. There are also courts of appeals in León, Granada and Bluefields, besides several district or local courts. The governors of the departments are appointed by the president. They also command the local military forces.

Army and Navy.—Military service is compulsory between 17 and 55 years of age, but the law in this regard is not rigidly enforced. The period of active service is one year. In the active army there are about 4,000 men; in the reserve about 36,000. The naval branch includes 10 small gunboats or revenue-cutters, of which four are on the lakes, three on the Caribbean and three on the Pacific Coast.

Education and Religion.—Earnest efforts are being made by the government to secure competent instructors and to increase the number of school buildings. The school age, as prescribed by law, is, for each child, the period from 5 to 14 years. The principal university, with faculties of law and medicine, is located at León. Other universities are situated at Granada and Managua, with faculties of law only. There are two normal schools and eight colleges at Managua, and schools of telegraphy at Managua and Granada. A national industrial, commercial and scientific museum has been established at Managua. Altogether there are about 40 institutions for higher education and about 350 elementary schools in the republic supported by the government. These employ over 390 teachers and are attended by more than 15,000 pupils. There are a few private schools. The prevailing form of religion is Roman Catholic but freedom is accorded to all denominations and special favors prohibited to any. The Roman Church has two archbishoprics, Managua and León and two bishoprics, Granada and Matagalpa.

Population.—The estimated population on 31 Dec. 1914 was 703,540, as against 689,891 on 31 Dec. 1913. About 75 per cent of the inhabitants live in the western half of the country. The people of this section are principally of mixed Spanish and Indian extraction.

though there are a few families of pure Spanish descent and many full-blooded Indians. The population of the eastern half is composed mainly of Mosquito and Zambo Indians and negroes from Jamaica and other islands in the Caribbean, with some Americans and a small number of Nicaraguans from the west coast. The Indian population is docile and industrious, furnishing most of the country's labor. The government has made several efforts to induce immigration, but so far the result has been negligible.

History.—On 21 Jan. 1522 Gil Gonzalez Dávila with four vessels sailed westward from Panama in search of the Spice Islands. Proceeding along the Pacific Coast, after many mishaps, he reached the home of an Indian chief whose name was Nicaragua and converted him to Christianity. On the same day 9,017 natives, if we may believe the commander's assertion, accepted baptism. Nicaragua's town stood on the shore of the lake to which his name has been given. Gil Gonzales heard from the pilots he had with him that, by way of the lake and river, there was easy communication between the "North Sea" and the "South Sea"; and he wrote that only "2 or 3 leagues of very level road" separated the ocean from the lake. Until 1718 the isthmus, including the province of Nicaragua, was subject to the viceroy of Peru; after that to the Spanish representative at Bogotá. New Granada (Colombia) continued to claim certain rights in the entire isthmian territory, even up to Cape Gracias á Dios. The most interesting period is that in which occurred the invasion and temporary conquest of Nicaragua by William Walker, of Nashville, Tenn., with his 56 "emigrants." Walker became virtually dictator in 1856. His aim, disclosed to one of his associates, was to found an empire embracing Central America and Mexico. (See *Bibliography*). In 1895 the short-lived "Greater Republic of Central America" was formed by the association of Nicaragua with Salvador and Honduras. It could hardly be called a genuine union.

Three years later that attempt to displace permanently the separatist tendencies was abandoned; but again (in 1907) a similar object was sought, and on this occasion the consequences were twofold—not alone the comparatively unimportant attacks by means of which Zelaya hoped by force to drive the Central American states into a confederation under his own leadership, but also the truly important interposition of the United States and Mexico and the peace conference held at Washington in November and December. The conference was attended by delegates from all the Central American countries, and a progressive effort then and there began to safeguard the interests of all by treaty and by conventions that seemed in the main well and wisely planned. In 1908 Great Britain recognized Nicaragua's sovereignty over the Mosquito Reservation, and in the same year Nicaragua concluded treaties of commerce with Italy and Belgium. In 1909 the measure of local discontent with President Zelaya's aggressive foreign policy and perhaps even more with the monopolies and concessions that seemed oppressive in Nicaragua itself, was filled to overflowing. Among other difficulties, there was a claim advanced by citizens of the

United States; and the presence of American cruisers in the vicinity of Nicaraguan ports soon lent a threatening aspect to a demand (17 March) for the submission of that claim to arbitration. It was so referred in May. Early in October a candidate for the office of chief executive, Gen. Juan J. Estrada, secured a following that justified revolution; the Atlantic Coast towns overpromptly surrendered to him or his forces; there were several miniature battles, and finally he was proclaimed the "provisional President," although Zelaya was still to be reckoned with. On 18 November reports of the shooting of Groce and Cannon (citizens of the United States) by Zelaya's order led to a declaration (22 November) that the government of the United States would demand reparation; and on 1 December the Estrada government was recognized and Zelaya's representative at Washington was dismissed with the warning that the United States would hold those who had ordered the execution of Groce and Cannon personally responsible. On 16 December Zelaya at last surrendered the cares of office. During 1910 the ruinous civil war continued, arraying East against West, until the latter section yielded and its capital, Managua, was taken at the end of August. Then General Estrada asserted authority as Provisional President, issuing on 15 September a call for a presidential election. Before that could be held Adolfo Diaz was inaugurated as Provisional President. On 7 Oct. 1911 the National Constituent Assembly elected General Mena President for a four-year term. Many concessions that Zelaya had granted were now repealed, on the ground, of course, that the lawful authority of a president had been exceeded, to the detriment of the country's interests. Re-establishment of diplomatic relations with the United States was marked by the appointment of Elliott Northcott as minister, and San Juan del Norte, or Greytown, was made a free port. But the crisis was not past.

The election of Mena by the Constituent Assembly, as mentioned above, was simply invalid in view of a certain agreement, known as the Dawson conventions, to which Mena was a party and which provided that a quite different method should be adopted—an election by the people rather than by the Constituent Assembly—to ascertain the nation's real choice of successors to the Provisional President and Vice-President. Mena, refusing to accept his fate, revolted on 29 July 1912; the Minister of the United States thereupon demanded protection for American lives and property; Provisional President Diaz requested assistance; in response marines under Rear-Admiral Southerland were sent to Nicaragua, and the surrender of Mena with 700 men took place on 25 September at Granada—at which city also the American Red Cross supplies of food were afterward distributed. By successes at Masaya, Granada, León, Chichigalpa and Chinandega, the American forces gained mastery of the entire region along the railway from Corinto to Managua, and fighting came to an end. A prompt withdrawal of the American forces should be noted: by 1 December only a legation guard of 400 marines remained at Managua. The elections held on 2 November resulted in the choice of Adolfo Diaz for a

four-year term, beginning 1 Jan. 1913. Peace having been established, indispensable arrangements were made with foreign bondholders and the National Bank of Nicaragua, Inc., designed to act as fiscal agent of the republic, began its useful work at the capital in October 1912.

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MARRION WILCOX.

NICARAGUA, Lake, in the republic of the same name, is situated in the southwest of Nicaragua, 106 feet above the Pacific Ocean, from which it is separated by a strip of land 12 miles wide. It is 110 miles long from northwest to southeast, has a mean breadth of 30 miles and a maximum of 40 miles, and ranges from 50 feet to 200 feet deep. It receives the waters of Lake Managua to the northwest by the Tipitapa River, and discharges by the San Juan River into the Caribbean Sea. There are numerous islands in the lake, the largest being Ometepe, noted for its two active volcanoes. There is steamer traffic, the lake forming a link in a route across the Isthmus of Central America. It appears that the elevation of the lake above the sea was greater in former times. In ancient times it was joined with Lake Managua and discharged its waters into the Pacific in the Gulf of Fonseca. See NICARAGUA CANAL.

NICARAGUA CANAL. References to phases of the history of this proposed inter-oceanic waterway have been made in the article NICARAGUA. Advocacy of this route as Panama's chief rival was rife during the 19th century and at the beginning of the 20th. In 1838 the mayor of New York City, Aaron Clark, together with other influential citizens, memorialized Congress in the interest of a canal planned to connect the Atlantic and Pacific oceans, recommending that negotiations should be opened between New Granada (now Colombia), Central America and the great powers of Europe, for the purpose of entering into a general agreement for the promotion of the project. President Van Buren sent John L. Stephens as an agent to the Isthmus, and Mr. Stephens, recommending the Nicaragua route as the most desirable, estimated the cost of a canal in that locality at \$25,000,000 but did not think the time favorable for undertaking such

a work, because of the unsettled and revolutionary conditions then prevailing. In 1826 John Bailey was sent out by an English company to survey the Nicaragua route, and negotiated for a concession. Though he failed in his main purpose, he remained in Central America, and in 1837 determined what he considered the best route for a canal—extending from San Juan (now Greytown) to Lake Nicaragua, across the lake to Lajas, and thence to San Juan del Sur on the Pacific. The reasons for the general interest in the question, well stated by General Goethals in the introduction to his valuable work, *The Panama Canal*, etc. (see *Bibliography*), in substance are that the settlement of the northwestern boundary question, by which the United States came into possession of Oregon, and the termination of the Mexican War, by which California was added to the Union, followed by the discovery of gold in the territory recently acquired, brought prominently to the attention of the American people the matter of transportation via the Isthmus. Communication overland was so difficult and dangerous that the main current of immigration was Cape Horn. To make the newly acquired territory more accessible, lines of steamers were inaugurated from New York to the Isthmus and from the Isthmus to California and Oregon. But the passage across the Isthmus was attended with serious personal inconveniences and suffering, as well as exorbitant charges.

The importance of making a connection across the Isthmus aroused the government to action, and arrangements were made for treaties with both New Granada (Colombia) and Nicaragua. The right of transit across the Isthmus of Panama was secured and ratifications were exchanged 10 June 1848; subsequently Nicaragua conferred on the United States, or a company of its citizens, the exclusive right to construct canals, railways, or any kind of roads, so as to open a passage and communication by land or water, or both, between the Caribbean Sea and the Pacific Ocean. In return the United States was to aid and protect Nicaragua in all defensive wars to the extent of protecting and preserving its territorial limits. The Nicaragua Treaty, however, was not approved at Washington, and the American Chargé, who had exceeded his authority in negotiating it, was removed.

His successor arranged a treaty upon the subject, and a contract with the American, Atlantic and Pacific Ship Canal Company, composed of Cornelius Vanderbilt, Joseph L. White, Nathaniel Wolfe and their associates. While the treaty was not ratified, the contract was protected, the company securing for that purpose articles of incorporation from Nicaragua. By the terms of the contract the company had the exclusive right of cutting a ship canal from Greytown to any point on the Pacific, by way of the San Juan River, Lake Nicaragua, the Tipitapa River or any other waters within Nicaragua's jurisdiction. It also gave exclusive right for the construction of rail or carriage roads, or both. The company determined that there should be a careful survey made from ocean to ocean, and that a line of location should be determined. Colonel Orville W. Childs, of Philadelphia, was appointed chief

engineer, and took charge of the work in 1850, completing it in 1852. He reached the conclusion that a ship canal by the Nicaragua route was practicable only by following up the valley of the San Juan River to Lake Nicaragua, and from the lake either southwesterly along a line through some valley extending across the dividing ridge, or northwesterly up the Tipitapa River to Lake Managua, thence through the valley extending through the head of that lake to some suitable seaport on the Pacific. "As between these two routes, an examination led him to believe that the one leading from the lake at the mouth of the Lajas River, up the eastern slope of the divide, and down the valley of the Rio Grande on the western slope to the Pacific, presented more favorable conditions than any other between Lake Nicaragua and the Pacific, and was superior to any route by way of Lake Managua. His project has been the basis of all subsequent ones. At the request of the company the President of the United States submitted Colonel Child's report of the survey and location to topographical engineers of the United States, for their inspection and opinion, and they reported in March 1852 that the plan proposed was practicable, but recommended certain changes and modifications. Nothing further was done by the American, Atlantic and Pacific Ship Canal Company toward the construction of a maritime canal, and its contract was forfeited.

The Treaty of 1884.—In December 1884 a treaty was negotiated between the United States and Nicaragua for the construction of a canal by the former, to be owned by the two contracting parties. While the treaty was pending in the Senate in 1885 it was withdrawn by the President for the reason that the perpetual alliance with Nicaragua which the treaty proposed, as well as the protection of the integrity of the territory of that state, was contrary to the policy of the United States. In 1887 Nicaragua granted a concession to A. G. Menocal and others for the construction of a ship canal from Greytown to Brito, and, as the canal would affect the territory of Costa Rica also, a similar concession was secured from this republic in 1888. The Maritime Canal Company of Nicaragua was organized and incorporated by the Congress in 1889, for the construction of the canal. Actual construction was begun in October of 1889 and was continued for over three years, but comparatively little was accomplished. Work was suspended during 1893. Several attempts were made to secure government aid, but without avail. A bill for this purpose, after its passage by the Senate in 1895, was pending in the House of Representatives (where it subsequently failed) when an amendment was made to the Sundry Civil Bill which provided for a board of three officers, one from the army, one from the navy and one from civil life, to make a personal investigation, and to examine the "plans, profiles, sections, prisms and specifications" for the various parts of Menocal's plans for the Nicaragua Canal, for the purpose of ascertaining "the feasibility, permanence, and cost of construction and completion of the canal." The board appointed consisted of Lieut.-Col. William Ludlow, corps of engineers, army of the United States, M. T. Endicott,

civil engineer, navy of the United States and Alfred Noble, civil engineer. The board found it impracticable, within the time fixed by law and with the limited means appropriated for its work, to make a full and thorough examination of the route and obtain the necessary data for a final project, and recommended that further explorations should be undertaken and observations made, to collect information and data, so as to determine the location and cost of the work. The board submitted, however, a tentative estimate of the cost.

Carrying out the recommendations of the board organized under the Sundry Civil Act of 1895, Congress appropriated by the act of 4 June 1897 funds to "continue the surveys and examinations authorized by the act approved 2 March 1895 into the proper route, feasibility, and cost of construction of the Nicaragua Canal, with a view to making complete plans for the entire work of construction of such canal as therein provided." The President appointed Admiral John G. Walker, Capt. Oberlin N. Carter (replaced 18 October by Col. Peter C. Hains) and Prof. Lewis M. Haupt to constitute the commission required by the law. This board submitted its report in May 1899, with the necessary detailed data and estimates for the construction of the Nicaragua Canal. The act of 3 March 1899 authorized the President to investigate particularly the Nicaragua and Panama routes with a view to deciding which was the more practical and feasible route for a canal connecting the Atlantic and Pacific Oceans, together with the approximate and probable cost of construction of a canal by each of the two or more routes. In compliance with this act the President appointed Admiral J. G. Walker, Samuel Pasco, Alfred Noble, George S. Morison, Col. Peter C. Hains, Prof. William H. Burr, Lieut.-Col. O. H. Ernst, Prof. Lewis M. Haupt and Emory R. Johnson as a commission to carry out the wishes of Congress as expressed by the act. This board submitted its report on 16 Nov. 1901. With regard to the choice of routes, the board reported: "There are certain physical advantages, such as a shorter canal line, a more complete knowledge of the country through which it passes, a lower cost of maintenance and operation, in favor of the Panama route, but the price fixed by the Panama Canal Company for a sale of its property and franchises is so unreasonable that its acceptance cannot be recommended by this commission. After considering all the facts developed by the investigations made by the commission, and having in view the terms offered by the New Panama Canal Company, this commission is of the opinion that the most practicable and feasible route for an Isthmus Canal to be under the control, management and ownership of the United States, is that known as the Nicaragua route."

The price fixed by the New Panama Canal Company was \$109,141,500; but the board was of the opinion that the value of the French property referred to was only \$40,000,000; and if the figure had been acceptable the report leaves no doubt that the recommendation of the board would have been different. Because of lack of funds the New Panama Canal Company could not carry the work to completion, and their only hope for any return for the

investment was from the United States. In these circumstances the company on 4 Jan. 1902 declared itself ready to transfer to the United States its properties and concessions on the payment of \$40,000,000. This put the matter in a new light, and the Isthmian Canal Commission was called together, changed its previous recommendation, and on 18 Jan. 1902 reported that in view of "conditions that now exist and all the facts and circumstances upon which its present judgment must be based, the commission is of the opinion that the most practicable and feasible route for an Isthmian canal, to be under the control and management and ownership of the United States, is that known as the Panama route."

The "Nicaragua Canal" Treaty of 1916. On 26 Feb. 1913 the Senate of the United States took into consideration a proposed new convention or treaty with Nicaragua, negotiated with the object of granting, on the one side, and of securing, on the other side, to the United States as an exclusive privilege the perpetual right to construct a canal across Nicaragua. That convention, signed in 1914 and ratified by Nicaragua but not by the Senate of the United States until 1916, made provision for the payment of \$3,000,000 for the canal option and (among other things) for a naval station on the Gulf of Fonseca, at which begins the boundary with Honduras and upon which the Republic of Salvador also looks out. As a matter of fact, the control of that important gulf is shared among the three nations of the old "Greater Republic of Central America" mentioned above; at the northern end of the route Costa Rica's boundary must be crossed; and this division of interest and control is but a reminder of difficulties that have been encountered whenever the government of the United States in the past, before the selection of the Panama route, endeavored to make satisfactory arrangements for cutting a canal by way of Lake Nicaragua. Ratification of the "Convention between the United States and Nicaragua" was advised by the Senate, with amendments, 18 Feb. 1916; on 19 June 1916 the convention was ratified by the President; on 24 June 1916 it was proclaimed (Treaty Series, No. 624, Washington 1916). In Article I "The Government of Nicaragua grants in perpetuity to the Government of the United States, forever free from all taxation or other public charge, the exclusive proprietary rights necessary and convenient for the construction, operation and maintenance of an interoceanic canal by way of the San Juan River and the Great Lake of Nicaragua or by way of any route over Nicaraguan territory." In Article II the government of Nicaragua "leases for a term of 99 years to the government of the United States the islands in the Caribbean Sea known as Great Corn Island and Little Corn Island; and the government of Nicaragua further grants to the government of the United States for a like period of 99 years the right to establish, operate and maintain a naval base at such place on the territory of Nicaragua bordering upon the Gulf of Fonseca as the government of the United States may select. The government of the United States shall have the option of renewing for a further term of 99 years the above leases and grants upon the expiration of their respective terms,

it being expressly agreed that the territory hereby leased and the naval base which may be maintained under the grant aforesaid shall be subject exclusively to the laws and sovereign authority of the United States during the terms of such lease and grant and of any renewal or renewals thereof." Article III relates to the payment above mentioned, etc. The consent of the Senate of the United States to the ratification of this convention was given with the proviso "that nothing in said convention is intended to affect any existing right" of Costa Rica, Salvador and Honduras.

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MARRION WILCOX.

NICARAGUA WOOD, called also Peachwood, a bright-red dyewood native to Nicaragua, and a species of *Cesalpinia*. It resembles Brazil wood botanically and in its properties, but yields a smaller amount of coloring matter.

NICATOR. See DEMETRIUS II.

NICCOLINI, Giovanni Battista, jō-vān'nē bāt-tēs'tā nēk-kō-lē'nē, Italian dramatist: b. San Giuliano, near Pisa, 31 Oct. 1782; d. Florence, 20 Sept. 1861. He studied at the University of Pisa; published his first poem in 1804; and became in 1807 professor of history and mythology in the Academy of Fine Arts in Florence. His chief writings are his patriotic tragedies and his lyric verse. Among the former are: 'Nabucco' (1816); 'Antonio Foscarini' (1827); 'Giovanni da Procida' (1830), and 'Arnoldo da Brescia' (1843), the last a bitter attack on the Guelph party and his most famous work. Among his other verse is 'Béatrice Cenci,' a free translation of Shelley; 'Rosmund a d'Inghilterra' (1838); and 'Filippo Strozzi' (1847). Strongly anti-papal in tone, in popular estimation his plays were esteemed rather above their merits, and their fervid idealism does not help their capabilities for acting. Niccolini wrote also some volumes of criticism. The best collected edition is by Gargioli (1862 et seq.). Consult the biography and critique by Vannucci (1866).

NICCOLITE, a native arsenide of nickel, having the chemical formula NiAs. The crystals, when found, belong to the hexagonal system; but the mineral usually occurs massive. It is reddish in color, and opaque with a metallic lustre. It has a hardness of from five to five and five-tenths, and a specific gravity of from seven and three-tenths to seven and seven-tenths. Niccolite occurs in Saxony, Bohemia,

Sweden, Cornwall, Scotland, Spain, Chile and the Argentine Republic. In North America it is found at Chatham, Conn., at Franklin Furnace, N. J., at Silver Cliff, Colo., and at Tilt Cove, Newfoundland. (Also known as "Kupfernickle," "false copper," or "devil's copper").

NICCOLLS, Samuel Jack, American Presbyterian clergyman: b. Greenfield Farm, Westmoreland County, Pa., 3 Aug. 1838; d. Old Forge, Adirondacks, N. Y., 19 Aug. 1915. He was graduated from Jefferson College in 1857; studied theology at Western Theological Seminary, and was ordained to the Presbyterian ministry in 1860. He was subsequently pastor at Chambersburg, Pa., and chaplain of the 126th Pennsylvania volunteers in 1862, and in 1865 became pastor of the 2d Presbyterian Church, Saint Louis. He was moderator of the Presbyterian General Assembly in 1872. In March 1915, he celebrated the 50th anniversary of his pastorate in Saint Louis. He published 'Women's Position in the Church,' 'The Eastern Question in Prophecy,' etc.

NICCOLO, Alunno, nēk'kō-lō a-loon'nō, Italian painter: b. Foligno about 1430; d. there in 1502. He is also called Niccolò Alunno, Niccolò di Liberatore and Niccolò da Foligno. According to tradition his first teacher was Bartolommeo di Tommaso. Later he fell under the influence of Benozzo. Niccolò is an Umbrian and the true representative of the art of Foligno. He is said to have been the teacher of Perugino, Pinturicchio and Andrea di Luigi; and, consequently, he is one of those who prepared the way for others of greater note, one of those who formed the Umbrian School which culminated in Perugino and Raphael. Alunno's first altarpiece at Deruta, representing the Virgin attended by Saint Francis and Saint Bernardino (deprived of its wings and predella), is dated 1458, a 'Madonna with Saints,' in the Brera Gallery, Milan, was painted in 1465; an altarpiece, 'Annunciation,' dated 1466, is in Santa Maria Nuova at Perugia and is remarkable for the graceful form of Gabriel with his crisp, wavy hair bound by a crimson band, and seraphs resembling Gozzoli's work and the altarpiece of Montepare is now in the Vatican Museum. This is dated 1466, and signed 'Nicholas Fulginos. After 1471 the influence of the decorative Crivelli begins to show, as in the altarpiece in the Duomo, Gualdo, and in the 'Annunciation,' Bologna Gallery. The altarpiece in Saint Niccolò, Foligno (of which the predella is in the Louvre), representing Saint Nicholas and the Infant Christ and painted in 1498, may be considered as Alunno's masterpiece in his second eclectic style. One of his latest works is the 'Madonna with Angels and Saints' (1499) in a church at La Bastia, between Assisi and Perugia. A 'Pieta,' of which only fragments remain, in the cathedral of Assisi, was considered one of his best works by his contemporaries. Vosarie says of the two angels represented here that no painter in Italy could have expressed their emotion more beautifully. Niccolò also painted standards called 'Gonfaloni,' which were used in religious ceremonies. One of the finest of these was presented to the Bologne Gallery by Pope Pius IX. Consult Rossi, Adamo, 'Pittori di Foligno' (Perugia 1872); Blanc, Charles, 'École ombrienne'; Crowe and Cavalcaselle, 'A New

History of Painting in Italy,' edited by Edward Hutton, Vol. III, pp. 163-174 (London and New York 1909).

NICCOLO (nēk'kō-lō) OF AREZZO, ā-rēt'sō, Italian sculptor and architect: b. Arezzo, 1350; d. 1417. He worked on the sculpture of the cathedral at Florence, and executed two statues for the campanile (1383). His relief of the Virgin in the façade of the Santa Maria della Misericordia is remarkable for a freedom and elegance which point to a distinct advance in Italian sculpture.

NICCOLÒ DE' NICCOLI, dā nēk'kō-lē, Italian humanist: b. Florence, 1363; d. there, 23 June 1437. He rendered literature most important service by ransacking Europe for manuscripts of the principal Greek and Latin works. At his death he presented to the public his library, which became the basis of the Marcian library, one of the most famous of Italy. Niccolò copied and corrected numerous manuscripts with his own hand, and thus came to be regarded as the originator of textual criticism of the ancient authors.

NICE, nī'kē, a Greek goddess. See **NIKE**.

NICE, nēs, Asia Minor. See **NICÆA**.

NICE, nēs', France, a city, seaport, and health resort, capital of the department of the Alpes Maritimes, beautifully situated near the base of the Maritime Alps, on the Mediterranean, and on both sides of the Paillon or Paglione, a mountain torrent of short and rapid course, 140 miles east by north of Marseilles. It is divided into the Old Town, on the left bank of the Paglione, and the New Town, on the right. Both quarters, but more especially the New Town, have of late years been much extended. The streets of the former are mean-looking compared with those of the latter, in which there are wide streets and boulevards, and lofty and handsome houses. The quays that border the Paglione are lined with gay shops, and between these and the sea the stream is entirely covered over, leaving a wide space or square where is a handsome public casino, with a fine winter garden. The Croce de Marbre commemorates the reconciliation of the Emperor Charles V and Francis I by Pope Paul II. There are statues of Masséna, Garibaldi and Carnot. At the mouth of the stream there is a public garden, and westward along the sea-front a fine promenade, the Promenade des Anglais, bordered with handsome hotels and villas. On a pier or jetty projecting from the public garden is a fine new casino. Public buildings include a cathedral, theological and teaching seminaries, natural history museum, observatory, several theatres, public library with 60,000 volumes, etc. Nice possesses some silk, cotton and paper mills; many oil mills and manufactories of leather, silk, soap, liqueurs, dyes, essences, perfumery, etc. Immense quantities of flowers are grown. The harbor or port is separated from the rest of the town by the Castle Hill (320 feet), which has been laid out into beautiful grounds commanding magnificent views and crowned by the remains of an old castle. The harbor has recently been greatly improved, and is available for vessels of 5,000 tons. The exports by sea consist principally of olive-oil. Nice is much

resorted to in winter by foreigners, particularly English. The carnival of Nice, which begins on Shrove Tuesday, lasts eight days. Owing to sudden changes of temperature (mean temperature 60° F., ranging from 27½° to 88°), its climate is unsuitable for those laboring under pulmonary and bronchial complaints, but patients suffering from chronic rheumatism, gout and paralysis derive benefit. Pop. 142,940.

The ancient Ligurian town of Nicæa, founded by a colony of Phocæans from Massalia (Marseilles), became subject to Rome in the 2d century B.C. It was in the hands of the Saracens during the greater part of the 10th century. Then, after existing as an independent city, it acknowledged the supremacy of the Counts of Provence and the House of Savoy (1388). In 1543 it was taken and pillaged by the Turks. Later, from 1600 onward, it was repeatedly taken by the French; and they kept possession of it from 1792 to 1814. In 1860 it was ceded to France by Sardinia (Savoy). Masséna was born near the city, and Garibaldi in it. Consult Hole, 'Nice and her Neighbours' (1881); Loveland, 'The Romance of Nice' (1912); Moris, 'Nice' (1899); Nash, 'Guide to Nice' (1884).

NICE, Councils of. See NICÆA, COUNCILS OF.

NICENE (nī'sēn) CREED, a detailed doctrine embodied in the liturgies of the Catholic, Oriental and Anglican churches, and generally accepted by Protestants. While not absolutely identical with the original Creed formulated at the Council of Nicæa (q.v.) in 325 A.D., against the Arian heresy, the main points of doctrine therein agreed on are embodied in it. Prior to its adoption, the several churches had their own doctrinal formulæ. The final clauses after "And I believe in the Holy Ghost" were added at the Council of Constantinople (381). See **ARIUS**; **CREEDS**; **FILIOQUE**.

NICEPHORUS, nī-sēf'ō-rūs, Greek historian: b. 758; d. 829. He is generally known as Nicephorus Constantinopolitanus, was secretary to the Empress Irene, and in 806 was elected patriarch of Constantinople. The violent Emperor Leo V deposed him, and he retired to a cloister in 805. To this retirement we owe his invaluable 'Chronologia Compendiaria' and 'Breviarium Historicum.'

NICEPHORUS I, Byzantine emperor of the first decade of the 9th century A.D.; d. 26 July 811. He is often called 'Logothetes,' this being his title as financial secretary to Irene, whom he succeeded on the throne October 802, owing to a sudden revolution. His experience in finance aided him in the imposition of heavy taxes, and he sided with the iconoclastic party. These two courses made him unpopular, and his unpopularity was increased by his non-success in external affairs. In 803 a part of Italy was assigned by treaty to Charlemagne; in 806 was forced to sign a humiliating peace with the Arabs, and in 811 was defeated and killed by the Bulgarians under Khan Krum.

NICEPHORUS II, Phocas, Byzantine emperor: b. 912; d. 10 Dec. 969. He was of Capadocian descent, and, like his father, Bardas Phocas, proved himself a great general. During the reigns of Constantine VII and Romanus II he fought the Arabs in Asia and southern

Italy, and in 961 recaptured the island of Crete from the Saracens. In 963 he returned to Constantinople after the death of Romanus II, was proclaimed emperor in August, and in September married Romanus' widow, Theophano. As emperor Nicephorus' military career was no less brilliant than before; he renewed the war against the Arabs, won all of Cilicia, and in 969 captured Antioch; and was equally successful against the Bulgarians and Macedonians. At home his heavy taxes to carry on these campaigns and his bold tampering with ecclesiastical funds aroused monks and people against him. He was assassinated by his wife's paramour and his own kinsman and general, John Tzimisce. Nicephorus was not only a general but a statesman and diplomat, as is evidenced by his work 'Legatio,' edited by Pertz (1839). Consult Schlumberger, 'Nicephore Phocas' (1890).

NICEPHORUS III, Botaniates, Byzantine emperor of the 11th century. He was a general grown old in the service, when in 1078 he successfully plotted against Michael VII and became emperor. His reign of three years was filled with contention against his rivals at home and with Robert Guiscard abroad. He was forced to abdicate in favor of Alexis Comnenus in April 1081, and spent the few months that remained to him in a monastery.

NICETAS ACOMINATUS, nī-sē'tas ā-kōm-ī-nā'-tūs, Byzantine historian: b. Chonæ (hence called **CHONIATES**), in the middle of the 12th century; d. Nicæa, 1216. He was a resident and official of Constantinople up to 1204, when the city was captured and he removed to Nicæa. His excellent history of the Byzantine Empire from 1118 to 1206, completing Zonaras, is his most important work; it is edited by Bekker (1835).

NICHIREN, nīch'ī-rēn, Japanese religious reformer: b. 1222 A.D.; d. 1282. He founded a Buddhist sect, the Nichivien-shiu. He appears to have been a fanatic religionist of a persecuting temper, and to have quarreled bitterly with other sects. Two exiles were imposed upon him for his subversive doctrines. The central doctrine of his teaching is that all life may attain to being a Buddha by repeated transmigrations. Final salvation is reached by prayer and obedience to the law. Nichiren is revered, but not worshipped, by his followers, whose chief shrines are at Ikegami, near Tokyo. A translation of the sacred book of the sect is printed in Max Müller's 'Sacred Books of the East.'

NICHOL, nīk'ōl, John, Scottish lecturer and author: b. Montrose, Scotland, 8 Sept. 1833; d. London, 11 Oct. 1894. He was educated at Glasgow University and Balliol College, Oxford, being graduated with honors from the latter in 1859. From 1862 to 1889 he was professor of English literature in Glasgow University, later lectured widely in England and Scotland on literary subjects, and was prominent in the university extension. He visited the United States several times, and during the Civil War warmly supported the Northern cause. He prepared the article on 'American Literature' for the 'Encyclopedia Britannica,' which has been separately published; and also wrote 'Fragments of Criticism' (1860); 'Hannibal' (1872), a dramatic

poem; 'Tables of European Literature and History' (1876); 'Byron' in the 'English Men of Letters' series (1880); 'Robert Burns' (1882); 'Francis Bacon' in 'Philosophic Classics for English Readers' (1888-89); 'Kant' (1889), and 'Carlyle' in the 'English Men of Letters' series (1892). Consult his 'Memoir' by Knight (1896).

NICHOL, John Pringle, Scottish astronomer; b. Brechin, Forfarshire, 13 Jan. 1804; d. near Rothesay, 19 Sept. 1859. Originally educated for the Scottish Church, at King's College, Aberdeen, he turned his attention to astronomy and in 1836 was appointed professor of astronomy in Glasgow University, a post which he retained with great credit till his death. He lectured in the United States 1848-49. Among his works may be mentioned 'The Architecture of the Heavens' (1838); 'Phenomena of the Solar System' (1838); 'The Stellar Universe' (1847); the 'Planetary System' (1851), and 'The Planet Neptune' (1855). These have the merit of being written in a very attractive and interesting style, and obtained a wide popularity. He likewise edited a 'Cyclopædia of Physical Sciences' (1857).

NICHOLAS, nīk'ō-lās, a proselyte of Antioch, one of the seven deacons (Acts vi, 5). He is sometimes charged, though on insufficient evidence, with founding the sect of Nicolaitans alluded to in Rev. ii, 15.

NICHOLAS, Saint, a popular saint revived by both Greeks and Latins on 6 December. Saint Nicholas belongs to the 4th century of the Christian Era. The accounts of his life are purely legendary. According to tradition he was a native of the city of Patara, in Lycia, Asia Minor, was devotional in early youth and entered the monastery of Sion near Myra. In the course of time he became an abbot and subsequently was elected archbishop of the metropolitan church of Myra. This was in the time of the Emperor Diocletian under whom Saint Nicholas was persecuted, tortured and kept in prison until the more tolerant reign of Constantine. He is said to have been present at the Council of Nicæa (325), but this is unconfirmed by historians.

The history of Saint Nicholas did not end with his death and burial. His relics were preserved with great honor at Myra until the end of the 11th century, when some merchants of Bari, on the Adriatic, moved by a pious indignation, made an expedition to the coast of Lycia; and, by means of a ruse, seized his remains and carried them off to Italy. Landing at Bari they deposited these sacred relics in the church of Saint Stephen (9 May 1087). On that day it is said that 30 persons were cured of distemper through imploring the intercession of Saint Nicholas. Since that time his tomb at Bari has been a pilgrimage place. Perhaps no saint enjoys so great a popularity as Saint Nicholas. He is the patron saint of Russia. He is regarded as the special guardian of virgins, of children and of sailors. Scholars were also under his protection; and he even came to be regarded as the patron of robbers, from an alleged adventure with thieves, whom he compelled to restore some stolen goods to their proper owners. In consequence thieves were called in the Middle Ages "clerks of Saint Nicholas." In art Saint Nicholas is represented

with various attributes. His most usual appearance is standing in his splendid episcopal attire by the side of three children in a tub. The interpretation of this is found in the legend that Saint Nicholas miraculously restored to life three youths, sons of rich parents, who had been murdered, cut up and hidden in a salting tub, by a wicked innkeeper of Myra, in whose house they had taken lodging for the night while on their way to Athens to continue their education. From this circumstance Saint Nicholas became the patron and guardian of children. The legend regarding his care of virgins and the connection of his name with the giving of presents in secret is told as follows: A nobleman in the town of Patara had three daughters, but was so poor that he was unable to provide them with suitable marriage portions. He was on the point of abandoning them to a sinful course of life when Saint Nicholas heard of it; and, going secretly to the nobleman's house at night, he threw a purse of gold into an open window. This fell at the feet of the father who used it for the dowry of the eldest daughter. On the second night Saint Nicholas threw a second purse for the second daughter; and on the third night another for the third daughter. On this occasion the nobleman caught Saint Nicholas in the act and held him by his robe. Saint Nicholas made him promise that he would inform no one of his munificence. From this incident it became the custom for the older members of a household to place presents in the shoes or stockings of their young relatives, who on discovering them in the morning were pleased to attribute them to the generosity of Saint Nicholas. From this same exhibition of munificence Saint Nicholas is often represented as bearing three golden balls which later became the sign of the pawnbrokers. Hence Saint Nicholas is sometimes considered as the patron of pawnbrokers.

An important function of Saint Nicholas was to guide mariners. Hence in many seaport towns there are churches dedicated to Saint Nicholas in which sailors hang up votive pictures and return thanks for preservation at sea. It is said that Saint Nicholas, when making a voyage to the Holy Land, caused a terrible tempest to abate; and at another time appeared and saved some mariners who had invoked his aid. Churches dedicated to Saint Nicholas are numerous in all countries.

On Saint Nicholas' Day in ancient times a singular ceremony used to take place. This was the election of the Boy Bishop or *Episcopus Puerorum*, who from 6 December to Innocents or Childermas Day (28 December), exercised a burlesque episcopal jurisdiction; and, with his juvenile dean and prebendaries, parodied the various ecclesiastical functions and ceremonies. These ceremonies, ridiculous to modern minds, were encouraged as object lessons and participated in by the clergy themselves. The election of the Boy Bishop prevailed throughout the English cathedrals and grammar schools; but it was most particularly observed at Sarum (Salisbury). A full description of the mock ceremonies is preserved in the 'Processional of Salisbury Cathedral,' where the service of the Boy Bishop is set to music and printed. Strype in his 'Ecclesiastical Memorials' says that in 1556 "on the eve

of his day Saint Nicholas, that is, a boy habited like a bishop, went abroad in most parts of London, singing after the old fashion, and was received by many ignorant but well disposed people into their houses, and had as much good cheer as ever was wont to be had before." With the establishment of Protestantism in England, the pastime of the Boy Bishop ended. In France the Boy Bishop was not abolished until 1721, and continued in Germany until late in the 18th century.

The Feast of Saint Nicholas at Bari is one of the principal ecclesiastical festivals of southern Italy; and the grand prior of Saint Nicholas at Bari is one of the chief ecclesiastical dignitaries of Italy.

The celebration of Saint Nicholas Day has long been general in the Low Countries and Rhine provinces; but the growing concentration of the winter festival on Christmas Day and the rise in importance of the Christmas tree during the last 200 years has caused the Saint Nicholas customs to be absorbed into the Christmas celebration. In Belgium and Holland Saint Nicholas Day is still the day of joy and not Christmas. "On the eve of his festival day," writes an authority, "Saint Nicholas makes his tour, visiting palace and cottage. Frequently in the early evening he makes a preliminary visit in his bishop's robes, with pastoral staff and mitre, at each house, making inquiries concerning the conduct of the children, giving appropriate praise or warning, and promising on the following morning to give substantial reward. When he is gone, the children place receptacles for the gifts which Saint Nicholas is expected to let fall down the chimney. The receptacle varies in different places. Sometimes shoes are neatly polished for the purpose, at other times plates, or baskets, or stockings, or specially made shoes of porcelain are set on the bed, in the open chimney, before the door of a room or merely in the corner of a room. Saint Nicholas' steed, variously conceived of as a gray horse or a white ass, is not forgotten. For him the children put water and hay, or carrot, or potato peeling, or a piece of bread in the shoe, or basket, or stocking. In the morning from the tipped-over chairs and general disarray in the room it is evident that Saint Nicholas has been present. Replacing the oats, or hay, or carrot are found sweets and playthings for children that have been good, obedient and studious during the year. In the case of bad children, rods are left and the fodder is untouched."

Saint Nicholas' robe — his "tabard" — enables him to travel from place to place instantly. In Holland he is supposed to use a horse for his journey at night over the roofs of the houses. Belgium and Holland have special cakes and sweets for the Saint Nicholas season. Life-sized figures of Saint Nicholas are frequent in front of shop windows and in some places a man dressed like the saint goes about the streets on a white horse with presents. The Dutch settlers brought the Saint Nicholas customs to New York, whence they spread to other parts of the United States and became amalgamated with the Christmas customs from other countries. The American "Santa Claus" is a corruption of the Dutch *San Nicolaas*. "Santa Claus," writes McKnight, "the name derived from Saint Nicholas through the familiar use of

children in Teutonic countries, crossed to America. The exact route followed by him is somewhat open to question. On the way he traded his gray horse or ass for a reindeer and made changes in his appearance. In America he has made himself very much at home; and, according to the explanation most generally accepted, from America he recrossed the Atlantic to England, whence he has journeyed to the most distant parts of the British Empire, to India and to Australia, where he is as familiarly known as in America." The immortal poem of 'The Night Before Christmas,' by Clement C. Moore, makes him a jolly elf "Saint Nick," who rides "in a miniature sleigh drawn by eight tiny reindeer."

Consult Schnell, Eugen, 'St. Nickolaus' (Revensburg 1886); Laroche, Jules, 'Vie de Saint Nicholas' (new ed., Paris 1893); Gaeta, 'S. Nicolo' (Naples 1904); Falcorius, N. C., 'Sancti Nicolai' (Naples 1751); Cahier, C., 'Caracteristiques des Saints' (Paris 1867); McKnight, George Harvey, 'St. Nicholas' (New York 1917). See also BEFANA.

NICHOLAS, Saint, of Myra, one of the chief saints of the Greek Church, called the Wonder-Worker and venerated by the Roman Catholic Church: b. Parara, province of Lycia, in Asia Minor, toward the end of the 3d century; d. Myra, 6 Dec. 345 or 352. He was a bishop of Myra, imprisoned during the Diocletian persecution and set at liberty by Constantine the Great. He was present at the Council of Nicaea (325). He is venerated in the East and West as a saint and miracle worker, the patron of little children, unwedded maidens and sailors, and of Russia and Greece. In 1087 his body was stolen by Italian merchants and taken to Bari in South Italy 9 May. His festival, the anniversary day of his death, is still kept with special ceremonies in Italy, Germany, Switzerland and the Low Countries. He is the original of the Christmas present-bringer, "Santa Claus," this name being a corruption from the Dutch, the early colonists bringing the observance of Saint Nicholas' day to America. Nicholas or old Nick being a cant name for the Devil. Saint Nicholas' clerks became a cant name for thieves. Consult Praxmarer, 'Der Heilige Nikolaus und seine Verehrung' (1894); and Chambers' 'Book of Days.' See BOY BISHOP.

NICHOLAS, the name of five popes, as follows:

NICHOLAS I, Saint: b. Rome; d. there, 867. He succeeded Benedict III in 858. He was of a resolute disposition and successfully upheld the papal authority. He excommunicated Photius, patriarch of Constantinople, who had usurped that see after the deposition of Ignatius by the Emperor Michael III. He restored the violated rights of Thietberga, the unjustly divorced wife of Lo Lothair of Lorraine, brother of the Emperor Louis II, and that though they took arms against him and laid siege to Saint Peter's itself. Consult Lämmer, 'Nikolaus I und die byzantinische Staatskirche seiner Zeit' (1857); and 'Lives' or studies by Greinacher (1909); Leroy (1898); and Roy (1901).

NICHOLAS II (GERHARD, gër'härt, Fr. zhā-rär): b. Burgundy; d. Florence, 19 July

1061. A canon of Liège he became bishop of Florence in 1046 and succeeded Stephen X in the papal chair in 1059. He was opposed by a rival, called Benedict X, the choice of some of the Roman nobles, but being disavowed by the Council of Satri, Benedict was obliged to forego his claim. Hildebrand was the counsellor of Nicholas throughout his pontificate, and through his direction a council was assembled at Rome in 1059 which restricted the papal election to the college of cardinals.

NICHOLAS III (GIOVANNI GAETANO DEGLI ORSINI): d. 1280. He came of a noble Italian family and in 1277 was elected in succession to John XXI. From the emperor, Rudolph of Hapsburg, he succeeded in obtaining the cession of Romagna and the exarchate of Ravenna, and he deprived Charles d'Anjou, king of Naples, of the vicariate of Tuscany. He sent missionaries to Persia and China (1278) and attempted to originate a crusade. He was succeeded by Martin IV.

NICHOLAS IV (GOROLAMO MASCI): b. Ascoli, Italy; d. 1292. While very young he entered the order of Saint Francis and in 1274 became its general. He was made a cardinal by Nicholas III and bishop of Palestrina by Martin IV, and in 1288 was elected Pope. He was the first Franciscan pontiff. He excommunicated James of Aragon and his followers in Sicily and promoted the claims of Charles II of Anjou to that kingdom. He sent missionaries to the Bulgarians, Tartars and Chinese. Acre, the last Christian stronghold in the East, fell into the hands of the Saracens during his pontificate, and unsuccessful efforts to excite a new crusade are supposed to have hastened his death.

NICHOLAS V (TOMMASO PARENTUCELLI): b. probably at Sarzana, near Pisa, 1398; d. 1455. He was the cardinal-bishop of Bologna and succeeded Eugenius IV in 1447. During his pontificate the last anti-pope, Felix V, made submission and the Council of Basle was dissolved (1449). Three conspiracies were formed against him by Stefano Porcaro, who, after being twice pardoned, was executed (1453). The fall of Constantinople (1453) led to strenuous effort by Nicholas to arouse the princes of Europe to succor their brethren in the East; but the age of chivalry was past and his appeals fell on deaf ears. He was one of the most learned men of his time, collected books and manuscripts, and ordered translations to be made of the Greek classics. The Vatican library was also founded by him, and he embellished Rome with numerous fine edifices.

NICHOLAS V (PIETRO RAINALDUCCI), anti-pope, 1328-30: b. Corbara in the Abruzzi; d. Avignon, October 1333. A married man, he separated from his wife in 1310, joined the Franciscan Order and acquired fame as a preacher. During the papal exile at Avignon, Louis of Bavaria nominated him Pope against John XXII. He was elected by an assembly of priests and laymen and was consecrated by the bishop of Venice in Saint Peter's Cathedral, 12 May 1328. In April 1329 he was excommunicated, until, submitting with a rope around his neck to John XXII, 25 Aug. 1330, he received the pardon which was refused to Lotis, who temporised for a retraction. The anti-pope re-

mained in retirement until his death.

NICHOLAS I, king of Montenegro: b. Niegush, the ancient home of the long-reigning family of Petrovitch-Niegush, 25 Sept. 1841; d. Antibes, France, 2 March 1921. He was the son of Mirko Petrovitch, a famous Montenegrin soldier, and brother of Danilo II. The latter was assassinated 13 Aug. 1860, leaving no male heir. Mirko Petrovitch having resigned his claim to the throne, Prince Nicholas succeeded. Owing to the influence of the wife of Danilo II, the Princess Darinka, Prince Nicholas had been educated in Paris at the Academy of Louis-le-Grand and was in Paris when his uncle was murdered. He returned to Cetinje, Montenegro, and in the same year was married to Milona, daughter of Peter Valsetitch, president of the Council of State. In 1862 he distinguished himself in the campaign against Turkey and on one occasion narrowly escaped with his life. In 1876 he declared war against Turkey and in 1877-78 captured Nikshitch, Antivari and Dulcigno. This war, in which his military reputation was greatly increased, resulted in a considerable extension of the frontiers of Montenegro and the acquisition of a seaboard on the Adriatic. In 1896 he celebrated the bicentenary of the Petrovitch dynasty and attended the coronation of the Tsar Nicholas II. In 1898 he visited Queen Victoria at Windsor Castle. On 28 Aug. 1910 on the 50th anniversary of his reign, he changed his title from that of Prince to King, in accordance with a petition from the National Assembly or Skupshtina. Nicholas I, his family and his government fled from Montenegro in December 1915, when the country was overrun by the Austro-Germans. Since that time he has lived in France and the Montenegrin government has been at Neilly-sur-Seine. On 8 Nov. 1918, Nicholas declared himself in favor of a union of Montenegro with the new state of Jugo-slavia with each component state independent as to religion, education and territorial integrity. On 29 November he was deposed by the Skupshtina, the Montenegrin National Assembly, which declared for a union of Montenegro with Serbia under King Peter. The family of Nicholas I was included in the act of deposition.

He had three sons and five daughters. The eldest son, Prince Danilo, married (1899) Duchess Jutta of Mecklenburg-Strelitz; Princess Helena is married to King Victor Emmanuel III of Italy; Princess Anka to Prince Francis Joseph of Battenberg; Princess Militza to the Grand Duke Peter Nikolaievitch, former commander of the Russian armies, and Princess Stana to Duke George of Leuchtenberg. Of him James D. Bouchier writes: "The descendant of a long line of warriors, gifted with a fine physique and a commanding presence, a successful military leader and a graceful pose, King Nicholas possesses many characteristics which awoke the enthusiasm of the impressionable Servian race, while his merits as a statesman have received general recognition." His writings hold a high place in modern Slavonic literature. They include historical dramas, poems and ballads. Among them are 'Balkansa Tzaritza' and 'Kniaz Arvaniti,' dramas; 'Skuphene Pesme' and 'Nova Kola,' songs; and 'Haidana, Potini Aben-serage' and 'Pesnik i Vila,' poems.

NICHOLAS I, Pavlovitch, Tsar of Russia: b. near Saint Petersburg, 6 July (25 June) 1796; d. Saint Petersburg, 2 March 1855. He was third son of Paul I. He married in 1817 the Princess Charlotte, daughter of Frederick William III of Prussia. The Crown was relinquished by his elder brother, Constantine, and on 24 Dec. 1825 he entered upon his reign and on 3 Sept. 1826 was crowned at Moscow. On 26 Dec. 1825 the military conspiracy of the Dekabrists, which had been for several years in operation, broke out. Nicholas suppressed this revolt with great energy and personal courage; but the ultimate result was to arouse a policy of strong autocracy, based largely on the army, and bent on strictly maintaining internal peace. The civil administration was placed under military supervision; and the laws subsequently promulgated for the relief of serfdom were largely ineffective. Nicholas' foreign policy was aggressive. A war with Persia (1827-28) was concluded by a peace which gave Russia an important increase in territory; and a disastrous one with Turkey (1828-29) by the peace of Adrianople which secured to Russia the eastern coast of the Black Sea, and brought about the establishment of the Grecian kingdom. The European revolutions of 1830 were followed by an insurrection in Poland, which was rigorously suppressed and was followed by the complete Russification of that country. The unbending rule of Nicholas earned him the sobriquet of the "Iron Tsar." Under the stern discipline which he believed the necessities of the time and the expanding empire required, Russia seemingly became well-ordered. This was largely due to the work of the dreaded Third Section—the secret police system which he inaugurated, so as to bring every subject into direct communication with the throne. As opposed to the willing service of a free and enlightened people, encouraged to express their opinions on public questions, the servile subservience of an oppressed people always tends to degeneracy, and its effects became evident when the army and navy, called upon for special efforts, revealed astounding instances of corruption, disorganization and stupidity in administrative circles. Having, as he thought, disciplined Russia, Nicholas believed it to be his duty to discipline the world. In 1826, on behalf of the British government, politically and commercially interested in the development of Eastern Europe, the Duke of Wellington on a diplomatic mission had sought to effect a concert of opinion. The Iron Tsar had proved superior in diplomatic finesse to the Iron Duke and, without political safeguards, Great Britain had to submit to the encroaching Russification of Turkey by the Treaty of Adrianople. In 1849 Nicholas aided Austria in the conquest of the Hungarian revolutionists. His attitude toward Turkey brought on the Crimean War. In 1853 he demanded protectorate over Turkish subjects of Greek religion, but the Sultan refused, and was supported by England and France. The Russian army proved to be unprepared, and was defeated at the Alma and Inkerman. Nicholas died before the end of the contest (see CRIMEAN WAR). During his reign conformity to the Orthodox Greek Church was imposed on his subjects. He was the most prominent sovereign of his time and an honest, brave and majestic despot, but a martinet and

a reactionary who was always afraid to delegate his authority.

Consult Edwards, 'The Romanoffs' (1890); 'Lives' by Lacroix (1864-75) and Schmucker (1860); Shieman, 'Geschichte Russlands unter Kaiser Nikolaus I' (1904 et seq.); and 'Cambridge Modern History' (Vols. X and XI, 1907, 1909).

NICHOLAS II, Tsar of Russia: b. Saint Petersburg, 18 May 1868; executed by the Revolutionists, 17 July 1918. He was the eldest son of Alexander III by his wife, the Danish princess Dagmar, known as czarina by the name Maria Feodorovna. His education under General Danilovitch was military; it was concluded by a trip through the East, in 1891, during which he was nearly killed by a sabre stroke from a Japanese fanatic. His father's death 1 Nov. 1894 brought him (much against his will) to the throne; he married Princess Alice of Hesse, 26 Nov. 1894; and in May 1896 was crowned with great pomp at Saint Petersburg. His policy he proclaimed would be the peaceful one of his father, and this for 20 years certainly proved true as regards his relations with the European powers. His visits to Vienna, Breslau and Paris in 1896, and the visits paid him in return in 1897 by the Emperor of Austria, by William II of Germany, and by President Faure of France showed his willingness and the eagerness of Austria, Germany and France that there be a peaceful European policy. Even more striking was the Tsar's note to the powers, published by Count Muravieff 24 Aug. 1898, inviting them to a Peace Congress, looking to the disarmament of the Powers. The Hague Congress in 1899 was followed by another visit to Paris by the tsar 18-21 Sept. 1901 and by President Loubet's trip to Saint Petersburg 20-23 May 1902, and by a Franco-Russian convention intended to offset the Anglo-Japanese entente. The war with Japan and a reactionary policy at home gave rise to a strong revolutionary movement in 1905. Repression followed with relentless hand and Nicholas presented a miserable spectacle of vacillation—too weak to assert his autocratic powers and exact obedience and without the resolution or the humanity to inaugurate a liberal policy. His superstition was shown by his consultation of fortune-tellers, spiritualists, mystics and charlatans in his desire to secure a male heir, his first four children being all girls. His internal policy is dealt with fully in the article on Russia (q.v.). Upon his accession, Nicholas II was hailed as a liberal, if not a radical. Whether there was internal reform during his administration is uncertain; even the rescript in favor of religious freedom seemed a doubtful reform in the eyes of some critics, who urged that although freedom was granted to all present sects the death penalty still held for any Greek churchman who left the Orthodox faith for any other. How far the emperor was personally responsible for the acts of his government is also doubtful; he was often described as the mere tool of his narrow procurator-general, Pobiedonostyeff. The measures taken to Russianize Finland, and the slack treatment of those guilty of the Kishineff massacres, seem—to say the least—unlike the tsar as he was pictured at his accession. The part taken by Nicholas to prevent the outbreak of war in 1914 and his determination to

protect Serbia were perhaps the greatest and noblest acts of his public life. The story of his efforts in these directions is told elsewhere. (See RUSSIA; WAR, EUROPEAN). Reverses at the front and hints of pro-German intrigues brought troubles to the Tsar and his government in 1915 and 1916. The closing days of the latter year saw the resignation of Premier Stuermer brought about by the Duma. Trepoff succeeded and a more progressive administration ensued. Rasputin, the notorious monk, whose influence at court had been as powerful as it was baneful, was murdered. Trepoff's administration displeased the bureaucrats, however, and in January 1917 he was succeeded by Prince Golitzin, a reactionary Conservative and probably a pro-German. Discontent soon manifested itself under his régime. Riots provoked by food scarcity broke out in Petrograd on 9 March; within two days the infection had spread to the munition workers who voted to strike, and a mutiny followed in the army. The Duma met on 12 March, defied the Tsar's decree of dissolution and assumed the leadership of what everyone now recognized as a revolution. Nicholas was peremptorily told to dismiss his reactionary ministers and to inaugurate internal reforms if he would save his throne. The Duma leaders, under Rodzianko, also intimated that an end must be put to German intrigue and that the war be prosecuted with full vigor and in close co-operation with the Entente. Nicholas's weakness of resolution delayed matters until it was too late to save the Imperial House. On 15 March 1917 Nicholas II abdicated the throne at Pskov, for himself and his son, in favor of the Grand Duke Michael. The latter declined the then doubtful honor of the succession until a National Assembly should have passed upon the future form of government. The new government placed the Imperial family under arrest in the palace at Tsarkoe-Selo. After a few months' confinement there the former Tsar and his family were deported to Tobolsk, where about a year was spent in semi-seclusion amid the rigors of a Siberian winter. By orders of the Bolsheviki Nicholas II, now plain Nicholas Romanoff, was shot to death 17 July 1918, and a subsequent announcement was made that his wife and children had also been executed, but the exact fate of the family remains uncertain. Pope Benedict XV sent a special envoy to Russia to ascertain their fate and, if they were found alive, to bespeak decent treatment in their regard, but thus far his efforts have been futile. See RUSSIA; WAR, EUROPEAN, and consult Elchaninov, A., 'Czar Nicholas II' (London 1913); Gardiner, A. G., 'Prophets, Priests and Kings' (London 1908; new ed., 1914); Harden, Maximilian, 'Monarchs and Men' (Philadelphia 1913). Leudet, Maurice, 'Nicholas II in time' (Paris 1899); Oukhtomski, Prince E. E., 'Voyage en Orient, Grèce, Egypte, Inde, 1890-91, de son altesse impériale le Césarevitch' (2 vols., Paris 1893); Vasili, Paul, 'Behind the Veil of the Russian Court' (London 1914); 'Speeches of Nicholas, 1894-1906' (in Russian, Saint Petersburg 1906).

NICHOLAS, Sir Edward, English secretary of state: b. Wiltshire, England, 4 April 1593; d. East Horsley, Surrey, England, 1 Sept. 1669. He was educated partly at Queen's Col-

lege, Oxford, and in 1620-21, 1623-24, 1627-28 he was a member of Parliament. In 1641 he became secretary of state under Charles I, urged a composition with the Scots, arranged the Treaty of Uxbridge, after the surrender of Oxford (1646), retired to the Continent, but nominally remained in his office until the king's execution. During the exile of Charles II he was practically excluded from influence through the hostility of Queen Henrietta and the Catholic faction; but at the restoration in 1660 he resumed his former office from which he resigned in 1662.

NICHOLAS, George, American soldier and statesman: b. Hanover, Va., about 1755; d. Kentucky, in 1799. He was the son of Robert Carter Nicholas (1715-80), a prominent Virginia statesman. After graduation at William and Mary College in 1772 he joined the 2d Virginia Regiment in 1775, of which he was made captain. In November 1776 he became major of the 11th Virginia Regiment, of which he was made lieutenant-colonel in the following year. He resigned from the service in November 1778. In 1781 he was a member of the Virginia assembly, and in 1788 he was an active member of the convention that ratified the Federal Constitution. In 1790 he removed to Kentucky and was a member of the convention that formed the constitution of Kentucky at Danville, Ky., 1 April 1792. He was the first attorney-general of Kentucky.

NICHOLAS, Wilson Cary, American soldier and legislator: b. Hanover, Va., about 1757; d. Milton, Va., 10 Oct. 1820. In 1774 he was graduated from William and Mary College, and at the beginning of the Revolutionary War joined the Continental army. He became officer in command of Washington's life guards and served in this position till 1783. He was a member of the Virginia State Convention which ratified the Constitution of the United States, and was one of those who favored ratification. In 1799 he became United States senator, and in 1804 resigned from the senate to become collector of the ports of Norfolk and Portsmouth. In 1807 he was elected to Congress, serving till 1814, and in the latter year was elected governor of Virginia for two years. He was one of the most influential supporters of Thomas Jefferson.

NICHOLAS OF CLÉMANGES. See CLÉMANGES, MATHIEU NICOLAS.

NICHOLAS OF CUSA. See CUSA.

NICHOLAS LAND, an Arctic archipelago discovered in 1913 by Capt. Boris Andreevitch Vilkitsky (1870), Russian naval officer and Arctic explorer, who met with great success while commanding a squadron of ice-breakers in surveys of the ice-clad waters of the Siberian Ocean. Nicholas II Land, named for the last tsar of Russia, extends from 30 miles north of Cape Chelyuskin to 81° N. lat., 96° E. long. The eastern coasts of the newly discovered archipelago cover about 200 miles. The most southerly of the islands is within 30 miles of Asia. The geological specimens obtained indicate that Nicholas II Land is an extension of the continent of Asia. The explorer described Nicholas II Land as consisting of high abrupt cliffs, covered with scanty vegetation, and isolated peaks apparently volcanic.

NICHOLAS OF LYRA, li'ra, called "Doctor Planus et Utilis," mediæval French monk and biblical scholar: b. Lyre, Normandy; d. Paris, 23 Oct. 1340. He entered the Franciscan order in 1291, became professor of theology in the Sorbonne; later was provincial of his order in Burgundy and labored for the conversion of the Jews. His Hebraic and rabbinical learning was profound. His chief work is the 'Postillæ Perpetuæ' (1471-74), a running commentary on the Scriptures and the first put into print. It is liberal in its interpretations, but, on account of his linguistic knowledge, is on a much sounder basis than similar works of the period. It was much used by Luther. Consult Davidson, 'Sacred Hermeneutics' (1843).

NICHOLAS NICKLEBY, nik'l-bi, a well known novel by Charles Dickens which appeared serially in 1838 and 1839. It contains in Dotheboys Hall a realistic description of the condition of cheap boarding schools of that period, and the author's strictures accomplished not a little toward reform in this direction.

NICHOLASVILLE, nik'ō-las-vil, Ky., city, county seat of Jessamine County, on the Cincinnati, New Orleans and Texas Pacific, the Louisville and Nashville railroads; about 10 miles south by west of Lexington and 70 miles east by south of Louisville. It was settled in 1799, and in 1835 was incorporated. It is the commercial centre of a productive agricultural region, in which tobacco is one of the chief crops, and considerable attention is given to horse-breeding. It has flour and lumber mills, tobacco storage plants, and wheel works. The Jessamine Female Institute, opened in 1854, is located here, and there is a public library and a college for boys. Pop. 2,935.

NICHOLLS, nik'ōlz, Charlotte. See BRONTË, CHARLOTTE.

NICHOLLS, Francis Tillon, American lawyer: b. Donaldsonville, Ascension Parish, La., 20 Aug. 1834; d. 5 Jan. 1912. He was graduated from West Point in 1855, and in 1856 served in the campaign against the Seminole Indians. He then resigned his commission in the army to study law and was admitted to the bar in 1858, beginning his practice in Napoleonville. In 1861 he entered the Confederate army as captain and was promoted lieutenant-colonel in the same year and brigadier-general in 1862. He had charge of the defenses of Lynchburg, Va., and in 1864 was superintendent of the trans-Mississippi conscript bureau. After the war he resumed his law practice in Ascension Parish, La., and later removed to New Orleans (1880). In 1876 he was the Democratic candidate for governor; his party claimed the election by about 8,000 votes, but a Republican returning board declared his opponent elected. He, however, took his seat and was subsequently recognized as governor by the Federal government. In 1888 he was again elected governor and during his administration actively opposed the Louisiana Lottery Company, and vetoed the bill granting it a new charter with increased privileges. From 1893 to 1904 he was chief justice of the Louisiana State Supreme Court and thereafter until his death associate chief justice.

NICHOLLS, Rhoda Holmes, English-American painter: b. in Coventry, England (maiden name Grome). After receiving an

education in London, she became a pupil of the Bloomsbury School of Art in London and won there the queen's scholarship. She then studied in Rome under Cammerano and Vertunni. After being married to Burr H. Nicholls in Sussex in 1884 she came to the United States and eventually settled in New York City. Mrs. Nicholls has exhibited in all the artistic centres in the United States, besides Rome, Turin, Munich and London. She has taken medals in New York, Boston, Atlanta, Nashville and Charleston and in the West Indies and Interstate, Chicago, Buffalo and Saint Louis Expositions. She was on the staff of the *Art Interchange* and *Art Amateur*; and was co-editor of *Palette and Brush*. She is a member of the New York Water Color Club; the American Water Color Society; the American Society of Miniature Painters; the Art Students' League; the Woman's Art Association of Canada, and many other clubs and societies.

NICHOLS, Edward Leamington, American physicist: b. Leamington, England (of American parents), 14 Sept. 1854. After graduation at Cornell University in 1875, he studied in Leipzig, Berlin and Göttingen, taking his Ph.D. at the latter in 1879. He then was appointed fellow in physics at the Johns Hopkins and afterward spent some time in the Edison Laboratory at Menlo Park, N. J. From 1881 to 1883 he was professor of physics and chemistry in the Central University of Kentucky and in 1883 became professor of physics and astronomy in the University of Kansas. In 1887 he was made professor of physics at Cornell, which he has since held. He was president of the American Association for the Advancement of Science in 1907 and of the American Physical Society in 1907-08. He is also a member of the National Academy of Sciences; the Kansas Academy of Science; the American Institute of Electrical Engineers; the Illuminating Engineering Society, and was a member of the visiting committee of the United States Bureau of Standards. Dartmouth has given him the degree of Sc.D. and the University of Pennsylvania that of LL.D. Dr. Nichols was the founder of the *Physical Review*, which he edited from 1893 to 1912. He has published 'The Galvanometer' (1894); 'A Laboratory Manual of Physics and Applied Electricity' with Profs. Merritt, Bedell and others (2 vols., 1895); 'The Elements of Physics,' with Prof. W. S. Franklin (3 vols., 1896); 'Outlines of Physics' (1897), and many papers in scientific journals on experimental physics.

NICHOLS, Ernest Fox, American physicist: b. Leavenworth, Kan., 1 June 1869. After graduation at the Kansas Agricultural College in 1888, he studied in Cornell, Berlin and Cambridge, England. From 1892 to 1898 he was professor of physics at Colgate University and held the similar chair in Dartmouth in 1898-1903 and Columbia University in 1903-09. In 1909 he was made president of Dartmouth and held this post until 1916, when he became professor of physics at Yale. In 1907-09 he was a research associate of the Carnegie Institute of Washington, engaged in the study of radiation phenomena at the Mount Wilson Solar Observatory. Some of his important work is the remodeling and improvement of the Crookes radiometer; the study and measure-

ment of long heat waves; the measurement of the heat radiation from the stars Arcturus and Vega and the planets Jupiter and Saturn; and the measurement of pressure due to radiation. The American Academy of Arts and Sciences gave him the Rumford Medal in 1905. The degree of LL.D. has been given to him by several colleges and universities: Colgate, Clark, Wesleyan, University of Vermont, University of Pittsburgh and Dennison, and that of Sc.D. by Cornell (1897) and Dartmouth (1903). Dr. Nichols is a member of various scientific societies and in 1903 was vice-president of the American Society for the Advancement of Science. He has contributed many papers on radiation and kindred subjects to important scientific journals in this country and in Europe. He is a collaborator of the *Astrophysical Journal* and associate editor of the *Physical Review*.

NICHOLS, George Ward, American writer: b. Mount Desert, Me., 21 June 1837; d. Cincinnati, Ohio, 15 Sept. 1885. He was art critic on the New York *Evening Post* under William Cullen Bryant and was aide-de-camp to General Sherman in the Civil War. He was president of the Cincinnati College of Music for several years and greatly improved its educational and financial standing. He wrote 'The Story of a Great March' (1865); 'Art Education Applied to Industry' (1877); 'Pottery' (1878), etc.

NICHOLS, Henry Ezra, American naval officer: b. New York; d. off Paranaque, Philippine Islands, 10 June 1899. He was graduated from the United States Naval Academy in 1865 and served in the navy with steady promotion. He was engaged on the Coast Survey in 1876-77 and in 1880-84, and in 1897 took command of the *Bennington*, which became one of Admiral Dewey's fleet in 1898. In 1899 he was transferred to the command of the monitor *Monadnock* and rendered valuable assistance at the capture of Paranaque. Captain Nichols was overcome by the heat during the bombardment and died while his ship was still in action.

NICHOLS, Henry Hobart, jr., American landscape painter: b. Washington, D. C., 1 May 1869. He received his education in the public schools of Washington and Shortledge College, Pennsylvania, and studied at the Art Students' League of Washington at Julien's Academy in Paris. In Paris he also studied under Castelucho. He was the founder of the Society of Washington Artists and was assistant to the director of Fine Arts of the United States Commission to the Paris Exposition in 1900. In 1912 he was elected an associate of the National Academy of Design. He is a regular contributor to the Corcoran Art Gallery's exhibitions and has received several prizes there. He is a member of the Allied Artists of America; of the New York Water Color Club; of the American Water Color Society, and many other clubs and societies. He now lives at Lawrence Park, Bronxville, N. Y.

NICHOLS, William Ford, American Protestant Episcopal bishop: b. Lloyd, N. Y., 9 June 1849; d. 5 June 1924. He was graduated from Trinity College, Hartford, Conn., in 1870 and from the Berkeley Divinity School in 1873. He entered the priesthood the next year and was successively rector of churches at West Hartford, Conn.; Newton, Conn.; Christ

Church, Hartford (1877-87); and Saint James, Philadelphia (1887-90). He declined the bishop-coadjutorship of Ohio in 1888, but in 1890 was consecrated bishop-coadjutor of California, becoming bishop of that diocese in 1893. In 1893 he founded the Christian Divinity School of the Pacific at San Mateo, Cal. He was a delegate to several conferences of his church in the United States and abroad and wrote 'On the Trial of Your Faith' (1895); 'A Father's Story of the Earthquake and Fire of 1906' (1906); 'Apt and Meet Counsels to Candidates for Holy Orders' (1909); 'Some World Circuit Saunterings' (1913), etc.

NICHOLS, William Henry, American manufacturing chemist: b. Brooklyn, N. Y., 9 Jan. 1852. He was educated in the Polytechnic Institute of Brooklyn and was graduated from the New York University in 1870, since when he has been engaged as manufacturing chemist, copper-refiner and smelter. In 1890 he became president of the Nichols Copper Company and has been associated with a number of other corporations. He was president of the Granby Consolidated Mining, Smelting and Powder Company and an incorporator of the American Chemical Society. In 1904-05 he was president of the Society of Chemical Industry and in 1912 of the International Congress of Applied Chemistry. He was also made chairman of the committee on chemicals of the Council of National Defense in April 1917.

NICHOLSON, nīk'ol-sōn, Sir Francis, English colonial governor: b. England, 1660; d. London, 5 March 1728. In 1684 he came to America as lieutenant in the English army and in 1688 was commissioned lieutenant-governor of the New England colonies and represented the governor, Sir Edmund Andros (q.v.) at New York. At the time of the accession of William and Mary in England and of the Leisler rebellion in New York, he was obliged to abdicate his office and return to England. (See LEISLER, JACOB). In 1690 he was appointed lieutenant-governor of Virginia and went to Jamestown to take charge of the affairs of the colony. During his administration, which was most successful, he gave especial attention to bettering the condition of the Established Church and to education; he was one of the founders of William and Mary College, to which he gave £300. When Andros succeeded Lord Howard as governor of Virginia, Nicholson, disappointed that he had not received the appointment, resigned as lieutenant-governor and was made governor of Maryland. Here he aroused opposition by changing the capital from Saint Mary's to Annapolis and also by his intolerant attitude toward the Catholics and others not connected with the Church of England. In 1698 he was appointed governor of Virginia, but failed to attain his former success in that colony. His constant menacing and tyrannical attitude aroused the opposition of the Virginians and he particularly angered them by his removal of the capital from Jamestown to Williamsburg; he was recalled from Virginia in 1705. In 1709 and 1711 he was in command of abortive expeditions against New France. In 1710 he commanded an expedition against Acadia and captured Port Royal and in 1712 was made governor of Acadia. In 1719 he received his appoint-

ment as governor of South Carolina, being the first royal governor of that colony and filled the office with ability and success. He was knighted in 1720 and returned to England in 1725, when he was promoted lieutenant-general. He wrote 'Journal of an Expedition for the Reduction of Port Royal' (1711), reprinted in the Nova Scotia Historical Society's 'Transactions' for 1879, and 'An Apology or Vindication of Sir Francis Nicholson, governor of South Carolina' (1724).

NICHOLSON, Henry Alleyne, English scientist: b. Penrith, Cumberland, 11 Sept. 1844; d. Aberdeen, Scotland, 19 Jan. 1899. He was educated at Göttingen and Edinburgh, was professor of natural history in the University of Toronto in 1871-74, of physical science in the Durham College of Physical Science in 1874-75 and of natural history at Saint Andrews in 1875-82. From 1882 to 1899 he was regius professor of natural history at Aberdeen. His chief work was done in the palæontological department of zoology. Among his writings are 'A Manual of Palæontology' (1872; 3d ed. with Lydekker 1889), 'Introduction to the Study of Biology' (1872); 'The Ancient Life History of the Earth' (1877); 'Synopsis of Classification of the Animal Kingdom' (1882), and many scientific papers.

NICHOLSON, Henry Hudson, American engineer: b. Rushford, Wis., 25 May 1850. He was educated at Antioch College, Ohio, and in 1865 served as a private in the 49th Wisconsin Infantry. In 1874-82 he was professor of science in the State Normal School, Peru, Neb., and from 1882 to 1905 professor of chemistry and director of the chemical laboratory in the University of Nebraska. In 1884 he studied at Harvard and in 1885 at Heidelberg and Berlin. He was consulting engineer of the Hamilton Mines Company, 1898-1903; Ingold Placer Mining Company, Jack Gold Mines Company, Oregon, and manager and engineer of the Standard Consolidated Mines Company; directing engineer of the Killen, Warner-Steward Company, Chicago; consulting engineer of the Killen-McLaughlin Mining Company, Red Cliff, Colorado, and of the Plumas Lincoln Copper Company, Doyle, Cal. He is a member and fellow of various societies and the author of several papers on his specialty.

NICHOLSON, Isaac Lea, American Protestant Episcopal bishop: b. Baltimore, Md., 18 Jan. 1844; d. Milwaukee, Wis., 9 Oct. 1906. He was graduated from Dartmouth in 1869, took priest's orders in the Episcopal Church in 1872 and held rectorships at Baltimore 1872-75; Westminster, Md., 1875-79, and Saint Mark's, Philadelphia, 1879-91. In 1891 he was consecrated bishop of Milwaukee.

NICHOLSON, James, American naval officer: b. Chestertown, Md., 1737; d. New York city, 2 Sept. 1804. He went to sea when a boy, and was engaged in the capture of Havana in 1762. In 1776 he was given command of the *Defence*, fitted out by the colony of Maryland, and retook some vessels which the British had captured. In June 1776 he was assigned to the command of the *Virginia* of the Continental navy, and while his vessel was

blockaded in Chesapeake Bay he with his crew joined the army and took part in the battle of Trenton. Later when the *Virginia* attempted to put to sea she went aground and was taken by the British, though Captain Nicholson and most of his crew escaped; an official inquiry acquitted him of all blame. In January 1777 he was made commander-in-chief of the Continental navy, holding that position till the close of the war. In June 1780, when in command of the frigate *Trumbull*, he fought a severe battle with the British ship *Wyatt*, without decisive result, and in August 1781 was taken prisoner in the *Trumbull* by the British vessels *Iris* and *General Monk*, though he made a most gallant resistance and did not surrender until his ship was completely disabled. He was exchanged shortly before the close of the war, and in 1801 was appointed commissioner of loans for the State of New York.

NICHOLSON, James William Augustus, American naval officer: b. Dedham, Mass., 10 March 1821; d. New York, 28 Oct. 1887. He entered the navy as a midshipman in 1838, served in the Mexican War and as lieutenant under Perry on the Japan expedition. In the Civil War he commanded the steamer *Isaac Smith* in the operations against Port Royal (1861); in 1862 was promoted to the rank of commander and had charge of the monitor *Manhattan* in the battle of Mobile Bay; and later took part in the bombardment of Fort Morgan. In 1873 he was promoted commodore, and from 1876 to 1880 was in command of the Brooklyn Navy Yard. In 1881 he was made rear-admiral and was assigned to the Mediterranean, where he protected the United States consulate during the English bombardment of Alexandria, Egypt, and had much influence in restoring order. In 1883 he was retired from active service with the rank of rear-admiral.

NICHOLSON, John, British officer in India: b. Dublin, 11 Dec. 1821; d. near Delhi, 23 Sept. 1857. He went to India in 1839 as a subaltern in the service of the East India Company; displayed great bravery in the defense of Ghazni in 1841 and during the treacherous attack made by the Afghans immediately afterward. He served in the commissariat during the campaign in the Satlej and was present at Ferozshah, and in 1846-47 was in Kashmir. While deputy commissioner in the district of the Punjab between the Jhelam and the Indus his tact and skill and prodigious valor in reducing the savage tribesmen to law and order was something marvelous, so much so that in his last year no murder or highway robbery was ever committed or even attempted; the impress of his commanding personality was such that he was worshipped by a sect of fakirs as a demigod under the name of Nikkel Seyn. He distinguished himself in the Second Sikh War (1849) at Gujrat and Chilianwallah. He served as administrative officer at Bannu 1851-56. On the outbreak of the Indian mutiny he was made brigadier-general. During that trying period he did more than any other man to maintain British authority in the Punjab; strove to put mettle into his over-cautious chief, General Wilson, and organized a flying column which signally defeated the mutineers at Trimmu Ghaut and at the Ravi River. He led

the assault on Delhi, at which he was mortally wounded, and died nine days afterward. Of commanding stature and a born soldier and administrator, his early death removed a tower of strength to British rule in India. Consult the 'Life' by J. L. Trotter (1904), and Sir John Kaye, 'Lives of Indian Officers' (1889).

NICHOLSON, Joseph Shield, English political economist: b. Wrawby, Lincolnshire, 9 Nov. 1850. He was educated at the University of Edinburgh, at Trinity College, Cambridge, and at Heidelberg, and in 1880 became professor of political economy at Edinburgh. Among his writings on his specialty are 'Effects of Machinery on Wages' (1878); 'The Silver Question' (1886); 'Principles of Political Economy' (1893-1901); 'Strikes and Social Problems' (1896); 'Banker's Money' (1902); 'Elements of Political Economy' (1903); 'The Tariff Question' (1903); 'History of the English Corn Laws' (1904); 'Rates and Taxes as affecting Agriculture' (1905); 'A Project of Empire' (1909); 'The Neutrality of the United States' (1915). He has also published some fiction, including 'Thoth' (1888); 'Toxar' (1890); edited (1884) Adam Smith's 'Wealth of Nations,' and written two volumes on 'Ariosto.'

NICHOLSON, Louisa Margaret (LOUISE NIKITA). American singer: b. Philadelphia, Pa., 1872. She was educated abroad, where she made her debut in 1889 with marked success, and became prima donna at the Paris Opera in 1894. The rôles in which she has achieved most success are 'Fille du régiment'; 'Traviata'; 'Pagliacci,' etc.

NICHOLSON, Meredith, American author: b. Crawfordsville, Ind., 9 Dec. 1866. He entered journalism and in 1885-97 was reporter and editor on the Indianapolis *News*. In 1897-1901 he was treasurer of a coal-mining company in Denver and then returned to Indianapolis, where he has since devoted himself to literature. He is a member of the National Institute of Arts and Letters and has received honorary degrees from Wabash and Butler colleges. He has written 'Short Flights,' verse (1891); 'The Main Chance' (1903); 'The Hoosiers' (1900); 'Zella Dameron' (1904); 'The House of a Thousand Candles' (1905); 'Poems' (1906); 'The Port of Missing Men' (1907); 'Rosalind at Red Gate' (1907); 'The Little Brown Jug at Kildare' (1908); 'The Lords of High Decision' (1909); 'The Siege of the Seven Suitors' (1910); 'A Hoosier Chronicle' (1912); 'Provincial America,' essays (1913); 'Otherwise Phyllis' (1913); 'The Poet' (1914); 'The Valley of Democracy' (1918).

NICHOLSON, Reynold Alleyne, English Orientalist: b. 19 Aug. 1868. He was a son of H. A. Nicholson (q.v.). He was educated at the University of Aberdeen and at Trinity College, Cambridge, continuing his studies in Germany. He was examiner in classics at Aberdeen in 1897 and since 1901 has been professor of Persian in University College, London, and lecturer in Persian at the University of Cambridge. He has published 'Selected Poems from the Divani Shamsi Tabriz' (1898); 'Memoirs of the Saints' (Persian text, 1905-07); 'Literary History of the Arabs' (with

Du Pre Thornton, 1907); 'Introduction and Notes to Fitzgerald's Omar Khayyam' (1909); 'The Don and the Dervish' (1911); 'The Mystics of Islam' (1914); three Arabic reading-books, etc.

NICHOLSON, Thomas, American bishop and educator: b. Woodburn, Ontario, 27 Jan. 1862. He was graduated from the Toronto Normal School in 1883 and entered the Methodist Episcopal ministry in 1884, after having taught in various schools. After holding charges in Michigan he became professor of philosophy and biblical literature and also principal of the academy at Cornell College, Iowa. From 1903 to 1908 he was professor of philosophy in Dakota Wesleyan University, of which he was also president. In 1908 the General Conference elected him secretary of the board of education of the churches, and he took a leading part in the educational development of Iowa and South Dakota. In 1916 he was elected bishop of the Methodist Episcopal church. He has lectured in many States on the English Bible. Several universities have given him the degrees of D.D., LL.D., A.B. and A.M. In 1898 he was president of the South Dakota State Teachers' Association. Bishop Nicholson is the author of 'Epworth League Bible Studies' (1901-02); 'Epworth League Devotional Topic Book' (1902); 'The Necessity of the Christian College' (1904), and 'Studies in Christian Experience' (1907). Since 1908 he has been editor of *The Christian Student* (Chicago).

NICHOLSON, William, English scientist: b. London, England, 1753; d. London, 21 May 1815. After making two voyages as a midshipman in the East India service (1769-76) he entered an attorney's office, but soon was sent to Amsterdam as agent for the sale of Wedgwood pottery. In 1784 he was appointed secretary to the General Chamber of Manufacturers of Great Britain and he was also connected with the Society for the Encouragement of Naval Architecture, established in 1791. He spent much time upon the construction of various machines for comb-cutting, file-making, cylinder printing, etc., and he invented an aerometer. In 1800 he gave a course of public lectures in London on natural philosophy and chemistry and about this time he discovered a way to bring about the decomposition of water by the voltaic current. During the later part of his life he was chiefly interested in waterworks engineering in Portsmouth, Gosport and Southwark.

In 1797 he founded the *Journal of Natural Philosophy, Chemistry and the Arts*, generally known as *Nicholson's Journal*, the earliest journal of its kind in Great Britain. This was continued until 1814. Nicholson attracted attention to himself by the publication of 'An Introduction to Natural Philosophy' (London 1781). This was followed by a translation of Voltaire's 'Elements of the Newtonian Philosophy.' Besides many contributions to the *Philosophical Transactions*, he published 'First Principles of Chemistry' (1788); a 'Chemical Dictionary' (1795); edited the 'British Encyclopædia, or Dictionary of Arts and Sciences' (6 vols., London 1809), and translated Fourcroy's 'Chemistry' (1787) and Chaptal's 'Chemistry' (1788).

NICHOLSON, William, English painter and engraver; b. Newark-on-Trent, 1872. He began his artistic education under Her-Romer in London and completed it under Bougereau and Constant in Paris. He collaborated with James Prydein the designing of posters, the brilliant originality of which at once attracted attention and established his reputation as a great wood engraver. Among his productions some of the more notable are 'An Alphabet' (1898); 'An Almanac of Twelve Sports' (1898); 'London Types'; 'Characters of Romance' (1900). His portrait woodcuts have met with wide acceptance, especially his 'Whistler,' 'Kipling,' 'Bernhardt,' 'Queen Victoria.' His portraits in oil include 'The Landlord,' a remarkably telling and vivid piece of work; 'The Little Baron'; 'Master Francis and Christopher Bacon'; 'Nancy with the Mug'; 'Nancy with the Feather Hat,' and those of his mother and W. E. Henley. 'Carlina,' an exquisite study in the nude; 'The First Communion Day,' and the 'Place du Petit Enfer' are examples of his work in other fields. His work is marked by originality, excellent draughtmanship, exquisite coloring and a genuine instinct for style. He was awarded a gold medal at the Paris exhibition of 1900.

NICHOLSON, William Gustavus, FIELD-MARSHAL LORD, British soldier; b. Leeds, 2 March 1845; d. London, 13 Sept. 1918. He passed through Woolwich in 1863 and obtained his first commission in the Royal Engineers. From 1868 to 1871 he served in the West Indies; in the latter year he was sent to India, where he spent about 30 years, being engaged most of the time on government engineering works. After serving in the Afghan War he became secretary of the defense committee at Simla, and later went through the Egyptian campaign in 1882. In 1890 he was made military secretary to Lord Roberts, then commander-in-chief in India. Between intervals of frontier fighting Nicholson constructed fortifications, roads and railways. When Lord Roberts took over the chief command in the South African War he called Kitchener from the Sudan and Nicholson from India to assist him. The latter returned to India at the end of 1900 with the rank of major-general. Early in 1901 he was appointed director-general of mobilization and military intelligence at the War Office, London, where he carried into effect a general reorganization in the face of powerful opposition. He served a year as chief military attaché to the Japanese army in Manchuria 1904-05, and in the latter year was offered a Mediterranean command, which he refused. In 1908 he was promoted chief of the general staff, in which post he was succeeded by General French in 1912. He continued to be a member of the Committee of Imperial Defense and during the war served as a commissioner to inquire into the conduct of the Gallipoli and Mesopotamian campaigns. Nicholson's brilliant career was remarkable in that he never commanded even a small unit in peace or war, yet he rose to field-marshal; he never graduated from the Staff College and yet became chief of the Imperial General Staff. Without political, family or other influence he became a peer of the realm and occupied a position of recognized authority among statesmen and soldiers.

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NICHOLSONITE, a variety of the mineral aragonite, containing from 1 to 10 per cent of zinc. Occurs at Leadville, Colo.

NICIAS, nish'i-as, Greek painter of the 4th century B.C. He was renowned for the loveliness of his woman figures in encaustic. He was a contemporary to Apelles, the painter of Alexander the Great, and Praxiteles the sculptor, whom he assisted in coloring his statues. He is said to have invented encaustic painting.

NICIAS, Athenian general in the Peloponnesian War (q.v.): d. Sicily, 414 B.C. He inherited great wealth (including over 1,000 slaves) from his father, Niceratus, and, entering politics after Pericles' death, became leader of the aristocratic party and the enemy of all demagogues, notably Cleon. He won popular favor, however, by his piety and the lavish use of his wealth. His natural caution and timidity was a proverb among the comic poets of the day, and he seems to have been the prey of blackmailers. In 425 he led the troops that hemmed the Spartans in at Sphacteria; in the next year captured Cythera; in 423 was in command in Thrace; and, after Cleon's death, brought about the famous Peace of Nicias (421), which ended the first period of the Peloponnesian War. Cleon's place as a leader of the war party was to a certain degree taken by Alcibiades, who won consent to his plan for the Sicilian expedition by astutely suggesting that Nicias, the opponent of the project, the tried general and the well-known conservative, should be one of the commanders of the expedition. The recall of Alcibiades soon after the expedition started left matters largely in Nicias' hands. After the death of his colleague Lamachus (415) this was less true, since the new general Demosthenes boldly urged open attack on Syracuse. Nicias saw that this would be fatal, and, it is said, that, influenced by superstitious fear of an eclipse of the moon, refused to act at all for a month. He was terribly defeated and weakly surrendered; and in spite of the promises of his enemies was put to death. He had been mortally sick throughout this trying campaign. Consult Church, 'Nicias and the Sicilian Expedition' (1899).

NICK OF THE WOODS, a romance by Robert Montgomery Bird, M.D., published in 1837. It is a tale of Kentucky during the "dark and bloody" days, and was very popular about the middle of the 19th century. A play, founded upon this narrative, was received with boundless applause, held the stage (a certain grade of stage) for many years, and was a forerunner of the "dime novel" in stimulating a desire among boys to run away from home and go West to kill Indians.

NICKEL, a metallic element resembling iron in its appearance and general properties, discovered by Cronstedt in 1751 in kupfernickel (see NICCOLITE), a mineral which resembles copper ore, but from which copper cannot be extracted and whose name appears to signify "devil's copper." Metallic nickel occurs in the form of grains along the bed of the Fraser River, and it is also a common constituent of meteorites. The commercial supply, however, is obtained by the reduction of certain nickel-bearing minerals, of which niccolite and garnierite are important. The latter mineral is

especially valuable because it is free from cobalt, a metal with which nickel is almost always associated, and from which it can be separated only with much difficulty. Garnierite is a hydrated silicate of nickel and magnesium, of variable composition, which occurs in vast quantities in the vicinity of Noumea, New Caledonia; similar deposits also exist in Douglas County, Ore., and Jackson County, N. C., and also in the province of Malaga, Spain. The New Caledonia mines are worked by a French company, which ships the nickel to Europe both as matte and as ore. Nickel also occurs as a subordinate constituent of the mineral pyrrhotite (Fe_3S_4) replacing the iron up to 6 per cent. In the Sudbury district of Ontario, the largest producer of nickel in the world, the chief ore is pyrrhotite occurring as a magmatic segregation (q.v.) in a great gabbro (q.v.) (norite) sill (q.v.). Little nickel is produced in the United States.

Physically, nickel is a hard, ductile, malleable metal, white in color, but with a yellowish tinge, and susceptible of a fine polish. Its specific gravity varies from 8.36 to 9.26, according to the physical treatment to which the metal has been subjected; its specific heat is about 0.109 and its specific electrical resistance is about one-seventh of that of mercury. It melts at a high temperature,—probably at about 2,500° F. Next to iron and cobalt, nickel is the most magnetic substance known, the magnet attracting it very strongly, though less strongly than either of the other two metals mentioned. (For full data concerning the magnetic qualities of nickel, consult Ewing, 'Magnetic Induction in Iron and Other Metals'). Nickel is greatly used for electroplating, both for protection against rusting and on account of the lustrous polish that can easily be given to articles coated with it. It is also largely coming into favor for the manufacture of cooking utensils. When alloyed with other metals nickel is used for coinage and for other purposes past enumeration. With iron it forms alloys that are collectively known as "nickel-steel," certain of these being of the highest value for the manufacture of armor plate. The nickel-iron alloys are anomalous in many respects. It has been found, for example, that although nickel and iron are two of the most highly magnetic elements known, it is possible to form alloys of these two metals alone, which are practically non-magnetic. Iron-nickel alloys are also anomalous with respect to their coefficients of expansion, and one of them in particular (known as "invar") has a coefficient of expansion which is almost inappreciable, although iron and nickel, separately, have coefficients of considerable magnitude. Chemically nickel is a dyad. It has the chemical symbol Ni, and an atomic weight of 58.7 if $\text{O}=16$, or of 58.3 if $\text{H}=1$. Its most important oxides are the monoxid, NiO , and the sesquioxid, Ni_2O_3 . The metal itself does not oxidize in air at ordinary temperatures, but only when strongly heated in contact with air or with steam. The monoxid, NiO , may be prepared by the direct oxidation of the metal at a high temperature in an atmosphere of steam, or by precipitating a solution of a nickel salt with caustic potash, and then heating the green nickel hydrate, $\text{Ni}(\text{OH})_2$, which is thrown down. The monoxid is a green powder, which be-

comes yellow when heated, and from it the various nickel salts may be prepared. The sesquioxid, Ni_2O_3 , is a black substance, and is most conveniently prepared by adding a solution of bleaching powder to a soluble nickel salt. Nickel bromide, NiBr_2 , nickel chloride, NiCl_2 , and nickel sulphate, $\text{NiSO}_4 + 7\text{H}_2\text{O}$, are used in medicine to a limited extent. Sulphuretted hydrogen gas precipitates nickel from alkaline solutions in the form of a black sulphide, having the formula NiS . (See CHEMICAL ANALYSIS). Finely divided nickel absorbs dry carbon monoxid at 85° F., with the formation of a singular compound called "nickel carbon monoxid," having the formula $\text{Ni}(\text{CO})_4$. This substance is a volatile liquid which freezes at 13° F. below zero, and boils at 109° F. Its vapor explodes violently when heated to 140° F., and deposits pure nickel when mixed with an inert gas and passed through a heated tube. Advantage is taken of this strange compound for the preparation of metallic nickel for chemical purposes, when great purity is essential. See ORE DEPOSITS.

NICKEL, Refining of. See ELECTRO-CHEMICAL INDUSTRIES.

NICKEL GLANCE, a name given to two nickel ores (NiAsS , NiSbS), now fallen practically into disuse and formerly applied to Gersdorffite.

NICKEL-STEEL. Following the hint offered by iron and nickel alloys in meteorites, experiments in making nickel-iron and nickel-steel began 80 years ago when Faraday and Stodart alloyed nickel and iron (1822). Further experiments, to mention only a few names, were made by Wolf in Schweinfurt (1830), by Bessemer (1858) and by John Garugee of Connecticut (1883). The first systematic and practical tests of the value of nickel-steel were made by James Riley of Glasgow in 1888-89. The experiments of C. E. Guillaume of the International Bureau of Standards reported in 1899 showed that in addition to its previously known characteristics, the most notable of which were resistance to corrosion much greater than that of carbon steel and the remarkable combination of high resistance to stresses and shocks, retaining its fibrous structure where carbon steel crumbles, with great malleability and ease of working. For forgings, however, it has been found necessary to have manganese present in the proportion of from 0.3 to 0.7 per cent. Nickel-steel, if containing more than 36 per cent of nickel, has the lowest coefficient of expansion known, remaining almost invariable in dimensions under the ordinary atmospheric changes of temperature. A combination of this steel with about one-half of one per cent each of manganese, silicon and chromium constitutes the alloy Invar (q.v.) an invaluable material for instruments of precision. Much more widespread, of course, is the use of nickel-steel and nickel-chrome steel for armor plate adopted because of its unequalled hardness and toughness and because its loss of strength from punching is only 15 to 20 per cent of the original strength, whereas carbon-steel loses about 33 per cent when punched. A more important use, though apparently limited by the expense of nickel-steel, is for rails; a test made by the Pennsylvania Railroad on the Horseshoe Curve resulted so favorably that the rails on much traveled

curves are nearly all of nickel-steel even where the straight away tracks are of carbon-steel. For ordinary uses only a very small percentage of nickel is required, the range being from 1.5 to 4 per cent. Nickel-steels may now be had in the market with from 1.5 to 95 per cent of nickel. It is in use for gun tubes and other ordnance parts, pneumatic hammers, drills, blades of turbines, gas engine valves, aero-engine parts, axles, shafts and gears and all parts of machines which have to sustain severe strains and shocks. A chrome-nickel steel carrying 0.45 per cent carbon; 0.51 per cent manganese; 1.19 per cent nickel, and 0.98 per cent chromium, shows a tensile strength of 224,250 pounds per square inch. It is much used in aeroplane construction. The mechanical properties of nickel steels, however, are not wholly dependent upon their content of nickel, but they are modified to a considerable degree by the percentages of carbon and manganese in the alloy. The increase of carbon in 30 per cent nickel-steel from 0.12 per cent up to 0.80 per cent exhibited an increase of tensile strength from 64,000 pounds to 114,000 pounds per square inch; the elastic limit at the same time being increased from 41,000 to 68,000 pounds per square inch. The elongation was increased from 29.5 per cent to 32.5 per cent and the reduction of area from 63.9 per cent to 50 per cent. The addition of very small percentages of chromium to nickel-steels increases very considerably their resistance to wear.

Platinite.—The nickel-steel containing 46 per cent of nickel and about 0.15 per cent of carbon has been given the name "platinite," because, having almost exactly the same expansibility under heat as the glass used in making incandescent electric light bulbs, it may, therefore, be used successfully as a substitute for platinum for the sealed-in wires. It is also of great value in making mountings for telescope, microscope and other optical lenses.

The alloys with larger proportions of nickel (above 36 per cent) not only have a surprisingly low coefficient of expansion, but differ from the alloys with less nickel in respect to magnetism; alloys with less than 25 per cent of nickel can be made non-magnetic or magnetic to any desired degree; between 25 and 35 per cent the alloys are practically non-magnetizable at ordinary temperatures, but on being cooled to 32° exhibit magnetic qualities, and after being cooled to 60° below zero, become highly magnetizable, a property not lost until it has again been heated to 1080°. Consult United States Standards Bureau Circular 58, 'Invar and Related Nickel-Steels' (Washington 1916).

NICKER, in *Teutonic mythology*, water-fairies which dwell in rivers and lakes as well as in the sea. Mention is made of them in the poem of 'Beowulf.' The word seems originally to have been used as an indefinite name for any water-monster. Traces of it may be found in 'Old Nick,' nix, and nixy (borrowed from German *Nixe*).

NICKNAMES, **National and Popular.** The little name called nickname is a familiar substitute for the proper name of a person or place, given either in ridicule or affection. In the English language "neke name" or "eke name," appears as early as 1440. Possibly the

name came from nick, to cut; for the nickname is primarily a cutting of the full name, such as Ned for Edward, Bess for Elizabeth, Nick for Nicholas, etc. Nicknames sometimes develop into graphic individualities and create a national type or figure, which the pencils of artists and caricaturists elaborate until Uncle Sam, or John Bull, or the poilu, or the Yank, or the doughboy come to represent the character and feeling of an entire nation or an entire class.

UNCLE SAM.—First on the list comes the famous "Uncle Sam." The story of the origin is as follows: In the year 1812 a Mr. Samuel Wilson, invariably called Uncle Sam by kindred and friends, was an inspector appointed by the government to receive large supplies for the army contracted for in New York and to be delivered at Troy on the Hudson. The casks and chests were all marked with the initials of the contractor Elbert Anderson (E. A.), above and beneath those of the country United States (U. S.). A facetious workman, being asked the meaning of the latter, replied in jest "he did not know unless they meant Elbert Anderson and Uncle Sam. The jest took, was repeated by other workmen and by them carried into the army. The initials on the commissary's barrels and boxes were carried throughout the country and the explanation soon gained wide renown. "Uncle Sam" became the representative of the United States government and the national figure.

BROTHER JONATHAN.—Older than Uncle Sam is Brother Jonathan, the popular representative of the people of the United States. The original was Jonathan Trumbull (q.v.), governor of Connecticut, noted for his common sense and integrity. He was a native of Lebanon, Conn., a graduate of Harvard and a member of the Connecticut assembly. He did everything in his power to secure the independence of the colonies and was implicitly trusted and consulted by Washington in emergencies. When Washington was in need of ammunition and the officers whom he called into consultation could offer no suggestions, Washington said, "We must refer the matter to Brother Jonathan," alluding to Trumbull, who from that day was known as Brother Jonathan. In due time the name was applied to the whole nation. Trumbull looked like the familiar symbolic caricature. He was tall, gaunt, sharp-featured and for full dress wore a swallow-tailed homespun coat made in his own household from wool of his own sheep and colored with maple-bark procured from his own trees. His tight trousers, six inches above his ankles, were of striped linsey-woolsey, spun and made by his own family.

JOHN BULL.—John Bull was used in a satire of Dr. John Arbuthnot called "Law is a Bottomless Pit," exemplified in the case of Lord Strutt, John Bull, Nicholas Frog and Lewis Baboon (Louis XIV), who spent all they had in a lawsuit. This was a series of five pamphlets advocating the conclusion of peace after the Wars of the Spanish Succession in the days of Queen Anne. The five tracts are printed in two parts as the History of John Bull in 'Miscellanies in Prose and Verse' (1727) with preface by Pope and Swift, intimate friends of Dr. Arbuthnot. Arbuthnot fixed the popular

conception of John Bull, although it is not certain that he originated the character. The lively satire is still amusing reading. Arbuthnot says: "Bull in the main was an honest, plain-dealing fellow, choleric, bold and of a very inconstant temper. Mrs. Bull was Queen Anne, John Bull's mother was the Church of England and John Bull's "Sister Peg," the Scotch, was a poor girl who had been reared on oatmeal and water and lodged in a garret exposed to the north wind. This had given her a hearty constitution. Peg would faint at the sound of an organ yet would dance and frisk at the noise of a bagpipe. "Peg was in love with John Calvin."

JACQUES BONHOMME.— Jacques Bonhomme is a name given to the French. It originated in mediæval times and was applied to the poor peasant, who, with extraordinary patience, first paid for the costly banners and suits of armor that were captured from the noblemen at Crécy and Poitiers and then paid their lord's ransom and after that again helped with their hard won earnings to swell his revenues. So tractable and meek were they that a nobleman who had wasted all his substance used to comfort his creditors with the observation that "Jacques Bonhomme" would pay all of his debts. But when the peasants awoke and rose in madness against their oppressors "Jacques Bonhomme," the good-natured peasant, went out of fashion for a time.

JEAN CRAPAUD ("toad") dates from the time the French kings had three toads in their coat-of-arms. Paris was called Lutetia the muddy, and the inhabitants were called Frogs. The Frenchman is often referred to as "Johnny Crapaud."

Nicknames of Various Nationalities.— **BLACKAMOR**, a negro in contra-distinction to a tawny Moor; **BLUE CAPS**, or **BLUE BONNETS**, name for Scotchmen; **BLUE NOSE**, name for Nova Scotians; **BOG TROTTER**, name for an Irishman; **BONNET ROUGE**, a French Red Republican, in allusion to the red cap of Liberty; **CABBAGE EATER** (*Kapustak*), a Russian; **CARLO**, an Italian; **CANUCK**, a Canadian; **CHUKHUA**, Russian name for a Finn; **COCKNEY**, a London citizen born within the sound of Bow Bells; **CHOW**, a Chinaman; **COON**, a negro; **COLIN TAMPON**, a Swiss; **CROATIC**, an Italian name for an Austrian; **COUSIN MICHAEL**, a German; **CUFFEY**, a negro (also written **CUDDY**), meaning a beast of burden (*FRIDAY*, child in *Ashantee*); **DAGO**, from Saint Jago or San Diego, an Italian laborer; **FROG-EATER**, a Frenchman, in allusion to his fondness for frogs; **GREASER**, name applied to a Mexican by the people of the United States on account of his greasy appearance; **INFIDEL**, a Turk; **HANS WORST** (*Jack Sausage*), a German; **IVAN IVANOVITCH**, a Russian, the embodiment of the Russian people; **JACK PUDDING**, an English clownish fellow; **JACQUES**, a poor French artisan; **JEAN DE LA SUIE**, a Savoyard; **JEAN POTAGE**, a Frenchman; **JEAN BAPTISTE**, a Canadian; **JOHN CHINAMAN**, a Chinaman; **JOHNNY ROW**, an English rustic, or country bumpkin; **MACARONI**, an Italian; **MOSKEL**, a native of Southern Russia; **MYNHEER CLOSH** (or **CLAUS**), a Dutchman; **MOSOO**, a Frenchman; **NIC FROG**, a Dutchman; **PADDY**, for Patrick, an Irishman; **PANTALONE**, name in Italy for taxpayers; **PIOU-PIOU**, French soldier, "worm

crusher"; **POT DE BIERE**, French name for an English soldier; **PICKLEHERRING**, a Dutchman, in allusion to his love for soused herring; **POLACK**, a Pole; **REDSKANKS**, a Scotch Highlander; **RED HEADS**, or **RED TURBANS**, Mohammedans; **ROBERT MACAIRE**, a Frenchman; **ROINECK** (*Wry neck*), a Britisher (*Dutch South Africa*); **SAMBO**, a negro; **SAMMY**, a Scotchman; **SAWNEY**, from Sandy, a Scotchman; **SURLEY BOY** (from *Sorley buie*, yellow hair), an Irishman; **TAFFY**, a corruption of David, a Welshman; **UNSPEAKABLE TURK**; **UNBLEACHED AMERICAN**, negro; **DIXIE**, a popular term for the Southern States, was probably derived from the geographical line drawn by Mason and Dixon which formerly separated the Northern from the Southern States. "Dixie land," made popular by a negro minstrel song, passed into current use as the name of the happy, abundant South. **YANKEE**; the best authorities agree that the word is derived from the imperfect effort made by the Northern Indians to pronounce the word English. "Yengees" was the nearest they could get to English. The contemporary Southerners were called by the Indians "Long knives," on account of their swords. "Yankeedom" is the nickname for New England. "Yankee Doodle" was the name given to a song, "The Yankee's Return from Camp," describing the raw recruits of 1775.

American Civil War Nicknames.— The Southerners were **SECESH**, or more good-naturedly, **JOHNNY REB** (rebels). Johnny was probably taken from Johnny cakes. The Northerners were **YANKS**, or **BOYS IN BLUE**, or **BLUE-BELLIES**. The North had also **DOUGHFACES**, Northern abettors of slavery, deriving their names from the kneadable character of dough. John Randolph of Roanoke branded the 18 Northern congressmen who helped to displace Mason and Dixon's Line as "doughfaces." **COPPERHEADS** was applied to the Northern faction in secret sympathy with the Southern "rebels." These retorted upon the Union men by calling them **NIGGERHEADS**. **BUTTERNUTS** was applied to sympathizers of the rebels, so-called from the uniforms worn in the early part of the war by the Confederate soldiers, which, being homespun, were dyed with the juice of the butternut. Radical Republicans were nicknamed **RADS**. Officials who were not expected to expose themselves to the enemy were called **BOMBPROOFS**; a **BUMMER** was a man of erratic behavior, and originally the bummer was called a **BUFFALO**, a name peculiar at first to North Carolina and then spreading throughout the South. The **JAYHAWKERS** combined murder with marauding, and were famous during the bloody strife carried on in Kansas before the Civil War in "Bleeding Kansas." The **MOSSYBACK** was a man of the South who hid in swamps to escape conscription. The **MUSICAL BOX OF THE CONFEDERATES**, also **JEFF DAVIS' BOX**, was the humorous name given to the ill-built, creaking army wagons. The **WOODEN HORSE**, which at one time was thought in the North to be an infernal machine to be sent into Boston or New York harbor, was a secret society organized for political purposes. Military imprisonment of suspected sympathizers with the South was known as the **BASTILLE**, consented to by the Hickory Unionists of the

border States. KU-KLUX-KLAN, a secret association of Southerners formed shortly after the Civil War to preserve order during a period when lawlessness was rife in the South. The name was an alliterative corruption of the Greek word meaning circle and Klan was added. "The Ku-Klux-Klan," says the *Memphis Appeal* (1871), was a secret political organization which, by their ghostly apparel in which they traversed the country, was intended to appeal to negro superstition and prevent devastations at night. But radicalism raised such a howl and thieves assuming the Ku-Klux garb, the organization was finally abandoned." This organization was also called the WHITE LEAGUE. See also KU-KLUX-KLAN.

World War Nicknames.—When the American soldiers found themselves in France and taking part in the great struggle, they discarded the numerical names of their divisions and substituted nicknames that applied descriptively to each particular group of fighters. General Pershing's history of American troops in France, from the time they arrived in 1917 up to the time the armistice was signed, showed that there were 40 divisions of "Doughboys" across the Atlantic. Nearly all of these gave themselves nicknames: the 26th Division, composed of National Guardsmen from the New England States, was known as the "New England Division"; the 27th Division was the "New York Division"; the 28th Division was the "Pennsylvania Division"; the 29th Division, composed of men from New Jersey, Delaware, Maryland, Virginia and the District of Columbia, was the "Blue and Gray Division," reminiscent of the Civil War; the 31st Division, composed of men from Georgia, Alabama and Florida, was the "Dixie Division"; the 33d Division was the "Illinois Division"; the 37th Division, from Ohio, was called the "Buckeye Division"; the 77th, from Camp Upton, near New York, the "Metropolitan Division"; the 84th, from Illinois, Kentucky and Indiana, the "Lincoln Division," and the 36th, the "Panther Division" from the fighting panther on their insignia and the Latin motto meaning "We'll do it in spite of hell." The men came from Texas and Oklahoma. The 85th, from Camp Custer, of Wisconsin, Michigan, Kentucky, Indiana and Illinois, was called the "Custer Division." The 78th Division, composed of men from New York, New Jersey and Pennsylvania, was called the "Lightning Division." The 80th, made up of men from the mountains of Virginia, was called the "Blue Ridge Division." The 41st, its members coming from Oregon, Washington, Idaho, Montana, Wyoming and North Dakota, was known as the "Sunset Division." The 42d had gained an enviable reputation as the "Rainbow Division" long before it sailed for the battlefields of France. This famous division was composed of the National Guard of New York, Louisiana, Pennsylvania, Wisconsin, Ohio, Georgia, Alabama, Iowa, Illinois, Indiana, Minnesota, Maryland, South Carolina, Colorado, Missouri, Virginia, North Carolina, Texas, New Jersey, Tennessee, Oklahoma, Michigan, District of Columbia, California, Nebraska and Oregon. The 91st Division, which, together with the 37th, was sent to help the French army in Belgium, composed of men from Oregon, Wash-

ington, Colorado, Nevada, Utah, Idaho, Montana and Wyoming, was the "Wild West Division." The 80th Division was known as "Lee's Division," named for Gen. Robert E. Lee, and composed of men of the Southern States.

Among the many nicknames of the war one of the most popular is that of DOUGHBOY. Doughboy was primarily a dough-cake baked for sailors; then it was applied to a brass button of similar shape worn by the infantry, and lastly to a foot soldier. The name occurs in Ringrove, 'Bucaniers of America' (1685); Damfier's 'Voyages' (1697), and in several of Mrs. Custer's books. The latter says in 'Tenting on the Plains': "Early in the Civil War the term was applied to the large globular brass buttons of the infantry uniform, from which it passed by natural transition to the infantrymen alone"; and also, "She was so accustomed to fast riding with our cavalry she does not know how to treat a doughboy." A doughboy is also a small round doughnut served to sailors on shipboard.

State and City Nicknames.—The American love for nicknames also is shown by the familiar titles given to States and cities. Arkansas is the "Bear State," a name given when bears abounded. California is the "Grizzly Bear State." Connecticut is the "Blue Law State," from the unenviable fame acquired by the first regulations of the government of the New Haven colony known as the Blue Laws; the "Freestone State," from the quarries of freestone; and the "Nutmeg State" from the alleged manufacture of wooden nutmegs. Delaware is the "Blue Hen State," from the notoriety that one of her sons, Captain Caldwell, acquired in the Revolutionary War for his love of cock-fighting, and also his well-drilled men known in the army as the "game cocks." His idea that a blue hen produced the best cocks gave rise to the appellation. Florida is the "Gulf State." Georgia is the "Cracker State," from the Crackers,—the most ignorant and lowest of its inhabitants. Illinois is the "Prairie State" and also the "Sucker State," from the numerous holes in the prairies made by the crawfish, into which the thirsty native traveler inserted a reed to draw forth refreshing water. Indiana is the "Hoosier State," said to have been derived from the call "Who's here?" Iowa is named the "Hawkeye State," from a great Indian chief, the terror of the early settlers; Kansas is the "Garden State," also called the "Squatter State," from the early settlers. Kentucky is the "Corn-Cracker State," and also "Bear State." Louisiana is the "Pelican State," from the bird that frequents the marshes, and "Creole," from its original French and Spanish colonists. Massachusetts, known first as the Colony of Massachusetts Bay, is the "Bay State." Maine is the "Pine Tree State." Maryland is the "Old Line State," from the Old Line regiments which he contributed to the Continental army in the War of the Revolution. Michigan is the "Wolverine State," from the little wolves abounding there; also the "Lake State." Minnesota is the "New England of the West." Mississippi is the "Mudcat State," from the numbers of cat-fish. Missouri is the "Bullion State," in allusion to Col. Thomas H. Benton who, being an advocate of gold and silver currency in Congress, was called "Old Bullion." New Hampshire is the

"Granite State," from its granite rocks. New York is the "Empire State," as surpassing all other States in wealth and population; also the "Excelsior State," from the motto on its coat-of-arms. North Carolina is the "Turpentine State." Ohio is the "Buckeye State," from the chestnut which grows there, whose fruit has a spot like a deer's eye. Pennsylvania is the "Keystone State," the central State when the Union was formed. Rhode Island is "Little Rhody," because of its size. South Carolina is the "Palmetto State." Texas is the "Lone Star State," because of the one star in her original coat-of-arms. Vermont is the "Green Mountain State." Virginia is called the "Old Dominion," a name earned in times of peril by her loyalty to Charles II. Wisconsin is called the "Badger State," on account of its many badgers.

Baltimore, Md., is called "Monumental City," having had monuments in her squares before other towns in the United States and boasting of the large and handsome Washington Monument. Boston has several nicknames. One is the "Athens of America," which caused the witty John Randolph of Roanoke to remark, "Boston may be the Athens of America, but it has never been my good fortune to meet with any of the Athenians." Oliver Wendell Holmes dubbed Boston "The Hub of the Universe," and Boston has also been called the "City of Notions" because of the mental attitude of its citizens, and the "Tri-mountain City," because it is built on three hills. This, the oldest appellation, survives in Tremont Street and Tremont Hotel. Brooklyn is the "City of Churches"; Buffalo is the "Queen City of the Lakes"; Chicago is the "Garden City"; Cincinnati is the "Queen City"; Cleveland the "Forest City"; Detroit the "City of the Straits"; Duluth the "Zenith City of the Unsalted Seas"; Galena the "Crescent City of the Northwest"; Hannibal the "Bluff City"; Hartford the "Charter Oak City" from the large oak tree, no longer in existence, in the cavity of which the charter of the colony of Connecticut was concealed by the legislature when James II, in 1686, sent Sir Edmund Andros across the seas to take possession of the charters granted to the colonies; Indianapolis is the "Railroad City"; Keokuk the "Gate City," on account of its situation at the foot of the Lower Rapids of the Mississippi River which opens here to navigation; Louisville, Ky., is called "Falls City," because it is at the head of the Louisville Falls of the Ohio River; Lowell, Mass., the "Spindle City," on account of its cotton factories; Montpelier, Vt., the "Green Mountain City"; Nashville, Tenn., the "City of Rocks"; New Haven, the "Elm City"; New Orleans, the "Crescent City," because the Mississippi makes a bend here; New York, the "Empire City," also "Gotham," derisively applied by Washington Irving in his 'Salmagundi'; Philadelphia, the "City of Brotherly Love" and the "Quaker City"; Portland, Me., the "Forest City"; Pittsburgh, the "Iron City"; Rochester, the "Flower City" and "Flour City," in allusion to its nursery trade and flour-mills; Savannah, the "Garden City"; Springfield, Ill., "Flower City"; Saint Louis, the "Mound City," from being built on the burial places of In-

dians; San Francisco, the "Golden City," also "Frisco"; Washington, D. C., the "City of Magnificent Distances" and the "Federal City."

NICOBAR (nik-ō-bār') **ISLANDS**, a group of 19 islands in the Bay of Bengal, 12 inhabited (total area 635 square miles), with the Andamans (q.v.), 75 miles to the north and forming together a province of British India. The Nicobars consist of two groups—a southern group, composed of the islands Great and Little Nicobar and several smaller islets, and a northern group, separated from the southern by Sombro Channel, about 36 miles broad. The largest island is Great Nicobar, 30 miles long by 12 miles broad, and the next Kamorta, which is the largest of the northern group. The highest mountain, Thuillier (2,105 feet) is on Great Nicobar. They yield cocoanuts, plantains, teak, sassafras, lemons, limes, oranges and pineapples. The thick forests and heavy dews render the climate unhealthful for foreigners. The rainfall varies from 165 inches in moist to 93 in dry years. The cocoanut palm yields the chief food of the natives and is almost the only tree cared for by them, about 15,000,000 being exported annually. Water is obtained by digging. The people belong to two races, an inland tribe, little civilized, who show Mongolian affinities and are regarded as indigenous, and the coast people who are of mixed Malay blood, but idle and lazy. They collect and export trepang and edible birds' nests. The archipelago known from the time of Ptolemy was the scene of Jesuit missionary activity from at least early in the 17th century and of Moravian after 1768, was occupied by Denmark, 1756–1856. In 1869 it was annexed by Great Britain, to put a stop to the piracy of the people. A penal colony which existed at Nancowry on the island Kamorta, was withdrawn in 1888. Pop. 8,818.

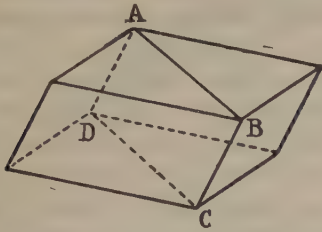
NICOBAR PIGEON. See PIGEON.

NICODEMUS, nik-ō-dē'mūs, ruler of the Jews, that is, a member of the Sanhedrin, who belonged to the sect of the Pharisees, and is only mentioned in the Fourth Gospel. He came to see Jesus secretly by night (John iii) and eventually after the Resurrection is traditionally said to have become one of his disciples. He protested against the injustice with which Jesus was treated by the council (John vii, 50) and after the crucifixion joined with Joseph of Arimathea in giving fitting sepulture to his body (John xix, 39). Some commentators have fancifully identified Nicodemus with the rich young man (Mark x, 17–24), but there is no solid ground for the conjecture.

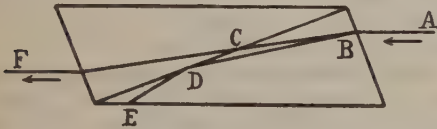
NICOL, nik'ol, **Ersine**, Scottish artist: b. Leith, 3 July 1825; d. 8 March 1904. He was educated in art at the Trustees' Academy, Edinburgh, under Sir William Allan. He resided some time in Dublin, where he painted portraits and subjects of humorous genre. In 1850 he settled in Edinburgh and in 1862 in London; but for 25 years a portion of the year was spent in Ireland, where he gathered material for and painted his numerous clever pictures of Irish peasant life, among which may be mentioned 'Donnybrook Fair' (1859); 'Paddy's Mark' (Corcoran Gallery, Washington); 'Paying the Rent' (Vanderbilt Collection, New York); 'The Day After the Fair'

(Scottish National Gallery); 'Beggar My Neighbour' (Glasgow Corporation Gallery). He was elected a member of the Royal Scottish Academy in 1859.

NICOL PRISM, a piece of apparatus invented in 1828, by William Nicol, for the production of a beam of plane-polarized light. Its



operation is based upon the fact that when a beam of ordinary light enters a crystal of Iceland spar (crystallized calcite) from certain directions, it is decomposed into two beams, each of which is plane-polarized. One of these beams is called the "ordinary ray" and the other the "extraordinary ray"; and as the mineral exerts a different refractive power upon the two, they are divergent within the crystal. Nicol conceived the idea of introducing a surface of discontinuity within the crystal, disposed at such an obliquity that one of these rays would be totally reflected, while the other would be transmitted, and allowed to emerge from the crystal in a direction parallel to that in which the incident beam entered it. His prism is made by cutting a rhomb of Iceland spar as indicated by the plane ABCD, in Fig. 1, which passes through the obtuse angles of the crystal. The surfaces being then polished, the parts are cemented together again with Canada balsam, as shown in Fig. 2. The ends are



ground so as to make an angle of about 68 degrees with the length of the rhomb, and a ray of ordinary light, upon entering the crystal as indicated at AB, in Fig. 2, is separated into two rays. Both are refracted, but the "ordinary ray," BD, is refracted more than the "extraordinary" one, BC; and BD strikes the plane of section of the crystal at such an obliquity that it is totally reflected to E, while BC, striking it at a less obliquity, passes through and emerges from the crystal at F. The sides of the rhomb are usually blackened, so that the ordinary ray is absorbed at E, and destroyed. The Nicol prism is exceedingly valuable, as it gives a beam of light that is completely polarized and entirely without color, when the incident light is white.

NICOLA, nik'ō-lā, Lewis, American soldier: b. Dublin, Ireland, 1717; d. Alexandria, Va., 9 Aug. 1807. He entered the English army in 1740, rose to the rank of major, but resigned and emigrated to America, where he settled in Philadelphia. During the American Revolution his military experience was of great assistance to the colonies and in 1783 he became brigadier-

general. It was he who wrote to Washington what is known as the 'Nicola Letter,' in which it is suggested that the latter should be made king. He wrote 'A Treatise of Military Exercise' (1776).

NICOLAI, nē'kō-lī, Christoph Friedrich, German publisher and author: b. Berlin, 18 March 1733; d. there, 8 Jan. 1811. From his father he inherited in 1752 the business of the Nicolai Publishing Company, which he made one of the foremost in Berlin. In his youth he was a friend of Lessing and of Moses Mendelssohn, with whom he founded the *Bibliothek der schönen Wissenschaften* (1757), a critical review, and another literary journal, the *Briefe die neueste Litteratur betreffend* (1761). But little by little he broke with the leaders of German thought and began to attack in a narrow and futile spirit both the critical school and the romantic movement, the significance of which he was quite incapable of appreciating. Goethe and Schiller replied in 'Xenien' to his parodies of 'Werther' (1775), etc. Nicolai wrote a novel with a rationalistic purpose, 'Sebaldu Notherker' (1773), and merits praise for his excellent 'Description of a Trip through Germany and Switzerland' (1789), and for the historical value of his 'Anecdotes of Frederick II' (1788-92). Consult the autobiography, edited by Löwe (1806), and the 'Life' by Göckingk (1820).

NICOLAI, Otto, German composer: b. Königsberg, Prussia, 9 June 1810; d. Berlin, 11 May 1849. He received his musical education from B. Klein of Berlin and his first work produced in public was a 'Te Deum' performed at the Singakademie in 1833. In 1833 the Chevalier Bunsen obtained for him the post of organist at the chapel of the Prussian embassy in Rome, where he made careful study of Italian church-music. He was conductor of a theatre at Vienna 1837-39 and kapellmeister of the Court opera 1841-47 and subsequently of the Berlin opera. He founded the philharmonic concerts at Vienna for the purpose of securing worthy renderings of the Beethoven symphonies. His best-known work is his 'Die lustigen Weiber von Windsor' (libretto by S. Mosenthal), first presented at Berlin 9 March 1849, which won and maintained great success by its humorous characterization, invention and technical skill. Consult Mendel, 'Life' (1866), which contains a list of all Nicolai's works, printed and in manuscript, and Kruse's 'Otto Nicolai and his Life as an Artist' (Berlin 1912).

NICOLAIEF, nē-kō-lī'ēf. See NIKOLAIEFF.

NICOLAITANS, nik-ō-lā'i-tanz, a sect mentioned in Rev. ii, 6, 15, as given over to idolatrous practices and impurity of life. They thus contravened the decree of the Council of Jerusalem, Acts xv, 20-29, and were accordingly accounted heretics. But the reference in the Revelation may be purely allegorical, in keeping with the symbolical allusiveness of the book. There is no ground for supposing that such a sect was founded by Nicolas, the proselyte of Antioch, who was one of the seven deacons. This name was given to a Gnostic sect of the 3d century, and it has been applied variously in an abusive and party spirit in later times. Consult 'Encyclopedia of Religion and Ethics.'

NICOLARDOT, Louis, loo-ē nē-kō-lār-dō. French author: b. Dijon, France, 28 Nov. 1822; d. Paris, France, 21 Nov. 1888. His literary work is favorably known and among his more notable publications are 'Journal of Louis XVI' (1873); 'The Impeccable Theophile Gautier' (1883); 'La Fontaine and the Human Comedy' (1885), etc.

NICOLAS, nīk'ō-lās, **SIR Nicholas Harris**, English antiquarian: b. Dartmouth, 10 March 1799; d. near Boulogne, 3 Aug. 1848. He was of French Protestant descent; served eight years in the navy (1808-16); studied law, and became the leading genealogist of his day. Hood, for instance, says that Miss Kilmansegg's ancestry "Were enough, in truth, to puzzle Old Nick, not to mention Sir Harris Nicolas." Among his many works are 'Notitia Historica' (1824); 'History of Agincourt' (1827); 'Proceedings and Ordinances of the Privy Council of England, 1386-1542' (1834-37); 'Despatches and Letters of Lord Nelson' (1844-46), and 'History of Royal Navy' (down to Henry V, 1847). He was created K.C.M.G. in 1832.

NICOLAUS (nīk-ō-lā'ūs) **OF DAMASCUS**, Greek historian. He lived in the time of Herod the Great and was intimate with that monarch and with Augustus. He tutored the children of Antony and Cleopatra. Of his writings, a 'Universal History' in 144 books, and his biography of Augustus, fragments of great value, remain. Consult Müller, 'Fragmenta Historicum Græcorum' (Vol. III, pp. 343-464).

NICOLAY, nēk'ō-lā, **John George**, American author: b. Essingen, Bavaria, 26 Feb. 1832; d. Washington, D. C., 26 Sept. 1901. He came with his family to the United States in 1838 and settled in Illinois, where he was educated in the public schools. He entered the office of the *Free Press* in Pittsfield, Ill., when 16 and later became its proprietor and publisher, soon making himself a political power in the State. In 1856 he entered the office of the secretary of state at Springfield, Ill., where he became a devoted adherent of Lincoln. When the latter was elected to the Presidency Nicolay was appointed his private secretary and as the duties of the office increased John Hay (q.v.) was selected as assistant secretary. Together they formed the plan of writing a biography of President Lincoln and gained his approval of their project. In 1865 Nicolay was appointed by the President to be United States consul at Paris, where he remained until 1869 and in 1872-87 he was marshal of the Supreme Court. In 1874 he began in collaboration with John Hay 'Abraham Lincoln, a History,' the authoritative biography, published serially (1886-90) and in book form and supplemented by Lincoln's 'Complete Works,' in 12 volumes (1894). He also wrote 'The Outbreak of the Civil War' (1881). His daughter, **HELEN NICOLAY**, who has inherited her father's absorption in the life and achievement of the great President, is the author of 'Personal Traits of Abraham Lincoln' (1912).

NICOLE, François Léon Etienne, frānswā lā-ōn ā-tē-ēn nē-kōl, Haitian poet: b. near Grande Rivière, 1731; d. Cape Français, 1773.

Educated in a Jesuit college, he went to Paris in 1750, where Voltaire introduced him to the Encyclopedists and Louis XV granted him a pension in recognition of his talents. In 1769 he returned to Haiti, where he was in the governor's employ. He published 'The Romance of the Slave' (1766); 'Tropical Flowers' (1770), and 'New Poems' (1772).

NICOLE, Pierre, French moralist: b. Chartres, 19 Oct. 1625; d. Paris, 16 Nov. 1695. Graduated from the University of Paris in 1644, he took minor orders; he was a member of the Port Royal community, held a professorship in it, wrote many of its schoolbooks, was one of its controversialists with the Jesuits and shared in its vicissitudes, being forced to retire to Belgium, but returning in 1683. The Abbé Goujet, who wrote his 'Life' (1732), says that he aided in the preparation of some of Pascal's 'Provincial Letters' (1656), and translated the series into Latin (1658). His best work is in his 'Essais de Morale' (14 vols., 1671 et seq.), one of which 'On the Means of Preserving Peace,' was praised rather extravagantly by Voltaire.

NICOLÉ, in Molière's 'Bourgeois Gentilhomme,' a servant of the Monsieur Jordain, who understands and exposes her master's follies in an amusing way.

NICOLET, nee-coe-lay, Canada, a town in Nicolet County, Quebec, at the mouth of the Nicolet River on Lake Saint Peter, 82 miles northeast of Montreal, on the Intercolonial and the Quebec, Montreal and Southern railways. It is the seat of Nicolet County and an enterprising manufacturing town. Sash and door factories, brick yards, tanneries and foundries are situated here and also factories for aerated waters, machine-shop products and optical appliances. Nicolet has a Roman Catholic cathedral, college, seminary and two monasteries. It also possesses a commercial academy, county buildings and a hospital. Pop. 2,593.

NICOLINI, nē-kō-lē'nē, **Ernesto**, French singer, whose real name was Ernest Nicolas: b. Saint-Malo, 1834; d. Pau, January 1898. His splendid tenor was trained at the Conservatoire. He made his début in Paris in 1857, soon afterward devoted himself to Italian opera and Italianized his name, returned to Paris and then toured Europe. His last years were spent off the stage, because of ill-health. He married Adelina Patti in 1886 with whom he toured.

NICOLL, **SIR William Robertson**, Scottish clergyman and editor: b. Aberdeenshire, 10 Oct. 1851; d. 4 May 1923. He graduated at the University of Aberdeen in 1870 and was Free Church minister of Dufftown (1874-77) and Kelso (1877-85). He became editor of several periodicals, including the *British Weekly*, the *English Bookman*, the *Expositor* and (1900) the *British Monthly*. Among his publications are 'Calls to Christ' (1881); 'John Bunyan' (1884); 'Ten-Minute Sermons' (1895); 'The Key of the Grave'; Sunday Afternoon Verses' (1897); 'Letters on Life' (1901); 'The Church's One Foundation' (1901); 'Life of Maclaren' (1908); 'The Round of the Clock'; 'Emily Brontë'; 'The Expositor's Dictionary of Texts'; and 'Sunday Evening' (1910). He edited the 'Expositor's Greek Testament'

(1897-1900); was an authority on the Brontës and was responsible for a complete edition of Charlotte Brontë's works; was library adviser to the publishing house of Hodder and Stoughton and the most distinguished of Non-Conformist journalists. He was knighted in 1909.

NICOLLET, nê-kō-lā, **Jean Nicolas**, French explorer and geologist: b. Cluses, Savoy, 24 July 1786; d. Washington, D. C., 11 Sept. 1843. He came to the United States in 1832 to make a scientific investigation of the Southern and Western States, and was later engaged by the United States government to make an exploration of the far West. He published 'Mémoire sur le mesure d'un arc de parallèle moyen entre le Pole et l'Equator' (1826); 'Cours à l'usage de la marine' (1830); 'Cours de mathématiques'; and a 'Report on the Hydrographical Basin of the Upper Mississippi' (1841), with a map (1843), etc.

NICOLLS, nîk'ôlz, **Mathias**, English colonial jurist: b. Plymouth, England, about 1630; d. Long Island, N. Y., 22 Dec. 1687. He was appointed secretary of the commission and captain under Col. Richard Nicolls, who was sent to capture New Netherlands in 1664. He became the first secretary of the province and a member of the governor's council. He was the chief compiler of the first code of English laws in New York, known as the "Duke's Laws." Later he was presiding judge of the Court of Assizes; in 1672 he was elected third mayor of New York, became first judge of the Court of Common Pleas, and in 1683 was appointed a judge of the Supreme Court of the colony.

NICOLLS, **Richard**, English colonial governor: b. Amptill, Bedfordshire, England, 1624; d. at sea, 28 May 1672. During the Civil War in England he joined the king's army, was placed in command of a troop of horse, and when the Royalists were defeated fled to Holland, where he entered the service of the Duke of York, serving with him in the Continental Wars. On the accession of Charles II he was appointed gentleman of the bed-chamber to the Duke of York. In 1664 the king made him the chief of a commission appointed to settle the affairs of the New England colonies and to take New Netherlands from the Dutch, the claim to which was based on priority of discovery and was equivalent to a declaration of war. He sailed from England in June of the same year, and after stopping at Boston for a short time reached New Amsterdam on the 25th of August. The Dutch surrendered to him without resistance; he took formal possession of the city on 8 September, the Dutch officials shortly after taking the oath of allegiance to the English king. Nicolls changed the name of the province and the city of New Amsterdam to New York; and also gave Albany its present name. In 1665 he proclaimed the "Duke's Laws" which had been prepared under his direction; this was the first code of laws in New York, and combined features of the English law with the Roman-Dutch law formerly prevailing in the province. In the same year he gave an English form of city government to New York City. His administration was efficient, and especially moderate and con-

siderate toward the Dutch, and he was respected and trusted by English and Dutch alike. In 1666 he successfully settled some difficulties with the French and Indians; in 1667 resigned but did not leave the colony till the arrival of his successor, Lovelace. He returned to England in 1668, and taking part in the war between England and Holland, was killed in the naval battle against De Ruyter in 1672.

NICOMACHUS, nî-kôm'ā-kūs, surnamed **GERASENUS**, Neo-Pythagorean philosopher: b. Gerasa, Palestine, about 1st century A.D. He was one of the earliest writers on mathematics and music, and his name became a synonym for mathematical accuracy. "You number like Nicomachus of Gerasa" being a Philopatris proverb. He wrote a life of Pythagoras and several musical and mathematical works which became lost. Enough, however, remained of his work to greatly influence learning in the 15th and 16th centuries.

NICOMEDIA, nîk-ō-mē'dî-ā, Asia Minor, an ancient city of Bithynia, its site occupied by the modern Izmid or Izmikmid (pop. 30,000), at the northeast corner of the Gulf of Izmid—the ancient Astacenus,—an arm of the Propontis or Sea of Marmora. It was named after its founder, Nicomedes I (278-250 B.C.), and was a residence of the Bithynian kings, a city of great splendor, and in later times a favorite place of resort with the emperors Diocletian and Constantine the Great. Arrian the historian was a native, and Hannibal committed suicide here. Numerous interesting remains of the city are preserved.

NICOPOLIS ("City of Victory"), ancient Epirus, Greece, in the extreme southern part opposite the promontory of Actium. It was founded in the year 31 B.C. by the Emperor Augustus (Octavian) to commemorate the great naval victory won by him at Actium over Antony and Cleopatra. He named it the City of Victory and made a great city of it. He gathered a large population from the neighboring towns and instituted games—the great Actian games in honor of Apollo Actius—which drew crowds every fourth year. On the spot where Octavian's tent stood he erected a temple to Neptune adorned with the prows of the captured galleys. The city was peopled by colonists from the vicinity, and it soon became the head (Strabo III, xiii, 3; VII, vii, 6 and X, ii, 2). Pliny the Elder called it a "free city" (Book I, p. 274). Saint Paul invited Titus to join him there (Titus iii, 12), from which we may gather the fact that Christians were among the population. Origen was there for a time (Eusebius, Hist. Eccl. vi, 16). At the beginning of the 5th century, it was laid waste by the Goths and was restored by Justinian. In the 6th century it was still the capital of Epirus. About 732 it was incorporated into the patriarchate of Constantinople. In the Middle Ages, the site was built upon and the town of Prevesa arose. Three miles north of the present town are found the ruins of Nicopolis in a place called Old Prevesa on a small bay of the Gulf of Arta, where a narrow isthmus separates the gulf from the Ionian Sea. These ruins consist of the acropolis, two theatres (one with 27 rows of

seats) and an aqueduct which conveyed water from a source 27 miles from the town. Consult Dion Casio Li; Procopius, *Bel-Goth*, iv, 22; Wordsworth, 'Greece,' 229; Leake, 'Northern Greece,' i, 185; Bowen, 'Athos and Epirus'; Merivale, 'Rome,' iii, 327; Lewin, 'Life and Epistles of St. Paul' (4th ed.) iii, 353.

NICOPOLIS, a city in Cappadocia, or Armenia Minor, founded by Pompey on the spot where he defeated Mithradates. It was beautifully situated in a well watered plain, the valley of the Lycus, 100 miles northwest of Satala and 98 miles northeast of Sebastia. It was originally called Tephrike and was colonized by veterans of the army and the neighboring peasantry. As all the Roman highways of this part of the country radiated from this point, Nicopolis soon became a populous city (Strabo XII, iii). Nicopolis was annexed to the Roman Empire in the time of Nero (A.D. 64) and became the metropolis of Lesser Armenia. It had an altar of the Augusti, and temples to Victory and to Zeus Nicephorus. Christianity was introduced into Nicopolis at an early date and under Licinius (about 319) 45 of the citizens were martyred. About 472 a church was erected here to the Virgin. In 499 Nicopolis was destroyed by an earthquake. Justinian rebuilt the walls and erected a monastery to the memory of the 45 martyrs (Procopius, 'De *Ædificiis*,' iii, 4). Under Heraclius it was captured by Chosroes and never regained its splendor. To-day the Armenian village of Purkh (with a population of about 200 families) occupies the ancient site of Nicopolis, in the sanjak of Kara-Hissar and the vilayet of Sivas.

NICOPOLIS, Egypt, city, founded by Octavian (24 B.C.) to commemorate his final victory over Antony and the surrender of Alexandria. The Roman emperor was at this moment highly incensed with the Alexandrians, and, by the foundation of a Roman town in their immediate neighborhood, sought to inflict a permanent blow on their political and commercial supremacy. Nicopolis was built a little west of the Delta on the banks of the canal that connected Canopus with the capital about three miles from its eastern gate. Augustus Cæsar planned to make Nicopolis a city of the first rank. He built an amphitheatre, established games and intended to erect several fine temples, but the natural advantages of Alexandria were greater and Nicopolis was never more than a suburb of its rival. Within a century after its foundation the name of Nicopolis disappears from history. Pliny mentions (vi, 23) a town called Juliopolis, situated on the same canal and about the same distance from Alexandria. In all probability the city was the successor of Nicopolis.

NICOPOLIS, a city in Thrace (Nikup) at the foot of Mount Halmus and at the junction of the Iatrus with the Danube, not far from the mouth of the Nessus. It is said to have been founded by Trajan to commemorate his victory over the Dacians. Upon ancient coins it is called Ulpia. The scholiast upon Ptolemy says it was subsequently named Christopolis. Socrates and Hierocles both called it Nicopolis.

Consult Ptolemy (iii, p. 11). See **NİKOPOL**, **BULGARIA**.

NICOSIA, nē'kō-zē'a, Cyprus, capital and largest city of Cyprus, situated in the north-central part of the island. Its earliest name was Ledra, but Leucon (or Leucos), son of Pomfrey Soter (B.C. 280) restored it and called it Leucotheon, or Levcosia. Constantine fortified it with walls that lasted until the time of the Venetians. Richard Cœur de Lion gave the city in 1193 to Guy de Lusignan, the first of the Lusignan kings (reigned 1192-94). The 300 years during which Cyprus was ruled by the house of Lusignan were the most brilliant in the varied history of Cyprus; and under these kings and queens Cyprus became of an importance out of proportion to its small area and population. Its wealth and luxury in the 14th century evoked the amazement of all Western visitors. The castle was rebuilt in 1211 and a new one was constructed in 1382. The walls, four miles in circuit, were finished by Peter II in 1372 and destroyed by the Venetians, with 80 churches and the famous monastery of Saint Dominic in 1564. In rebuilding the walls the circular form was retained, but the circuit was reduced to three miles. The river Pedias, which had flowed through the city, was turned into a new channel outside it. Nicosia is situated on a barren plain framed by distant hills. In the middle of the town stands the cathedral of Saint Sophia, adopted as a mosque by the Turks in 1570. It was begun early in the 13th century but was injured by an earthquake in 1267. The magnificent west porch dates from the 14th century. Two minarets now replace the western towers and the building is white-washed in accordance with Moslem requirements. Among the other interesting buildings are the palace of the Latin archbishops of Nicosia; the Armenian church; the Haidor Pasha Mosque, formerly Saint Katharine's Church, a purely Gothic building; the diminutive Arablar Mosque of Byzantine origin; the Turkish Bath, formerly the church of Saint George of the Latins; the mosque of the Standard Bearer (Turkish); and the library containing a small but valuable collection of Turkish, Persian and Arabic manuscripts. The old Qonaq, or Palace of Nicosia, disappeared in 1904 for the new palace, containing the courthouse and government offices.

"The older houses," writes a recent traveler, "are nearly all built of mud-colored, sun-dried bricks but here and there may be seen the remains of stone-built houses, with beautiful arched gateways surrounded by coats-of-arms, relics of the Lusignan and Venetian periods. The bazaars afford a considerable variety of scene, they are either under arches, or are covered overhead with trellised vines, or stretched awning of canvas, while each street is appropriated to its own particular trade. The articles offered for sale are vegetables and fruits, rugs, pack-saddles, cottons and silks of native manufacture, hammered copper pots, silver-ware, etc. Every Friday a fair is held, which is largely attended by the inhabitants of the neighboring villages." The town also manufactures leather goods and woolen articles. Pop. (1911) 16,052. Consult Lukach and Jardine, 'Handbook of Cyprus' (London 1913).

NICOSIA, Sicily, a city in the province of Catania, 42 miles west of Catania and 21 miles north of Leónforte. Nicosia is situated on a rocky eminence, 2,840 feet above the level of the sea and also on the Salso River. The town, which presents a thoroughly mediæval appearance, is more behind the age than any other in Sicily. The inhabitants speak a Lombard dialect. Nicosia's origin is unknown; but it was destroyed by the Saracens and reoccupied by the Normans. Among the interesting buildings are a fine Norman cathedral and the church of Sainte Maria Maggiore containing reredos by Antonio Gagini. There are many quaint and picturesque houses. In the vicinity are rich mines of rock salt; beds of alum and sulphur and sulphur springs. The industries of the town are corn, wine, cattle and oil. Nicosia has been the episcopal see of Sicily since 1816. From Nicosia the old road, rocky and picturesque, passes Rocca di Sarno, where the brave Norman Serlo perished through treachery, and leads to Leónforte. Pop. (1911) 16,441.

NICOT, Jean, zhōn nē-kō, SIEUR DE VILLEMAIN, French diplomat: b. Nîmes, 1530; d. Paris, 5 May 1606. He studied in Paris, was a courtier of Henry II and acted as envoy of Francis II to Lisbon (1560), whence, having procured seeds from a Dutchman who brought them from Florida, he introduced tobacco into France. To this circumstance the scientific name for tobacco, *Nicotiana*, is due. Nicot wrote a French dictionary, 'Trésor de la langue française' (1606).

NICOTIANA, nī-kō-shī-ā'na, a genus of plants of the potato family (*Solanaceæ*), represented by the two species of tobacco (*N. tabacum* and *N. rustica*). These plants abound in all their parts with poisonous elements, the special and characteristic one in this case being the alkaloid nicotine, to which tobacco owes its peculiar narcotic properties. See TOBACCO.

NICOTIN, or **NICOTINE**, named from Jean Nicot (q.v.) who introduced the tobacco plant into France, the characteristic alkaloid element of the tobacco plant, in all parts of which it appears in combination with malic and citric acids. When pure and freshly prepared, it is a colorless, intensely poisonous liquid, which evolves a very irritating odor of tobacco, but on exposure to the air it rapidly oxidizes and becomes brown in color. It is moderately soluble in water, and dissolves readily in alcohol and ether. The quantity of nicotine contained in the smoke of burning tobacco leaf varies from about 2 to 8 per cent, the larger percentage being in the coarser kinds. Taken internally, nicotine is one of the most potent of poisons; one-sixty-fifth of a grain taken by the mouth causes symptoms of poisoning to be shown, and a single drop will kill a rabbit or cat in a few seconds. See TOBACCO.

NICOYA, nē-kō'yā, a gulf on the west coast of Costa Rica, extending inland north by west about 60 miles and from 20 to 30 miles in width. Along the shore are high mountains and many picturesque inlets. Cape Blanco is at the entrance. Punta Arenas, on the east shore, is the port of entry.

NICTHEROY, nē-tā-rō'ē, Brazil, a town of Rio de Janeiro, prior to 1894 the capital of

the state, on Praia Grande Bay in the Bay of Rio de Janeiro, opposite the city of that name. It is noted for its elegant suburban residences. Pop. estimated at 40,000.

NICTITATION, nīk'tī-tā'shōn, involuntary winking of the eye, from the Latin word *nictare*, to beckon. It is a slight spasm of the orbicularis muscle of the eye and is often induced by nervousness, hysteria, neurasthenia, etc. "The eyelids sometimes nictitate with an involuntary quiver" is a medical definition of nictitation; and a chronic spasm of the eyelids is spoken of as a "nictitating spasm." Some animals, such as elephants, opossums, seals and the cat tribe, and all birds and fishes, have what is called a third eyelid, or nictitating membrane.

NIDIFICATION is nest-building: that is, the process and practice of arranging or constructing a place for the deposit and protection of eggs and of the young hatched therefrom as long as required by the circumstances of each case. The membranous or glutinous packets in which the eggs of many of the higher worms, mollusks, of some insects, and even of most amphibians (frogs and salamanders, for example) are enclosed, coincident with their voidance by the female, may not be included, because they are not prepared by the mother, but are as natural products as the eggs themselves. Insects and spiders put their eggs in places of safety, or where the young, when they come, will be close to their proper food. When not buried in some way they may be protected by some sort of covering, but this is about all until we come to the highest group—the ants, wasps and bees. The larvæ of insects, however, construct for themselves many and sometimes very remarkable abiding-places, which are certainly "nests" in the broader sense of the term, since they are the shelters within which juvenile growth and transformations, often much prolonged, are carried on; but it is not proper to include mere pupa-cases, such as the cocoons of moths. Thus the white, silken webs that disfigure and injure our fruit-trees are spun by a colony of caterpillars, and form their nest, to which they return nightly after feeding; finally, however, each caterpillar wraps a cocoon about him and sinks into the pupal inertia for the winter, and this wrapping is in no sense a nest. Some insects, however, do make definite homes for eggs and expected young. The most striking examples are found among the wasps and bees, both social and solitary, and the ants, the last-named forming regular nurseries in their colony-habitations, and caring for their larvæ as do the most intelligent mammals for their young. Sufficient details to illustrate these and other cases of insect nidification may be found in the articles ANT; BEE; INSECT; MOTH; WASP, etc. The clearest illustration, probably, is afforded by the common brown wasps (*Polistes*) that make individual paper nests, shaped like inverted wine-glasses, hung by a short stem; they are very often attached to the ceilings of sheds, barn-lofts and the porches of rural houses. These begin with a single cell made in early warm weather by a female wasp that has survived the winter. In this cell she lays a fertile egg, and then proceeds diligently to add other cells around this until finally half a dozen circles have been fashioned. Mean-

while the eggs in the central, first-made cells, have hatched and the grubs grow and must be fed. As they increase, the cells are lengthened, and constant nourishment is given by the busy mother, until finally the earliest grubs escape as mature wasps and begin to help in the care of the rapidly increasing family. This is a real nest.

The examples of nidification among fishes are related in considerable detail in the article FISHES, NEST-MAKING BY.

Among the salamanders, newts, toads, frogs and other amphibia, the eggs are usually inclosed in some sort of gelatinous envelope and laid in the water, in most cases without any particular care, and in others are attached to stones or plants, and probably guarded by the parent. Some newts and frogs coil about or carry the eggs; or, as in the case of the well-known Surinam toad, the eggs are voided from the protruding and turned-up oviduct of the female in such a way that the male, perched on her back, squeezes them into the spongy surface of her back, where they mature in little pockets. Some Eastern frogs and many of the South American tree-frogs have similar devices, but only one makes what might be called a nest. This is the ferreiro or "smith" (*Hyla faber*) of Brazil, which digs up mud in its ponds, and builds around a chosen space a strong wall reaching to, or a little above, the surface of the water. This is done at night by the female, who pats the wall into a firm rampart; and here she lays her eggs, the tadpoles thus hatching and growing in security until able to escape and take care of themselves.

The reptiles in many cases (among snakes and lizards) bring forth their young alive, and when they care for them do so without any previous preparation. The pythons (q.v.) coil around their eggs and thus protect and incubate them. Many snakes worm their way into loose soil or rotting dung-heaps, and leave their eggs to chance. The chameleons and many other lizards scrape a hole in the mold and cover up the eggs left there. That is also the method of the turtles, but they are more careful, for while some simply dig a cavity in the sand of the sea-beach or river-bank, deposit their eggs and cover them up, others take great pains to pack the earth down hard. The well-known green turtle searches long and carefully before she satisfies herself that the spot is suitable, and then digs with her flippers a hole three feet deep, in which she deposits about 200 eggs. The hole is then filled up, and the top leveled off until little or no trace of the operation is visible. That is the practice of the Old World crocodiles, also the gharial, or gangetic crocodile which varies it by burying its eggs deeply in two layers, with a thick layer of sand between them. Our American alligators, however, make much more elaborate preparations for their young as is described under ALLIGATOR.

Birds, of course, furnish the most typical examples of nest-building and of all the other phenomena of nidification, often on a scale that compels wonder at the ingenuity and beauty displayed. See BIRDS, NESTS OF.

Nidification, among mammals, involves a wider use of the term than with birds, at least, and may be defined as any living-place constructed by the animal and formed more or less

like a bird's nest. A striking instance is afforded by the habits of the big anthropoid apes—the gorilla, orang-utan and the chimpanzee. All of these, in a very similar manner, construct platforms of broken branches in trees, upon which to sleep, where the females bring forth and nourish their young. Sir James Brooke, in his 'Ten Years in Sarawak,' says that in the case of the orang-utan, the nest is always built low down, often within 25 feet of the ground, and is three or four feet in diameter and quite flat on top. The Australian bandicoots form compact nests of grass in a shallow hole in the ground, and our American opossums in a hollow log, or broken tree-trunk. The cony (*Hyrax*) of South Africa, and our cony (*Ochotona*), make warm winter-nests within the interstices of loose rocks, and some African lemurs bed-chambers of sticks and leaves in the tree-tops. The chief mammalian nest-builders, however, are found among the arboreal squirrels and the rats and mice of various parts of the world. The European dormouse is an excellent example. The British squirrel forms a nest, "constructed," says Bell ('British Quadrupeda,' 1839), "in a very intricate and beautiful manner, of moss, leaves and fibres curiously interlaced; and it is usually placed either in a hole in a tree, or in a fork between two branches, often where it can with difficulty be distinguished from the tree itself." Our American rodents have similar habits. The flying squirrels of this country form thick warm beds of feathers, hair or other soft materials in abandoned woodpecker-holes and other cranies. Our common gray and fox squirrels, which spend the winter in well-bedded chambers in tree-holes, construct in summer large nests of leaves and leafy twigs, massed together in tree-tops, into which they bore their way, then, by crowding and biting, hollow out the interior into a snug living-room. Our field-mice make warm nests of grass, etc., in hollows of the soil for winter residence; and one of them, the jumping-mouse, weaves a ball of such materials, placed in a bush, into which it creeps for hibernation. Still more remarkable are the similar but larger houses of the wood-rats (*Neotoma*). Thus Cram ('American Animals,' 1902) says of the Alleghany wood-rat that it inhabits rocky ledges among loose piles of broken rocks, "Here he gathers together a mass of sticks, shreds of bark, leaves and other debris to form a nest, building them sometimes into a more regular dome-shaped structure."

ERNEST INGERSOLL.

NIEBELUNGEN LIED. See NIBELUNGEN LIED.

NIEBUHR, nē'boor, Barthold Georg, German historian and classical scholar, the founder of modern historical method: b. Copenhagen, 27 Aug. 1776; d. Bonn, 2 Jan. 1831. He was son of Karsten Niebuhr (q.v.); was educated by his father in his early youth; studied at Kiel (1794-96), at London and at Edinburgh (1798-99); and in 1800 entered the service of the Danish government. He became director of the government's bank in 1804, and showed in this post and in the Prussian service, which he entered in 1806, much business ability, due, so he affirmed, to his life in England and Scotland. A quarrel with Hardenberg made Niebuhr's retirement necessary in 1810, soon after he had

been engaged in financing a Prussian loan in Holland; and he taught Roman history at Berlin for three years with such success that he was led to publish the first two volumes of his 'Roman History' (1811-12). But in 1813 he re-entered the Prussian government employ, and took a prominent part in rousing national opposition to Napoleon; but his temper was overbearing and he soon broke with his superior, Stein. In 1816 he was sent as Minister to the Vatican, brought about the understanding between Prussia and the Pope signalized by the bull 'De Salute Animarum' in 1821, and had his first opportunity of testing his critical theories as to early Roman history by topographical and other detail. In 1823 he retired from the diplomatic service and settled in Bonn, where he lectured on ancient and modern history.

Niebuhr's great and epoch-making work was his destructive criticism of the early Roman legendary period and his reconstruction of this same period from the mass of myth and legend, which beclouded it, or, to put it more broadly and more truly, it was his application of this higher critical method to history. His 'Roman History' (1811-32, English version, Hare and Thirwall, 1851), carrying the story of Rome down to the Punic Wars, was completed in an English form by Leonhard Schmitz in 'Lectures on the History of Rome from the First Punic War to the Death of Constantine' (1844). These two parts form a great collection of facts and material, and a wonderful exemplification of method, but the more popular and brilliant style of Niebuhr's pupil, Theodor Mommsen (q.v.), has made Niebuhr's work to a certain degree antiquated. He collaborated with Platner and Bunsen in their 'Description of the City of Rome'; founded with Böckh and Brandis the *Rheinisches Museum*, a classical review; edited the 'Corpus Scriptorum Historiæ Byzantinæ'; and wrote many minor philological and historical studies, besides editing new fragments of Gaius, Cicero and Merobaudes. His 'Stories of the Greek Heroes' ('Griechische Heroengeschichte,' 1842), originally written for his son, Marcus, is a famous juvenile. Niebuhr was possessed of original genius, had an intuitive grasp of history that made him detect the false evidence and was so adept at learning languages that he had mastered 20 in early manhood. He was also a man of broad scholarship and catholic taste, as may be seen by his personal reminiscences and correspondence in Hensler's 'Lebensnachrichten über Niebuhr' (1838-39). Consult also the biographies by Classen (1876) and Eyssenhardt (1886); and Winkworth, 'Life and Letters' (1852).

NIEBUHR, Karsten, German traveler, father of B. G. Niebuhr (q.v.): b. Lüdingworth, Hanover, 17 March 1733; d. Meldorf, Prussia, 26 April 1815. In 1760 he entered the Danish service as lieutenant of engineers, and in 1761 joined the expedition sent by Frederick V of Denmark to explore Arabia, Egypt and Syria. All his companions in this expedition died within a year after their departure, but in spite of these distressing discouragements, he pursued his work single-handed, and in 1766 returned to Copenhagen. The works in which he gave the world the result of his expedition are classics and remarkable for their accuracy.

They include 'Breschreibung von Arabien' (1772); 'Reisebeschreibung von Arabien und anderen umliegenden Ländern' (1774-78). Consult his son's 'Karsten Niebuhr's Leben' (1817; Eng. trans., 1838).

NIECKS, nēks, Frederick, Anglo-German composer and critic: b. Düsseldorf, Germany, 3 Feb. 1845. He was educated at Leipzig University and was a violinist and music teacher in his native city till 1868 when he settled in Scotland, where he was for some years engaged in teaching music, and since 1875 he has written much for musical journals. From 1891 to 1914 he was Reid professor of music at the University of Edinburgh. He has published 'A Concise Dictionary of Musical Terms' (1884); 'Chopin as a Man and Musician' (1888); and 'Programme Music in the Last Four Centuries' (1908).

NIEDERMEYER, nē'dēr-mī-ēr, Louis, Swiss composer: b. Nyon, 27 April 1802; d. Paris, 14 March 1861. He studied under Moscheles in Vienna, and in Italy with Fioravanti and Zingarelli and settled in Paris. He met with no great success in operatic music, such as 'Marie Stuart' (1844) and 'La Fronde' (1853), and thereafter devoted himself to religious music, his true vocation, not only composing but teaching and editing a journal called *La Meitrise*. His opera 'Stradella' and his melody for Lamartine's 'Lac' are his best compositions of a secular sort. His training school for religious music was aided by the French government.

NIEDERWALD, nē'dēr-vält, Germany, the western termination of the Taunus range in the Prussian district of Wiesbaden, abutting on the Rhine opposite Bingen. On a commanding site near its summit was erected, 28 Sept. 1883, the national memorial commemorative of the successful War of 1870-71. An extended pedestal, ornamented with allegorical figures, is surmounted by a bronze figure of Germania, 34½ feet in height. The whole was designed by Schilling, a Dresden sculptor. Toothed-railways carry visitors up to the monument from the villages of Rüdesheim and Assmannshausen at the foot, both noted for their wine.

NIEHAUS, nē'hous, Charles Henry, American sculptor: b. Cincinnati, Ohio, 24 Jan. 1855. He was educated at the public schools and the McMicken School of Art; and on the savings of his boyish years proceeded to Munich, Bavaria, where he won high distinction. After his residence in Germany he returned to the United States, proceeding again to Europe and setting up a studio in Rome from 1881 to 1885. His fame as a sculptor was meantime growing. He is equally expressive with the chisel as with the modeling tool. No sculptor has been more associated with memorials of a public character than he. Among monuments may be cited the Hahnemann and Paul Jones monuments at Washington, D. C.; the equestrian monuments to Drake at Titusville, Pa., and to General Forrest, at Memphis, Tenn.; the apotheosis of Saint Louis at Saint Louis, Mo.; the Astor historical doors to Trinity Church, New York; and the pediment to the State House at Kentucky. Among busts may be mentioned those of Disraeli, Dr. Collyer, Robert Blum, Joseph Jefferson, Rabbi Gottheil, Hon. Charles Hack-

ley and Governor Hoadley. His ideal works include the *Cæstus* in the Metropolitan Museum, New York, the 'Greek Athelete using a Strygil.' His statues include those of Garfield at Cincinnati and the Capitol, Washington; Governor Allen of Ohio, Ingalls and Morton in the rotunda of the Capitol, Washington; Moses and Gibbon in the Congressional Library; Farragut and McKinley at Muskegon; and a statue of McKinley and lunette for his tomb at Canton, Ohio. He has executed three statues of President Lincoln, the first a seated figure of heroic size in bronze, the property of the Historical Society of Buffalo, N. Y.; the second, almost a replica of the first, is at Muskegon. His third statue, exhibited in 1916 which is in Cressele marble, is regarded as a most successful presentation and reveals almost perfectly the deeply brooding expression habitual to the countenance of the martyred President. Mr. Niehaus was awarded gold medals at Buffalo in 1901; at Charleston in 1902; and Saint Louis in 1904. He was elected a member of the National Academy in 1906. Consult Armstrong, 'Charles Niehaus' (New York 1902).

NIEL, nē-ěl, **Adolphe**, French marshal: b. Murat, Haute-Garonne, 4 Oct. 1802; d. 14 Aug. 1869. He was educated at the École Polytechnique, Paris, and the Military School, Metz, and in 1835 became captain of engineers. He took part in the expedition against Constantine in Algeria 1836-37; commanded the engineers at the siege of Rome in 1849 during the revolutionary movement under Garibaldi; took part in the bombardment of Bomersund in the Baltic in 1854, and as chief of engineers planned the operations against Sebastopol in 1855. He figured prominently at Magenta and Solferino in the Italian campaign of 1859, was made a marshal of France by Napoleon III in return for his service and in 1867 became Minister of War. The *Marshal Niel* rose derives its name from him.

NIELLO WORK, in art, a method of ornamentation described among other old writers by Pliny, and much practised in the Middle Ages, and to which may be traced the origin of engraving. The lines of a design are cut in a piece of gold or silver; it is then covered with a black composition consisting of copper, silver, lead and sulphur, and a little borax is sprinkled over it by subjecting it to heat over a fire; the composition becomes liquid and runs into the lines of the design; the whole is then allowed to cool, when the surface of the metal is scraped and burnished, leaving the drawing in black upon the metal. Plaques so ornamented were principally employed in the making of church plate and reliquaries and for costly personal ornament. The art is still practised by goldsmiths as a mode of ornamenting ware, especially in Russia and India, but its principal use is for door-plates, plates for shop fronts, etc., in which the brass or zinc plates are engraved and the depressions filled with wax. The term is also applied to impressions in a viscid water-ink on paper from metal-plate engravings taken by the early fathers of copper-plate printing for testing the state of their work. See ENGRAVING. Consult Wilson, H., 'Silver-work and Jewellery' (London 1912).

NIEMANN, nē-män, **Albert**, German operatic tenor: b. Erxleben, near Magdeburg, 15 Jan.

1831. At first a worker in a machine factory, he became an actor in 1849; was trained in singing by Schneider, hofkapellmeister at Dessau, and by Nusch, a baritone; appeared at Berlin, Stuttgart and Königsberg; and after further study under Duprez at Paris, played in the first production of *Tannhäuser* in that city (1861), was made "kammersänger" to the emperor and attained great success throughout Germany. From 1866 until his retirement in 1889 he was connected with the court opera of Berlin, where he was distinguished in heroic rôles. Wagner selected him to impersonate Siegmund in 'Die Walküre' at Bayreuth in 1876. He appeared with success in the United States in 1887-88. Consult Sternfeld, 'Albert Niemann' (1904).

NIEMCEWICZ, nyēm-tsā'vich, **Julian Ursin**, Polish statesman and author: b. Skoki, Lithuania, 1757; d. Paris, 21 April 1841. After graduating from a military school, he entered the army in 1777 and became major in 1788. In that year he was sent as a deputy to the Polish Diet where he defended the rights of the middle and peasant classes. He was a publisher of the *People's Paper* and framed the "Constitution of the Third of May" (1791), which made monarchy hereditary in Poland. He acted as adviser and adjutant to Kosciuszko and was taken prisoner with him at the fatal battle of Maciejowice (1794) and shared his captivity in Petrograd. On his release he traveled in the United States, where he married Mrs. Livingston Kean of New York. When he heard of Napoleon's entrance into Poland in 1807 he returned to his native land. After the Congress of Vienna he was made Secretary of State and President of the Constitutional Committee in Poland; and when Poland came under Russian control he was retained in office. The events of 1830 drove him again into exile and he went to Paris, where he died. Niemcewicz wrote in many styles. His 'Historical Songs of the Poles' (Warsaw 1816), a series of ballads describing the chief heroes of Poland's golden age of Sigismund I and the reigns of Stephen Bathori and Sobieski, are greatly beloved by the Poles and did much to arouse their national consciousness. His comedy, 'The Return of the Deputy' (1790) was popular also and his novel, 'John of Tenczyn' (1825), much in the style of Walter Scott gives a fine picture of old Polish days. He also wrote a 'History of the Reign of Sigismund III' (3 vols., 1819); and a 'Collection of Memoirs on Ancient Poland' (6 vols., 1822-23). A collection of his works was published in 12 volumes (Leipzig 1838-40), but it is not complete. Consult Czartorewski, 'Life of Niemcewicz' (in Polish, Paris 1860); Pamientniki, 'Memoirs' (1876, 1877, 1912) and Niemcewicz, 'Lithuanian Letters' (1812).

NIEMEN, nē'mēn or nyēm'ēn, a river of Prussia, with 70 miles, the lower part of its course of 500 miles, lying within the province of East Prussia, where it is called the Meml. It rises a few miles south of the city of Minsk. It is navigable to Grodno; below Tilsit it divides into two branches, which reach the Kurisches Haff each by four mouths and is almost cut off from the sea by narrow spits of sand.

NIEMEYER, nē-mi-ēr, **Felix von**, German physician, grandson of the poet and theologian Felix August Hermann Niemeyer: b. Magde-

burg, 31 Dec. 1820; d. Tübingen, 14 March 1871. He was educated at Halle; practised in Madgeburg 1844-55; was professor of pathology and therapeutics at Greifswald, and from 1860 at Tübingen; was military surgeon during the Franco-Prussian War; was ennobled for his services to the king of Württemberg; and wrote a 'Textbook of Special Pathology and Therapeutics, (1858), often republished and distinctly valuable.

NIEPCE, Joseph Nicéphore, zhō-zéf nē-sā-fôr nē-ēps, French inventor: b. Châlon-sur-Saône, 7 March 1765; d. Gras, near Châlon, July 1833. He served in the French Revolutionary army, was administrator of the district of Nice 1795-1801, then devoted himself to chemical and mechanical studies at Châlon, and from 1811 to lithography. His researches in photography began in 1813, and by 1824 he was successful in obtaining permanent impressions of the images of the *camera obscura*. In 1826 he joined Daguerre in a further prosecution of the investigations. An article of their agreement seems to make it clear that the real credit for the discovery of photography belongs to Niepce, and that Daguerre was merely an important and in its development. Consult Fouqué, 'La vérité sur l'invention de la photographie' (1867); and the 'Life' by Davanne (1885). See also DAGUERRE; PHOTOGRAPHY.

NIETZSCHE, nēt'shē, Friedrich Wilhelm, German philosopher: b. Röcken, 15 Oct. 1844; d. Weimar, 25 Aug. 1900. He studied philology at Bonn and Leipzig, and held the professorship of classical philology at Bâle from 1869 to 1879. The next 10 years were spent at different health resorts. In 1889 he became insane and died at Weimar in 1900. His most important writings are 'Die Geburt der Tragödie' (1872); 'Unzeitgemässe Betrachtungen' (1873-76); 'Menschliches alzu Menschliches' (1878); 'Also sprach Zarathustra' (1883-92); 'Jenseits von Gut und Böse' (1886); 'Zur Genealogie der Moral' (1887); 'Der Wille zur Macht' (1895).

Nietzsche's theories may conveniently be divided into three periods; the first, which may be called the æsthetic period, extending until 1878; the second, the intellectual or positivistic period, until about 1883, and the third, or ethical, until 1889. The relation between these periods has been much discussed, and many critics have denied the existence of any unifying principle. It must be remembered that his writings are the brilliant but nevertheless incoherent revolt of a doomed mind against its malady. On the other hand, the whole of Nietzsche's philosophy often seems an attempt to answer the question as to the nature of the chief good, and the chief radical differences in the three periods may be explained as due to changes in his standard of valuation.

(1) During this period Nietzsche accepted Schopenhauer's general standpoint, especially his emphasis upon the priority of will to intellect, and his pessimism, but regarded the latter as resulting in increased artistic activity rather than in question. The ultimate values are those of the artist, and the two great forces in art are typified by the Greek gods, Apollo and Dionysus. The former is the dream, which, conscious of its own illusion, mirrors appear-

ances. The latter is the intoxication that marks the breaking forth of the underlying reality. The hope of modern art lies in the union of the two in the Wagnerian opera, an estimate of Wagner later to be contradicted.

(2) With the beginning of the intellectual period, a logical rather than an æsthetic value is made supreme.

(3) The third period is by far the most important, since it contains the most characteristic and original of Nietzsche's views; and here the ultimate value is one of conduct rather than of thought or feeling. The basal reality is the will for power, a metaphysical principle which is extended from human activity to the universe, but which as such receives only vague treatment. The ethics is both negative and positive, in that it consists, first, of a criticism of existing moral distinctions, and, second, of the exposition and defense of a new moral ideal. Historically there are two moralities, each with its own set of opposites. Good and evil, the first pair, are valuations of the ruling classes, for whom everything that expresses or furthers the will of the individual is good. All that he does or likes, his passions, his ideals, all that forms a part of himself is good; while whatever is different is evil. The other pair of valuations, good and bad, belongs, on the contrary, to the slaves, and here whatever characterizes the ruler and so is inconvenient or painful to the subject is stigmatized as bad, while good is applied to all those qualities and actions that make life easier. It is essentially the morality of suppressed resentment; and whereas the seal of aristocratic approval is set upon the positive traits of the healthy animal, such as courage, self-assertion and desire for unrestrained freedom, to the slave good means meekness, sympathy and obedience. The present European standards are those of the slaves, and Nietzsche even affirms that they have become such largely through a deliberate plot of the Jews, at the beginning of the Christian era, to revenge themselves upon their Aryan conquerors by foisting upon them an ignoble standard of worth.

The aristocratic moral ideal that Nietzsche would substitute for this one takes self-assertion as its most essential characteristic. At the bottom of everything is the will for power; and all that makes for fullness of life is to be cherished, even though it overrides all our ideas of morality and of religion. The so-called virtues of pity, humility and the like are merely symptoms of weakness and degeneracy. Strength and pride, ruthlessness toward oneself and toward others, courage and love of battle, all mark the true man, who has put behind him prejudice and tradition. For such complete affirmation of life opposition is a necessity, and a good war sanctifies every cause. The impulses should be given full play, not weakened by despicable self-denial. Altruism is an offense against delicacy, and pain alone can bring about the proud isolation that is above all pettiness. Such a view of the chief good is by no means to be called hedonistic. There is doubtless a fierce joy in battle and in all sorts of conflict; but the end proposed and reached is not happiness. Power and power alone is the good.

The two doctrines most often associated with Nietzsche's name, though they are not essential to his ethics, are those of the Superman and the

Eternal Recurrence. The first is the end and justification of human struggle, and in the earlier books is represented as a mystical product of the individual will, while later it is described as a higher species with the relationship to man that man has to the ape. The Eternal Recurrence is the theory, by no means new, that present events but form a part of an infinite cycle and thus will be endlessly repeated in every detail. The final test of Nietzsche's aristocrat is his willingness to accept such repetition even of the hardest conditions. The whole attitude toward life evidently makes the pessimism of the first period no longer possible; and the new standpoint is characterized by its author as tragic optimism, namely, the view that finds life worth while not in spite of but because of its pain. Nietzsche's theories have been much discussed and have exercised an unexpected influence, especially among men interested primarily in art or in social reform; and many consider them the logical outcome and application of Darwinism, but there is nothing in Darwinism itself, apart from all preconceived philosophical interpretations, which compels a Nietzschean ethics.

Bibliography.—Bakewell, 'The Teachings of Friedrich Nietzsche' ('The International Journal of Ethics,' IX, 4 April 1899, pp. 314-331); Brandes, 'Friedrich Nietzsche' (1888; tr. New York 1914); Chatterton-Hill, J., 'The Philosophy of Nietzsche' (New York 1913); Dolson, 'The Philosophy of Nietzsche' (New York 1901); 'Cornell Studies in Philosophy' (No. 3); Drews, 'Nietzsche's Philosophie' (1904); uncompleted biography by E. Förster-Nietzsche (Vol. I, Leipzig 1895); 'Der unsame Nietzsche' (Leipzig 1914; tr. London 1915); Kaatz, 'Die Weltanschauung Fr. Nietzsches' (1891-92); Kennedy, J. M., 'Nietzsche' (London 1914); Kronenberg, 'Nietzsche und seine Herrenmoral' (Munich 1901); Leichtenberger, 'La Philosophie de Nietzsche' (Paris 1899); Mencken, H. L., 'The Philosophy of Nietzsche' (3d ed., Boston 1913); Pattison, 'The Opinions of Friedrich Nietzsche' (*The Critical Review*, May 1898); Riehl, 'Frederich Nietzsche, Der Künstler und der Denker' (3d ed., Stuttgart 1901).

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NIEUPORT, nē'oo-pôr, Belgium, town in the province of West Flanders, on the Yser River, 10 miles southwest of Ostend. It was a strongly fortified town in the Middle Ages. A castle was erected here in the 9th century by the Flemish counts for protection against the Normans. Of this castle only the donjon tower remains. In 1160 the name was changed from Santhoven to Neoportus. The siege of Nieuport by the French in 1488-89 is the chief episode of its heroic period. Here, too, Maurice of Nassau defeated in 1600 the Spaniards under the Archduke Albert in the famous battle of the Dunes. The old buildings are highly interesting: the Cloth Market dates from 1480; there is an old Gothic church (restored in 1903); and a town-hall containing a small collection of paintings.

The lighthouse dates from 1289. Two miles from the town is the modern seaside resort, Nieuport Bains, which although dating

from only 1869 is very popular for visitors on account of the fine bathing. The pier extends 1,500 yards into the sea at the entrance of the Yser which has been canalized. The industries of Nieuport are shipbuilding, rope and net-making and fishing. Pop. (1904) 3,780.

During the European War Nieuport was the scene of almost continuous fighting. The famous Nieuport-Dixmude line offered the greatest resistance to the German drives for Calais. Trench warfare was almost incessant at Nieuport during the first year of the war.

NIEUWENHUIS, Ferdinand Domela, Dutch Socialist; b. Amsterdam, 1846. He was educated at the Lutheran Seminary in Amsterdam and was pastor of churches in Harlingen, Beverwijk and The Hague. In 1879 he became leader of the Social Democrats, which he had founded, and in 1887 he was elected to the States-General. Growing more extreme in his views he formed, with Cornelissen, a free Socialist faction. He took a prominent part in the Socialist congresses of Brussels (1891) and Zürich (1893), opposing Liebknecht and compulsory military service. In 1897 he started a new journal, *De veye Socialist*. Nieuwenhuis is the author of 'Schetsen en tafereelen uit de Fransche revolutie van 1789' (1889); 'Die geschiedenis van het socialisme' (3 vols., 1901-02); 'Hoc ons land geregeerd wordt op papieren in de werkelijk held' (The Hague 1891; 4th ed.); 'De welenschap en het Karakter' (The Hague 1892) and many other books and pamphlets on political subjects. He has also written on religion and published a book on the Bible, 'De Bijbel' (Amsterdam 1893).

NIEVO, Ippolito, Italian poet: b. Padua, 1832; d. by shipwreck near Tirreno, 4 March 1861. He was educated in Padua, Verona and Mantua; joined the army; took part in the revolution under Garibaldi and became a colonel. His works, which show the development of the Italian national consciousness from 1775 to 1850, are ranked high in Italy. They comprise historical novels, stories, dramas and poems. Nievo has much wit and a picturesque manner of expression. He passed from romanticism to realism. He is regarded as the founder of the realistic school in Italy. His works include 'Angelo di bonta' (1856); 'Conte pecoraio' (1857); three collections of tales; 'Confessioni d'un ottuagenario' (1867), posthumously published; and the unfinished 'Il pescatore di anime.' His portrait appears in 'Nuova Enciclopedia Italiana' (Boccardo, Vol. XV, p. 429, Turin 1883). Consult Mantovini, D., 'Il poeta soldato, Ippolito Nievo' (Milan 1900); Molmenti, P. G., 'Ippolito Nievo, cenni critico-biografici' (Venice 1869); and Croce, I. Nievo' (in *La Critica*, November 1912).

NIEVRE, nē-āv'r, France, a central department, bounded by Yonne, Cher, Allier, Saône-et-Loire and Côte-d'Or; area, 2,658 square miles; capital, Nevers. The soil is generally rocky and sandy, cut up by ramifications, almost always wooded, of the mountains of Morvan, forming the watershed between the Rhône and the Seine. There are several plateaux more or less fertile, a number of hills covered with vines and valleys productive in pastures; but the principal wealth consists in forests and minerals. The Nièvre, whence the name of the department, is an inconsiderable affluent of the

Loire from the right. The three chief rivers — the Allier, Lorie and Yonne — are navigable, and the Yonne, which belongs to the system of the Seine, is connected with the Loire by a canal across the watershed, and there is also the Nivernais Canal. Oats and wheat are the chief cereals. More than a third of the whole surface is covered with forests, the timber from which, forming one of the principal sources of wealth, is conveyed by water in great quantities to Paris, etc. Its wines are important. Minerals include iron and coal, and the chief manufacturing products are woolen cloths, linen, glass, porcelain, cutlery, etc. Pop. 299,312.

NIFLHEIM, nif'him, in Scandinavian mythology, the region of endless cold and everlasting night, ruled over by Hela. It is separated from Muspelsheim, the kingdom of light and heat, by a huge chasm (Ginnungagap, yawning gap). Here flows the spring Hvergelmir, watched by the dragon Nidhugger; this spring sends out 12 ice-rivers, from the drops of which, thawed by sparks from Muspelsheim, sprang the chaotic giant, Ymir, and the cow, Audhumbla.

NIFO, né'fō, Agostino, Italian philosopher: b. Giapoli, Calabria, Sicily, about 1473; d. Sissa, 18 June 1538. Three cities claim to be his birthplace: Giapoli, near Calabria, Sicily; Tropea, near Abruzzi; and Sessa, near Tierra di Lavoro. The latter Nifo recognized as his natal town. He lived in Sezga, studied philosophy in Padua and lectured in Padua, Naples, Rome and Pisa, attracting the attention of Leo X, who had him defend the Catholic doctrine of immortality against the attack of Pomponazio and the Alexandrists. In this famous controversy he opposed Pomponazio's theory that the rational soul is inseparably bound up with the material part of the individual and insisted that the individual soul is indestructible (being a part of absolute intellect) and on the death of the body is merged into eternal unity. As a reward for his splendid argument he was made Count Palatine with the right to call himself by the name of Medici. In 1495 he published an edition of the works of Averroes with a commentary presenting the views of the orthodox Catholics. His commentaries on Aristotle were widely read and frequently reprinted. The most famous edition appeared in 14 volumes, including the 'Opuscula' (Paris 1654). His own philosophical works are 'De immortalitate animi' (Venice 1524); 'De intellectu et daemonibus'; 'De infinitate primi motoris quæsto' and 'Opuscula moralia et politica.'

NIGEL, nig'el, English satirist of the close of the 12th century, sometimes called WIREKER. A monk at Christ Church priory, Canterbury, he wrote various verse, the most important of his poems being the 'Speculum Stultorum,' in which, as in the prose work 'Contra Curiales et Officiales Clericos,' he boldly attacked the vices of his fellow-ecclesiastics. The 'Speculum Stultorum' or 'Mirror of Fools,' with its story of the ass, Burnellus, who wished his tail was longer, for centuries enjoyed great popularity. Consult Wright, 'Anglo-Saxon Satirical Poets' (1874).

NIGELLA, a genus of plants of natural order *Rumunculaceæ*, having five colored spread-

ing sepals; 5 or 10 small two-lipped petals, with tubular claw; the carpels more or less connected together, many-seeded; leaves divided into threadlike segments, flowers, solitary at the top of stem or branches. They are annuals, natives chiefly of the countries near the Mediterranean and warmer temperate parts of Asia. Some, occasionally seen in gardens in Britain, are vulgarly known by the names *Devil-in-a-bush* and *Devil-in-a-mist*. The seeds are aromatic and somewhat peppery. Those of *N. sativa*, species common in cornfields in southern Europe, are supposed to be the *black cummin* of the ancients, perhaps the *cummin* of the Bible. The seeds of a specie of *Nigella* are much used by the Afghans for flavoring curries.

NIGER, ni'jēr, or **JOLIBA**, jöl'i-ba, a river of West Africa, the third in size of the African continent, known by various native names throughout its course, being the Joliba in its upper reach, the Mayo Balleo and Isa Eghirren in the central reach and the Kwarra or Quorra in its lowest reach. The upper and central reaches are politically controlled by France and the lower reach, through Northern and Southern Nigeria, by Great Britain. The Niger rises on the eastern slope of Mount Yenkina on the boundaries of Sierra Leone and Liberia, about 175 miles from the west coast, its headwaters being contiguous to those of the Senegal which flow in an opposite course. It flows northeast as far as Timbuktu, 300 miles above which it is joined by the Bani, a large tributary, and splits up into numerous diverging channels and lakes. After passing Timbuktu it flows east for 200 miles, then turns southeast through a rocky country past Say. At about 11° 40' N., just above Ilo, it enters British North Nigeria, at Giri being joined by the Sokoto River from the east. At Boussa navigation is impeded by dangerous rapids. Finally, after a long southwestern curve to Bida, it bends more to the south and is joined by a tributary of first-class size, the Benue, or Mother of Waters, a rival in volume which has come from a source 860 miles to the east. The united stream now "passes through a series of bold picturesque hills by a narrow gorge," and eventually breaks up into one of the most remarkable mangrove-covered deltas of the world. This delta, malarious and unhealthy, covers an area of about 14,000 square miles, completely intersected by branches of the river, the principal of which, the Nun, runs through the middle of the delta. The westernmost branch, the Benue, has a bar, which presents a great difficulty to navigation. Other mouths or branches are the Bonny, New Calabar, Brass and Forcados (which has now taken the place of the Nun as the principal navigable mouth), distributing the Niger's waters into the bights of Benin and Biafra in the Gulf of Guinea. In its course the Niger passes through much fertile valley lands, and there are valuable lignite deposits east and west of the river, while numerous towns and villages stand on its banks, and a considerable canoe commerce is prosecuted. Slaves were formerly nearly the only article of export from the Niger, but palm oil is now the principal staple, the delta outlets being known as oil rivers. The whole course of the river is about 2,500 miles, and the area of its basin is estimated at 584,000 square miles. By means of the Niger-Benue system direct access is had at

the height of the season with Nafoda, 200 miles from Lake Tchad, and 900 miles from the sea. Mungo Park was the first European traveler to explore any part of this river (1796-97) and was drowned in the Boussa rapids. The honors of modern exploration are divided between French, British and German travelers. Consult Bindloss, 'In the Niger Country' (London 1898); Hourst, 'Exploration of the Niger' (Eng. trans., ib. 1898); Leonard, A. G., 'The Lower Niger and its Tributaries' (ib. 1906); Mockler-Ferryman, 'Up the Niger' (ib. 1892).

NIGER, Military Territory of the, a subdivision of French West Africa, situated in the Upper Senegal-Niger colony (formed in 1904 from the Senegambia and Niger territories). The territory lies north of the British Protectorate of Nigeria and directly west of Upper Senegal-Niger.

At the same time that the colony of Upper Senegal-Niger was formed the military territories, which now form an integral part of it, were broken up. The second military territory (which included nearly all the country within the Bend) was handed over to the civil administration. The first (Timbuktu) has been incorporated in Upper Senegal-Niger, and is administered by a colonel under the authority of the lieutenant-governor. The third (Zinder-Chad) territory has been constituted an autonomous unit. The capital is Bakmako (pop. 1918, 8,734). The most important cities are Kayes (pop. 5,820), and Timbuktu (4,270). At Bamako is a professional school and a school for the sons of chiefs. At Timbuktu there is a Mussulman Superior School with 67 pupils and one official. The natives cultivate peanuts, millet, maize, rice and cotton. Rubber and *Kariti* are other products. Cattle abound. Native industries include pottery, brick making, jewelry, weaving and leather-work. The chief imports are cotton, foodstuffs and metal-work. The chief exports are peanuts, cattle, rubber, skins and wool. There is a complete system of telegraph from Kayes to Naimey and from Zinder to Lake Tchad. The Senegal-Niger Railway runs from Kayes to Koulikoro, a distance of 349 miles. Small steamboats run from Koulikoro to Timbuktu, so that it is now possible to perform the entire journey from Europe to Timbuktu by rail and boat. A wireless telegraph connects Timbuktu with the Eiffel Tower in Paris. See UPPER SENEGAL-NIGER; TIMBUKTU; FRENCH WEST AFRICA.

NIGERIA, nī-jě'rī-a, or **NIGER** (nī'jēr) **TERRITORIES**, West Africa, an extensive British colonial possession on the lower Niger, organized since 1900, within the boundaries arranged by the Anglo-German Agreements of 1885, 1886 and 1893, and the Anglo-French Agreements of 1889, 1890 and 1898. It comprises the Lagos Protectorate and Southern and Northern Nigeria, being bounded on the east by German Kamerun, and on the west and north by Dahomey and the French military territories.

Nigeria includes the whole course of the Niger from a short distance above Ilo to its mouth, and also the left bank for a few miles higher up. The northern boundary runs irregularly eastward to a point on Lake Tchad. Nigeria also includes the whole course of the

Benue from a point above Yola to its confluence with the Niger at Lokoja. The coast-line extends from the Rio del Rey on the east, to near the mouth of the Benue River on the west, and thus includes all the mouths of the Niger. The total area is about 336,000 square miles; the mixed negro population may amount to 17,000,000, chief of which are the Fulah or Fulani of the Hausa states. Mohammedanism is widely diffused. For administrative purposes the territory is divided into Northern and Southern Nigeria, the boundary line being drawn due east from Owo, on the Lagos frontier. The country is mainly a level or rolling plateau, but in the central districts there are mountain ranges and isolated peaks, many of them forest-clad, of considerable elevation. The Niger and the Benue are the chief rivers, the latter being especially valuable for navigation. The Gulbin-Sokoto is a perennial left-bank tributary of the Niger, and the Waube, flowing into Lake Tchad, is also of some importance. The climate is tropical, with a dry (October-May) and a wet season. During the latter the rains are often extremely heavy and accompanied by severe thunder-storms. The mean annual temperature is about 80° F., but at some periods of the year the temperature in the shade may exceed 100°. The delta lands are unhealthy, and the same may be said of much of the interior, but the climate of the elevated districts is generally quite suited to Europeans. Geologically, the region is formed mainly of granite and various metamorphic rocks, but sedimentary formations, chiefly sandstones and almost entirely belonging to the older periods, are also found. Silver, tin, antimony, lead, iron and other minerals occur. Among the vegetable and agricultural products, most of which are exported, are cotton, indigo, palm-oil, palm kernels, ground-nuts, india-rubber, ebony, camwood, gums and coffee. Ivory and hides are also important exports, and among the native industries leather-working deserves mention. There are great tin deposits covering 9,000 square miles. There is direct railway communication between Lagos and Kano (712 miles), and other lines. The chief towns of Southern Nigeria are Asaba, Onicha, Akassa, Idda, Wari, Burutu, Brass, New Calabar, Bonny Opobo and Old Calabar, all ports with custom-houses; Ado and Benin. The chief towns of Northern Nigeria, which consists mainly of the former Sokoto empire and the larger part of Bornu, are Lokoja, at the confluence of the Niger and Benue, Kano, Sokoto, Gando, Ilorin, Yakoba, Kuka, Yola, Ilo and Katsena.

The greater part of Nigeria was administered by the Royal Niger Company till 1 Jan. 1900, when it was bought out by the British government and the two protectorates of Northern and Southern Nigeria formed. This company was formed in 1882 as the National African Company, and four years later it received its royal charter. Most of what is now Southern Nigeria was not under the rule of the company, but formed from 1884 till 1893 the Oil Rivers Protectorate, and from 1893 till 1899 the Niger Coast Protectorate. The kingdom of Benin was incorporated in the Niger Coast Protectorate in 1897.

In 1906 the colony and protectorate of Lagos was incorporated with Southern Nigeria; and in 1914 Northern and Southern Nigeria were

amalgamated under a governor-general. Lagos is the present seat of government; but it is intended to remove the capital to Kaduna, in the heart of the country.

Consult, in addition of the travels of Barth, Clapperton, R. Lander, Richardson and Rohlf, Bindloss, 'In the Niger Country' (1899); Falconer, 'On Horseback through Nigeria' (1911); Leonard, 'The Lower Niger and Its Tribes' (1906); Lucas, 'Historical Geography of British Colonies: West Africa' (1913); Morel, 'Nigeria: Its Problems and Its People' (1911); Orr, 'The Making of Northern Nigeria' (1911); Raphael, 'Through Unknown Nigeria' (1914); Schultze, 'The Sultanate of Bornu' (Eng. trans., 1914), and a recent work by a former lieutenant-governor of Northern Nigeria, Temple, C. L., 'Native Races and their Rulers' (Cape Town 1918).

NIGGER CHUB, or **NIGGER DICK**, a dark-green chub (q.v.) of the Mississippi Valley, distinguished by the three-lobed condition of the under jaw. See **CUTLIPS**.

NIGGER TOES. See **BRAZIL NUT**.

NIGGERFISH, a name given to the seabass of the genus *Bodiamus*, common in the waters of Bermuda and Florida. The Spanish name for it is *guatavere*. Consult Harris, William C., and Bean, Tarleton H., 'The Basses: Fresh-water and Marine' (illustrated by Louis Rhead, New York 1905).

NIGHT. (1) See **DAY**. (2) In Greek mythology, Night (Nyx) was personified as a powerful goddess, who by means of sleep exercised power over men and gods. She was the daughter of Chaos, wife of Erebus, and mother of Æther and Hemera (Day), of the Fates, Sleep, Death, Dreams, Hunger, Fear, Nemesis and Strife. By day she dwelt in Tartarus enveloped in thick clouds.

NIGHT-APE. See **DOUROUCOULI**.

NIGHT-BLINDNESS, a defect of vision. See **VISION**, **DEFECTS OF**.

NIGHT BLOOMING CEREUS, the name given to the superb variety of night-flowering cactus, the *cereus grandiflorus*, with its vanilla-scented flowers. See **CEREUS** and **CACTUS**.

NIGHT-HAWK, or **BULL-BAT**, an American nightjar or goat sucker (*Chordeiles virginianus*). It arrives in the Northern States about the middle of May and is crepuscular and nocturnal in habits, pursuing insects on the wing with great activity and often at a great height in the air, frequently over towns and cities. It retires in the daylight hours to the woods or an orchard and sleeps sitting lengthwise on some large horizontal limb, or on a log, where its grayish mottled plumage, blending with the color of the old bark, makes it unnoticeable. When flying it often utters a harsh scream, and also, when dropping suddenly through the air, as it often does, it produces a strange booming sound. The night-hawk attains a length of 9 or 10 inches. It is blackish-brown on the upper parts, barred and mottled with grayish and buffy; a large wing-spot, bar across the tail, and V-shaped blotch on the throat, are white in both sexes and is the easiest mark of recognition. The tail is forked and is a little shorter than the wings when in repose. The gape is large and the rectal bristles are inconspicuous.

The eggs, two in number, oblong shape, and dirty bluish-white sprinkled with dark olive-brown, are produced about the middle of May, and are deposited on the bare ground in a dry situation, no nest being constructed. In Texas, Mexico and the Antilles there exists an allied species (*C. acutipennis*).

NIGHT-HERON. See **HERONS**.

NIGHT SCHOOLS. See **EVENING SCHOOLS**.

NIGHT THOUGHTS, or **THE COMPLAINT**. The first book of the 'Night Thoughts' appeared in 1741, when Young had just completed his 60th year; the ninth and last book was published four years later. The professed purpose of the whole poem is to recommend the faith in another life as a compensation for the sorrows, disappointments and hollowness of this one. Young is careful to tell us in the preface to the first night that "the occasion of the poem was real, not fictitious"; and doubtless the reflections in the first two books were largely suggested by personal bereavement. His wife died early in 1741; two other friends, a daughter of his wife by a former marriage and her husband, to both of whom Young was warmly attached, had died, one in 1735 and the other in 1740.

"Insatiate archer, would not one suffice!"

cries the poet in a burst of genuine grief. But grief that is really poignant is not usually quite so rhetorical; one does not need to read far even in the early parts of the poem to suspect that the poet was not wounded so much in his affections as in his ambitions. Did we know nothing of Young's career, we might safely conjecture that this is the complaint of a man who, at the summit of his years, turns away from life disappointed, with the pious resolve to disown and discredit the things he had most desired. After the close of the third Night this tone of melancholy reflection changes to one of declamatory argument. Young had the typical 18th century confidence in "reason" and used the last six Nights of the poem mostly in the attempt to "reclaim" a certain Lorenzo, who is supposed to be a representative of the prevalent deism of Young's time. But Lorenzo is a man of straw; and Young's familiar arguments, whatever their intrinsic value, are lost in such a wilderness of wordy metaphor that the reader of to-day is inclined to sympathize with Lorenzo and emerges at the end of 10,000 lines dazed and wearied rather than convinced.

In fact, Young's poem exhibits about all the dangers that best the extravagant rhetorician. His imagination is at times genuinely lofty; yet he is always mistaking bigness for greatness. With a flux of metaphor, apostrophe and hyperbole at command, he is always forgetting that the most sublime and the most pathetic truths admit only the simplest statement. If he occasionally writes a line of epigrammatic brevity and force, like

"Procrastination is the thief of time".

or

"An undevout astronomer is mad",

he is sure to submerge his fine line in a rubbish of feeble metaphor. Worst of all, such a continuous roll of tumid declamation, in exclamations and superlatives, forces us to doubt the poet's sincerity. Lacking in spontaneous feel-

ing, he deems it his duty to force his emotions by violent rhetorical stimulants. As he says, "On such a theme as this, 'tis impious to be calm".

But emotion thus excited is likely to leave the reader's sceptical calm quite undisturbed.

Yet it must be remembered that in his own day Young enjoyed a reputation hardly inferior to that of Pope. The 'Night Thoughts' was deemed the greatest moral poem of the century, admired equally for its art and its religion. For some 40 years probably no other poem in England was more widely read. The fame of it quickly spread to Germany, where no fewer than three different translations were made in the decade from 1750 to 1760. In France also it was hardly less admired.

Explanation of this popularity is found partly in some unquestioned merits of Young's work—in the sustained amplitude of its blank verse, thought by many superior to Milton's; in the exhaustless, if unregulated, store of its imagery; in occasional passages of subtle thought or lofty emotion. But the most important cause of this contemporary estimate of Young's poem is in its appeal to a temper of unrest and dissatisfaction then almost universal in Europe, a temper which took different forms in different countries, but everywhere was inclined to welcome a literature of morbid, sentimental melancholy. It is noticeable that the one prose work more widely read in England than any other for some 30 years, Hervey's 'Meditations among the Tombs,' was an exact contemporary of 'The Night Thoughts,' and was filled with the same tumid rhetoric. Blair's 'Grave' (1743), a poem of some thousand lines of blank verse, is another example of what has been called the Graveyard School of literature. The temper which enjoyed such literature was one of the many forms of reaction against convention in religion and society as well as in art, which issued later in romanticism in literature, and in revolution in society. With the growth of a more healthy and vigorous tone of feeling, the interest in this morbid, sentimental work largely passed away; it is safe to say that 'The Night Thoughts' has found few readers in the last hundred years. Consult Courthope's 'History of English Poetry' (Vol. V); Eliot, George, 'Essays'—"Worldliness and Other Worldliness"; Kind, J. L., 'Edward Young in Germany' (Columbia University Press).

CALEB T. WINCHESTER.

NIGHTINGALE, Florence, English philanthropist; b. Florence, 12 May 1820; d. London, 13 Aug. 1910. She early became interested in hospital work, was trained as a nurse and studied the methods of hospital administration through Europe. In 1853 she established a hospital for invalid gentlewomen in London. The early stages of the Crimean War (1854-55) disclosed a terrible state of affairs in regard to the treatment of the wounded. The hospital arrangements were inadequate and unorganized; the usual satellites of warfare—fever, cholera and dysentery—were doing their deadly work among the wounded and healthy alike. Public indignation was aroused, and the government called on Miss Nightingale. It was a remarkable coincidence that, while the Minister for War, Sydney Herbert, was writing asking her to undertake the onerous task of organizing the hospitals, the lady

was also writing to him, offering her services, her experience and, if necessary, her life itself. In a week she raised a band of trained nurses and proceeded with them to the Turkish military hospital at Scutari on the Bosphorus, arriving on 4 Nov. 1854. She took command of the hospital, introduced system and order where indescribable chaos had reigned, and laid the foundations of modern scientific nursing. She made three trips across the Black Sea to the Crimea and reorganized the base hospitals and dressing stations. Here she was attacked with fever; a special yacht carried her back to Scutari. On her recovery she resumed her post and continued her devoted labors till the end of the war. In recognition of her services a fund of £50,000 (\$250,000) was raised for her. She refused to accept the money for herself but devoted it to found the Nightingale Home at Saint Thomas' Hospital. She received the thanks of Parliament and was frequently consulted by royal commissions in regard to field and camp hospitals. Her advice was sought by the American government during the Civil War and by the French in the Franco-Prussian War of 1870-71. Numerous honors were conferred on her; she received the rare distinction of the Order of Merit in 1907 and the freedom of the city of London in 1908. Among her writings are 'Notes on Hospitals' (1859); 'Notes on Nursing' (1860); 'Lying-In Institutions' (1871) and 'Life or Death in India' (1874). She is commemorated in the new statuary group of the Crimean War Monument in London and the Nightingale statue in Waterloo Place. Longfellow's 'Santa Filomena' was written in her honor, since when she became known as 'The Lady with a Lamp.' Consult the authoritative 'Life' by E. T. Cook (London 1913) and biographies by Matheson, A. (1913); Richards (1909) and Miss Tooley (1905); Kinglake's 'Invasion of the Crimea.'

NIGHTINGALE, a celebrated song-bird of the family *Sylvidae* or Warblers. The nightingale (*Daulias lusciniæ* or *Luscinia megarhyncha*) is attractive for no lustre or brilliancy of plumage, the upper parts of the body being rusty-brown tinged with olive, and the under parts pale ash, blending into white at the throat and belly. Its average length is about six inches. In habits the nightingale is active and lively; it frequents trees of small size and bushes, and subsists chiefly upon an insectivorous dietary. It is a migratory bird, and occurs throughout Europe, but in Great Britain is limited to certain districts, so that it is never or rarely heard in Wales nor in the most western districts of England, nor in Ireland or Scotland. The song continues from 15 April until the middle of June, when the young are hatched. The male bird sings during the day, and at night also and perhaps more frequently, while the female is incubating; and the flood of song poured forth in the stillness of the evening forms one of the chief sources from which the reputation of the nightingale has been derived. The nest is of rough construction. It is generally formed of leaves and grasses, and is situated mostly in damp places or in the neighborhood of water. The eggs number from four to five, and are of an olive-green color. These birds live in confine-

ment. The bird-catchers, if possible, take the males before the arrival of the females. Birds trapped after the pairing season are said to languish and die. Another species, formerly regarded as identical with the above, is *D. philomela*, which has a more easterly distribution, extending far into western Asia. This is the bird most often referred to in literature as the Persian bulbul; and it takes a prominent place in classic mythology as does a third species, *Luscinia hafizi*, in Persia and Turkestan. Nightingales endure captivity well and are kept as cage-birds in all parts of the world. See CAGE-BIRDS and the authorities there mentioned; consult also Burroughs, 'Winter Sunshine' (Boston 1876; autograph ed., ib. 1904); Newton, Alfred, 'Dictionary of Birds' (London 1896); Kirkman (ed.), 'The British Bird Book' (London 1911), and the writings of British ornithologists.

NIGHTJAR, a bird of the family *Caprimulgidae* (q.v.). This name was first given to a single species, that common in the British Islands, on account of the jarring note it utters after dark; but most of the members of this nocturnal family produce similar sounds, and the term seems preferable in many respects to the erroneous designation "goatsuckers" traditionally applied to them in southern Europe and which should long ago have been abandoned. American representatives are the night-hawks, whippoorwills and chuck-will's-widow, elsewhere described. The British nightjar is much like the American whippoorwill in appearance, and is known by many provincial names, such as dor-hawk, churr-owl, fern-owl, etc. Consult Montagu, 'Dictionary of British Birds'; Newton, Alfred, 'Dictionary of Birds' (London 1896); White, 'Natural History of Selborne.'

NIGHTMARE, a sensation of oppression or of suffocation which sometimes occurs during sleep. The sufferer experiences a short period of intense anxiety, fear, horror, etc.; feels what seems an enormous weight on his breast; is pursued by a phantom, monster or wild beast, which he cannot escape; is on the brink of a precipice from which he cannot remove, or is, perhaps, rolling down it without being able to make any exertion for his safety; and his bodily members refuse to do their office, until he suddenly awakens himself by starting up, or by a loud cry; he is then in great terror, and the body may be covered with sweat. Nightmare is generally due to repletion and indigestion, and is often superinduced by lying on the back, especially when the head is low. A person subject to nightmare should carefully observe moderation in eating and drinking, should avoid heavy meals shortly before retiring and likewise overrich food. Alcoholic excess may lead to nervous disorders characterized by conditions, physical and psychical, which increase liability to nightmare and similar forms of disturbance. See DELIRIUM; INCUBUS; MARA.

NIGHTMARE ABBEY, a novel by Thomas Love Peacock, the hero of which is a caricature of Shelley. It was published in 1818.

NIGHT'S LODGING, A. (Na dnve). Gorki wrote his drama 'Na dnve' ('At the Bottom') in 1902. It was translated into German

as 'Ein Nachtsylx' ('A Night's Lodging'), and is known by this title in English. It gained its reputation because Max Reinhardt introduced it at the Little Theatre in Berlin, after it had been acclaimed as a masterpiece in Moscow on 31 Dec. 1902. There is no action and the plot is insignificant. A poor, maltreated woman dies in the purlieu. Vaska, the thief, rejects the landlady and keeps company with her kindlier sister. During a brawl the land-lord is killed, and the widow denounces her past lover to the police. The redeeming character is a pilgrim whose quaint philosophy seems to keep aflame the spark of humanity in the creatures of the purlieu. When he leaves, all return to their sordid lives, and one of them, a former actor, hangs himself. The characters are described with gross fidelity to nature, and it is only the artistry of the Moscow Art Theatre and of Reinhardt's troupe that made the production possible. In the hands of less gifted players the drama is intolerable.

LEO WIENER.

NIGHTSHADE, any of several plants of the order *Solanaceae*, sometimes called nightshade family, especially distinguished for toxic properties, and constituting the typical genus *Solanum*. The common or black nightshade (*S. nigrum*), an annual or biennial, with erect angular stem, ovate, sinuate-dentate leaves, drooping lateral umbels of white flowers and globose black berries, grows as a weed in waste place in most parts of the world. It is only slightly narcotic. The leaves in a fresh state are said to be injurious to animals which eat them, but seem to lose almost all narcotic property by boiling, and are used as spinach, particularly in warm climates. The berries, though generally dreaded or suspected, may also, it is said, be eaten, at least in moderate quantity, without danger. They contain, however, the alkaloid solanine found also in the shoots of the potato. Several comparatively innocuous species, such as the horsenettle or apple of Sodom (*S. carolinense*) with orange-yellow berries, are natives of the dry western portions of the United States and Canada, and one, the bittersweet, blue bindweed, felon wort, poison-flower or woody nightshade (*S. dulcamara*), is naturalized all over the eastern half of the country. (See DULCAMARA). The deadly nightshade (see BELLADONNA) is a member of an allied genus, whose toxic principle is atropin (q.v.).

NIGIDIUS FIGULIS, Publius, Roman scholar: b. about 98 B.C.; d. 44 B.C. He took part in political affairs during the closing days of the republic; became praetor in 59 B.C.; and having sided with Pompey in the Civil War was compelled by Caesar to live in exile. In philosophy he was a Pythagorean; and for the scope of his learning he was ranked by Aulus Gellius next to Varro (q.v.). His fame as an astrologer was great, and in the 'Chronicle' of Eusebius he is styled "Pythagoricus et magus." Gellius complains of the obscurity and subtlety of Figulus' writings, but the examples he adduces in proof are not thought by critics to support the assertion. The fragments extant have been edited by Swoboda (1889). Consult also Röhrig, 'De Nigidio Figulo' (1887).

NIGRITE. A variety of asphalt mined at Soldier Summit, Utah. Brittle, imperfectly

fusible, imperfectly soluble and probably useful for same purposes as grahamite.

NIGRITIA, nī-grīsh'ī-ā. See **SUDAN**.

NIHILIANIST, in *theology*, one who taught "*Christus, secundum quod est homo, nihil est*," that is, the human nature of Christ had no existence, so far as it could be called his. In other words Christ did not become anything different from what he was before, by assuming human nature, because no change can be wrought in the unchangeable God, and a man is not to be called a cloak because he puts one on. This was the view of Abelard, and John of Damascus, and was held to be tenable, at least, by Peter Lombard (see **LOMBARD, PETER**). It was condemned in the Lateran Council of 1179.

NIHILISM, from the Latin *nihil* (a trifle, nothing), the state or condition of nihility, being nothing. A general term used to define a Russian socialistic movement, and a name also applied in metaphysics to the doctrine that refuses a substantial reality to the existences of which man is conscious. In Russia the word Nihilist was first applied by Ivan Turgenev to the hero of his novel 'Fathers and Sons,' who was intended to be the personification of a movement in Russia for the emancipation of women, the independence of children and the spread of natural religion.

Doctrine of Nihilism.—Followers of Nihilism were those who disbelieved that improvement in the social condition of man is possible by orderly progress and evolution; particularly members of any association that was devoted to the work of destroying the established form of the Russian government without any hope or definite theory of substituting another government in its place. In general, the Nihilists stood for communism, free-love and the abolition of religion and centralized government. Nihilism appears to have permeated every stratum of Russian society, and its recruits and followers are gathered from every social grade, alike from the nobility, the army and the peasants. The Bolsheviks of the revolution of November 1917 are essentially the heirs of the Nihilists.

Early History.—As early as 1818 a party of freedom, so-called, was organized in Russia, and on 14 Dec. 1825 occurred the rising of the Decembrists among the officers and soldiers of the army. These revolutionists aimed at the emancipation of the serfs and the introduction of constitutional government. The revolt was quelled, and six of the leaders were executed and 125 others imprisoned or exiled. About 1850 liberal ideas received an impetus from the study of socialistic writers of other countries. On 23 April 1849, some 40 persons were arrested who belonged to an association formed by Petrashevsky, an official of the Foreign Office. These were sentenced to death, but the sentences were commuted to imprisonment and banishment. In 1857 Alexander Herzen founded a journal, the *Kolokol*, which had a remarkable influence upon the Russian youth. In the same year there arose in Russia a movement, under the leadership of Chernishevski, which criticised existing society. In the universities and among the educated everywhere this movement spread like wildfire. In 1864 he

published a novel entitled 'What is to be Done?' which proved a revolutionary firebrand among the peasantry. This appeared while he was in jail, and with the consent of the authorities. Like most of the books of the Nihilists of the time, its propaganda were marked as fiction. Another writer, Shapoff, urged the introduction of self-government and local autonomy. Numerous organizations sprang up in the universities, and in 1862 the various secret associations united under the name of 'Land and Freedom.' In 1866 a certain Karakozov tried to assassinate the Tsar. In 1868 Bakunin commenced the publication of a newspaper in Geneva. In this journal he advocated the total abolition of the state and the substitution of small communes.

The Socialistic Propaganda.—In the early part of 1870 a number of young men and young women of the upper classes voluntarily went to work in the fields and the factories so as personally to carry on Socialistic propaganda and distribute Socialistic literature. Their organs were the *Forward* of London and the *Workingman* of Geneva. This work continued about six years, during which time there were 23 political trials of 417 persons, half of whom were condemned to exile in Siberia or to hard labor in the mines. During this period there existed a more moderate party, but it failed to satisfy the demands of the young men of the universities. In 1875 the Narodniki "nationalists" became a prominent organization. The government became active, and during 1876 and 1877 the prisons were filled with propagandists.

The Party of Removal.—In 1877 former adherents of the Nihilistic movement organized a new and stronger secret party, which aimed at the removal by force of crowned heads, and a warfare against the government. On 24 Jan. 1878, a young woman of 28, named Vera Zasulich, shot at General Trepoff, who had caused a prisoner to be whipped for refusing to take off his hat to him. She was tried before a jury, and, strangely enough, was acquitted. The government was enraged and had the verdict annulled. On 4 Aug. 1878 General Mesentzoff was killed, and 22 Feb. 1879, the governor of Kharkov, Prince Kropotkin, was assassinated. On 2 April 1879, an attempt to assassinate the emperor, Alexander II, was made by Soloviev. He was captured and hanged. Alexander II (q.v.) was assassinated 13 March 1881. These crimes were claimed by a secret revolutionary committee which really had very little authority over the direct perpetrators.

The Will of the People.—Some time later at a secret meeting of this committee held at Lipetz, the acquisition of political freedom was declared to be the first necessity. It was hoped to gain this by the formation of a legislative body, elected by the people, with guarantees for electoral independence, and liberty to agitate for reforms. This was demanded from Alexander III (q.v.) shortly after the assassination of his predecessor as the price of cessation from violence. This new party, the "Narodnaia Volia" or "Will of the People," sought to overthrow despotism by execution of the communistic instincts of the peasants. It set forth the following demands: (1) A representative assembly having supreme control in

state matters; (2) provincial self-government with elective officers; (3) village communism; (4) freedom of conscience, press, speech, association and political agitation; (5) suffrage; (6) a national militia instead of a standing army; (7) nationalization of land; (8) measures to socialize factories. This movement proved a total failure and the party collapsed in 1885.

Latter-Day Conditions.—The condition of Nihilism in Russia before revolutions of 1917 has been likened to a sleeping volcano. There had been no successful outbreak and few assassinations although the secret party existed in larger numbers than ever before. The discoveries of the police showed that Nihilism was widely spreading in Russia, not only among the working classes but among the aristocracy, and even in the army, especially in Saint Petersburg, and in many of the principal cities and towns. Secret affiliations were known to exist between the Russian Nihilists and the French and Italian anarchists. Relieved of the oppression from above by the successful outcome of the revolution of May 1917, Nihilism has given rise to the Bolsheviki, the dominant party at present (January 1918). See ANARCHISM; MAXAMILLISTS; SOCIALISM.

Bibliography.—Kennan, 'Siberia and the Exile System' (New York 1891); Kornilov, 'Modern Russian History' (tr. New York 1917); Krapotkin, 'Memoirs of a Revolutionist' (Boston 1899); Milyoukov, 'Russia and Its Crisis' (Chicago 1906); Tikhomiroff, 'Russia, Political and Social' (London 1887); and 'Russia under the Tsars' (London 1885).

NIHONGI, *nē'hōn-gē*, a Japanese historical work embracing records of ancient Japan. It was first issued in 712 as the *Kojiki*, and was edited and fashioned on the model of Chinese histories, reissued in 720.

NIIGATA, *nē-ē-gā'tā*, Japan, a seaport city, capital of the province of Echigo, on the west coast of the island of Hondo, nearly opposite the island of Sado, on the west bank of the Shinanogawa. Its streets are intersected by canals and there are 200 bridges. It was one of the treaty ports opened in 1859, but owing to unsuitable harbor, now deepened by dredging, its foreign trade has been nominal; its coasting and internal trade, however, is important and increasing, the province being rich in petroleum and minerals, and agriculture being well developed. Pop. 66,622.

NIJMEGEN, *nī'mā-hēn*. See NIMWEGEN.

NIJNE-TAGILSK, *nēzh'nē-tā-gīlsk'*, East Russia, the chief town of the Ural Mountains mining region in the government of Perm, on the Tagil, 135 miles east of Perm. Its chief industrial establishments are the iron works founded by Demidoff; iron, gold, copper and platinum are mined in the surrounding district. Pop. 45,179.

NIJNI-NOVGOROD, *nēzh'nī-nōv'gō-rōd*, or **NIZHNI-NOVGOROD** ('Lower Novgorod'), Russia, a government bounded north by the governments of Kostroma and Viatka, east by Kasan and Simbirsk, south by Penza and Tamboff and west by Vladimir; area, 19,789 square miles. The capital is Nijni-Novgorod (q.v.). The surface forms an extensive plain, occasionally broken and diversified by low un-

dulating hills. These hills are almost invariably composed of limestone, which is largely developed over the whole government. The only metal found is iron; gypsum prevails in every quarter. The entire government belongs to the basin of the Volga, which, entering it on the northwest, and traversing it in one vast curve to the east, drains a considerable portion of it directly, all the other drainage being brought to it by the Oka and its tributaries on the west, the Sura and its tributaries on the east and the Senets and Vetluga on the north. The soil is of remarkable fertility, rendering this government the granary of Russia. The principal crops, in addition to the ordinary cereals, are hemp and flax. Much attention also is paid to the production of fruit. The extent of forest is equal to that of arable land, and there are tracts of excellent timber. Both manufactures and trade have made great progress. Several governments possess much larger establishments, but in none is the spirit of activity and enterprise more universal. The principal manufactures are coarse cloth, canvas, cordage, glass, soap and leather; domestic industries are important and growing. The trade includes corn, flour, hemp and flax, iron and ironmongery, etc. The central position of this government, and its large navigable rivers, are highly favorable to its trade. Pop. 2,081,200.

NIJNI-NOVGOROD, **NIZHNI-NOVGOROD**, or simply **NIJNIY**, Russia, the capital of a government of the same name, at the confluence of the Oka and Volga, 273 (by rail) miles east of Moscow. It is of world-wide celebrity in connection with its great commercial fair which has been held here annually since 1816, lasts from 15 July to 10 September and is attended by an average of 400,000 dealers and visitors, from all countries between England and China. There is an upper city containing the Kremlin, a lower city and a suburb. The Kremlin, finely situated on the loftiest point of the high town, is surrounded by a lofty wall flanked with towers, round or square, and contains the principal edifices, particularly two cathedrals, with precious relics, one a picture 900 years old, the governor's palace, and an episcopal seminary. With the exception of these, the elegant church of the Holy Women, and a few other public edifices, the whole town is built of wood and possesses little interest. It is, however, becoming noted for its educational institutions, including schools, libraries and museums. For the convenience of those frequenting the fairs there is an enormous market hall, electric lighting and an electric street railroad, and 60 blocks of buildings for booths, containing more than 2,500 apartments separated by fireproof walls. The value of goods sold at one of these fairs often exceeds \$90,000,000. At these fairs all foreign goods are supplied in smaller quantities, those of Russian production showing an increase. Nijni-Novgorod, founded in 1221, was devastated on several occasions by the Tartars; its prosperity dates from 1816 when the great fair was removed to Nijni-Novgorod from Makarieff, after a great fire. Pop. 112,300.

NIKA (*nē'ka*) **RIOT**. The insurrection in Constantinople in 532 against Justinian, caused by the contention between the Blue and Green factions. See JUSTINIAN I.

NIKE, nī'kē, in Greek mythology, the goddess of victory; called by the Romans Victoria. Her festival was on 1 November. In art she is generally represented as a winged female figure. Her attributes are a palm branch, a garland and sometimes a herald's staff.

NIKE APTEROS, or **ATHENE NIKE**, a small but beautiful Doric temple standing on a bastion flanking the entrance to the Athenian Acropolis. It was torn down by the Turks in the 17th century.

NIKISCH, nē'kīsh, **Arthur**, Hungarian orchestral conductor; b. Szentmiklos, Hungary, 12 Oct. 1855; d. Leipzig, 23 Jan. 1922. He studied violin, composition and piano under Hellmesberger, Dessoff and Schenner, respectively, in the Vienna Conservatory; was first violin in the Vienna Royal Opera orchestra for a year; and then in 1877 became musical director of the City Theatre of Leipzig. He directed the Boston Symphony Orchestra 1889-93, the Royal Hungarian Opera in Budapest 1893-99, and the Philharmonic concerts in Leipzig thereafter. In Leipzig he conducted the famous Gewandhaus orchestra. He toured the United States in 1912 with the London Symphony Orchestra. Nikisch wrote 'Die Christnacht,' and other music. Consult the study by Pfohl (1900).

NIKITA, nē-kē'tā, **Louise**. See **NICHOLSON**, LOUISA MARGARET.

NIKITIN, nyē-kē'tyēn, **Ivan Savitch**, Russian poet; b. Voronezh, 3 Oct. 1824; d. there, 28 Oct. 1861. He was educated in the seminary of his native town and on the failure of his family fortunes managed a roadside inn in 1843. He also kept a book store toward the end of his life. Nikitin began to write about 1850. His patriotic poem 'Russia,' published in 1853, attracted attention and was followed by a volume of poems (1856), issued under the patronage of Count Dmitri Tolstoy. In 1858 he won much fame by the publication of a poem, 'Kulak' (The Money-Lender), which portrays peasant life in graphic style. 'The Volga Boatman'; 'The Ploughman' and 'A Winter Night in a Village' became very popular. Nikitin also wrote two novels. Some of his poems have been translated into English. His biographer, De Poulé, issued a complete collection of his works (Moscow 1886). Consult biography by Sawizkij (Petrograd 1893); and Newmarch, Rosa, 'Poetry and Progress in Russia' (New York 1907).

NIKKO (Sun's Brightness). Properly speaking Nikko is the name of a mountainous district lying about 100 miles to the north of Tokyo; but it is generally applied to the principal villages, Hachi-ishi and Irimachi, 91 miles from Tokyo by the Northern Railway and the sacred grounds between them. Lying 2,000 feet above the sea, Nikko is a delightful summer resort. The mountain range in which it is picturesquely located is called Nikko-Zan (Mountains of the Sun's Brightness). From time immemorial Nikko, with its mountains, cascades and monumental forest trees, has always been revered by the Japanese. A Japanese proverb says: "Do not use the word magnificent till you have seen Nikko." A Shinto temple existed at Nikko in remote times; but it was removed and in 767 a Buddhist temple was founded by Shodo Sho-nin, the subject

of many strange legends. In the 17th century was added the mausoleum of the illustrious Iyeyasu, founder of the Tokugawa dynasty, who was buried there with amazing pomp in 1617, and the tomb of his scarcely less famous grandson, Iyemitsu, who was slain in 1650 while visiting his grandfather's tomb. On issuing from the village one of the first objects to attract attention is the *Mihashi*, or Sacred Red Bridge, spanning the *Daiya-gawa*, a stream about 40 feet wide. This bridge, erected in 1638, was closed to all persons but the Shogun, save twice a year when pilgrims were allowed to walk across. Having been washed away in 1902 this bridge was restored in 1907. Forty yards lower down is the bridge for ordinary visitors. Ascending a paved slope, through a grove of cryptomerias, the visitor reaches the enclosure commonly spoken of as *Mangwanji*, within which stands the *Sambutsudo*, or Hall of the Three Buddhas, so called from the gigantic gilt images of the thousand-handed Kwannon. Near this is the famous pillar called *Sorinto*, erected in 1643 for the purpose of averting evil influences. This is a cylindrical copper column, 42 feet high, very black, and adorned at the top with a series of lotus flowers from the petals of which hang small bells. Broad steps between two rows of cryptomerias lead to the granite *torii*, presented by the Daimyo of Chikuzen in 1618, on the left of which is a five-storied pagoda of graceful form and painted in harmonious colors. This building (104 feet) was given in 1649. Around its base the signs of the zodiac are carved. Among the other buildings clustering around the shrine of Iyeyasu are the *Ni-o-mon*, or Gate of the Two Kings, with its carvings of lions, unicorns, elephants, tigers and peonies; the vermilion-colored wall that encloses store-houses and various buildings connected with the religious rites; a bell-tower with the famous "Moth-eaten Bell," given by the king of Korea; bronze lanterns; and the temple of Yakushi, the patron saint of Iyeyasu. Then comes the *Yomei-mon* gate, with its superb carvings, one of which was purposely carved upside down owing to a superstitious idea that the flawless perfection of this structure might bring misfortune upon the house of Tokugawa by exciting the jealousy of heaven. Beyond lies a court and then comes the *Kara-mon*, or Chinese gate, which gives admission to the most sacred enclosure of all, which is surrounded by the *tamagaki*, or fence, a quadrangle of gilt trellis-work, 50 yards square and superbly carved. Within this trellis stands the chapel called *Hondon*, or oratory, better described as a series of three chambers lavishly decorated with black lacquer and gilt. The last chamber in the Holy of Holies is an expression of Japanese Buddhist art at its acme, "a blaze of gold and resplendent colors, with elaborate paintings of mythological beings and ancient court personages, precious woods inlaid and carved, richly lacquered pillars, splendid metal-work often superimposed layer upon layer—the whole a marvel of minute detail and in perfect preservation." Through a door, over which is a carving called the *Nemuri no Neko*, or Sleeping Cat, one of Hidari Jingoro's most famous works, the visitor passes; and, after ascending 200 steps, finds the tomb of Iyeyasu

on the hill beyond. Tall cryptomerias overshadow this, a small bronze pagoda, with a stone table in front bearing an immense bronze stork with brass candlestick in its mouth, an incense burner and a vase with lotus flowers. The whole is enclosed by a high stone wall. Lacquered buildings, Buddhist images, pagodas and *torii* are abundant in the vicinity. Flights of stone steps and carved gates lead likewise to the mausoleum of Iyemitsu, the oratory and chapels of whom are not less magnificent than those of Iyeyasu. The tomb itself is on the summit of a hill called *Hotoke-iwa*, and not far away is buried Iyeyasu's horse, which carried Iyeyasu in the decisive battle of Seki-ga-hara in 1600. The trees on this hill are of marvelous variety and beauty, particularly in the autumn. Numerous shrines, temples, sacred buildings and images fill the great enclosure.

Thirteen of the "Abbots" of Nikko (who were always princes of the imperial blood) are buried in the grounds. The magnificent residence of the abbots was burned in 1871 by a fire that destroyed a large number of the temples. What the visitor sees is, therefore, but a fragment of Nikko's former splendor. Enough remains to astonish and bewilder the eyes and mind. Since the beginning of the present century judicious repairs have been proceeding. A great festival is held here annually on 1 and 2 June. The sacred palanquins containing the divine symbols are then borne in procession, when ancient costumes, masks and armor are donned by the villagers, old and young taking part in the display. Another, but less elaborate, ceremonial takes place annually on 17 September. Many foreign residents of Tokio have villas in Nikko, or at Chuzenji, seven miles beyond. The one drawback to the climate is the frequent rain. Within a radius of 15 miles there are no less than 25 or 30 lovely cascades. The mountain climbs of Nyoho-Zan and Nantai-Zan attract many tourists. Nikko is not only noted for its superb wood-carving and painting and the most perfect assemblage of shrines in all Japan, but for the glorious tints of its foliage at the beginning of November. Hence it has been described as "a double glory—a glory of nature and a glory of art." Nikko is a mart for skins of the badger, deer, marten, wild-boar, etc., and for various pretty articles made of a black fossil wood (*jindai-boku*), brought from Sendai in the north. (See IYEFASU and TOKUGAWA). Consult Tyndale, Walter, 'Japan and the Japanese' (London 1910); Clarke, Joseph I. C., 'Japan at First Hand' (New York 1918).

NIKOLAI NIKOLAIEVITCH, *nyē'kō-lā'yē-vitch*, (Grand Duke Nicholas), Russian general: b. Saint Petersburg, 6 Nov. 1856. He is the second cousin of the Emperor Nicholas II. He was graduated from the Nikolaiev Military Academy and made lieutenant of cavalry in 1871. During the Russo-Turkish War he became junior officer of a Hussar regiment and was decorated for conspicuous bravery; receiving the Cross of Saint George and the Golden Sword for his daring to cross the Balkans and the Danube. He also received the Prussian order 'Pour le Merite.' He took part in the capture of Sofia and Adrianople. In 1893 he was made lieutenant-general; in 1895 inspector of cavalry and colonel of Hussars of His

Majesty's guard; in 1905 he was made major-general of the Guards and president of the council of defense; and in the next year became commander of the military district of Petrograd. In 1907 he married the Princess Anastasia (b. Cettinge, 1867), daughter of the king of Montenegro and sister of the queen of Italy. His great military reputation and his knowledge of European strategy caused him to be appointed commander-in-chief of the Russian army at the outbreak of the European War in 1914. In September 1915 he was removed from the command in European Russia and sent to the Caucasus to take command against the Turks in that region, being superseded in the command of the European Russian army by the Tsar. Nicholas was largely instrumental for the issuance of the manifesto promising the Poles national autonomy. He is a profound student of all military matters and was one of the first in Russia to appreciate the value of aviation. Nicholas is a good writer and is fond of delving into Russian history. He is also a noted sportsman and has in his palace at Petrograd a unique collection of stuffed bears, which he himself killed in various parts of the world. Consult 'Le Grand Duke Nicolas' (in *Le Correspondant*, Paris 1915).

NIKOLAIEFF, *nē-kō-l'ī'ēf*, or **NICOLAIEV**, Russia, a seaport, and the chief naval station on the Black Sea, at the confluence of the Ingul and Bug, 36 miles northwest and in the government of Kherson. It occupies a large space, is fortified and well built, with wide streets and a finely planted boulevard. It is administered by a governor, who is also commander-in-chief of the Black Sea fleet. It was founded in 1791, has important dock yards, depots and machine shops, and a floating dock anchored in the Bug; also tobacco factories and a large trade in grain. Pop. 106,300 (about 17 per cent being Jews).

NIKON, *nē'kōn*, Russian patriarch and primate: b. 1605; d. 17 Aug. 1681. He was appointed (1646) by the Tsar Alexis Mikhailovitch to be archimandrite of the Novospasky monastery in Moscow, became metropolitan of Novgorod in 1648 and in 1652 patriarch of Russia. In 1666 he was deposed and banished to a monastery. He died while on his way, by imperial permission, to the monastery of the Resurrection of Christ, which Nikon himself had built, and where he had gone into temporary retirement in 1658. He introduced reforms into the service of the Church, upheld monasticism, lived a life of exemplary devotion and aimed at the educational and social advancement of the people. His revision of the debased liturgies of the Church in order to bring them into conformity with their originals gave rise to the sect of the Raskolnics (q.v.) or "Old Believers," and culminated in his own disgrace; but his reforms were adopted. Consult Palmer, W., 'The Patriarch and the Tsar' (1871-76).

NIKOPOL, Bulgaria, chief town in the sub-prefecture in the district of Plevna on the Danube, 24 miles northeast of Plevna, on the railway from Sofia to Bucharest. As a military post it has been important for centuries and is commanded by a citadel and fortifications which run down to the river. A mined castle dominates the scene and gives a touch of pic-

turesqueness to the country. Here, too, the Danube is joined by the Osem. Until the creation of a new port at Somovit, Nikopol was the outlet for the trade of Plevna, Lovtcha and other inland towns. It now has additional trade on account of the railway. The chief exports are cereals and the chief industries tanning and fishing. The town is also called Nicopolis ad Istrum, being confused with the town of Nicopolis founded by Trajan to commemorate his victory over the Dacians, several miles below at a spot still called Nikup, at the confluence of the Iatrus or Qantra with the Danube. Nikopoli occupies the site of the ancient Asamus. It has seen many battles. Sigismund of Hungary captured the fortress in 1392 and 1395, and he, in turn, was defeated by the Turks under Bajazet I in 1396. The town was besieged by Ladislaus I of Hungary in 1444; the Turks were defeated by Bathori in 1595 and by Michael of Wallachia in 1598; the town was captured by Pasvan-oglu in 1797; the Russians under Kamensky took it in 1810; the Turkish fleet was destroyed here and the Turkish camp taken by Govarov in 1829, and the town was captured and burned by the Russians under Krüdener in 1877. Good wine is produced in the country and there is considerable trade between Nikopol and Wallachia, as well as to other parts of Bulgaria. Nikopol is inhabited chiefly by Bulgarians and Turks. Pop. (1910), 5,379.

NIKOPOL, Russia, town in the government of Ekaterinoslav, on the right bank of the Dnieper, 70 miles southwest of Ekaterinoslav. It is situated on an elongated peninsula between two arms of the Dnieper; and as the banks are low and marshy here it is a place where the Dnieper can be conveniently crossed. Hence, for centuries, Nikopol (formerly called Nikitin Rog), has been an important place. At the present time it is on the highway from Ekaterinoslav to Kherson, the point where the "salt-highway" of the Chumaks, or Little Russian salt-carriers, crosses the Dnieper and leads thence to the Crimea. As Nikopol is also a strategic point, many battles have been fought for its possession, testified by numbers of graves in the vicinity, and in one of these mounds was found the famous Scythian vase representing the capture of wild horses, together with other antiquities. A little beyond the town is situated the old fortified camp of the Zaporogian Cossacks described in Gogol's novel 'Taras Bulba' (1834). Nikopolis is one of the chief centres for the export of corn, hemp, linseed-oil and wool. Agriculture and shipbuilding are also industries. The chief inhabitants are Jews, Mennonites and Little Russians. Pop. (1900), 21,282.

NILE, a river of northeast Africa, celebrated from remote antiquity as the Egyptian Hope or Aur-Aa—Great River, the Hebrew Sihor, and the Greek *Νεῖλος* the longest river of the African continent, and the second in length of the rivers of the world, the Missouri-Mississippi being the longest. Its length is estimated at 4,000 miles, and the area of its basin at 1,082,000 square miles, extending through 35 degrees of latitude, or 2,450 miles in a direct line.

The White Nile or Bahr-el-Abiad flows from Victoria Nyanza, and is joined at Khartum by the Blue Nile or Bahr-el-Azrek which has

its source in the Abyssinian Mountains. The principal feeder of the Victoria Nyanza and the head stream of the Nile proper is the Kagera, formed by three tributaries, the chief of which is the Nyavarongo, which rises in about 2° 30' S. at an altitude of about 7,000 feet; the Kagera flows through a delta into Victoria Nyanza just north of 1°. Other influents are the Katonga from the west, the Nzota from the northeast, the Morao and Ruvano from the east. The great river which flows out of Victoria Nyanza in the north at about lat. 0° 30' N., and long. 33° 40' E., before its identity with the Nile was known, was called the Kari or Somerset River. At its outflow from the lake it forms the unimportant Ripon Falls, then flows northwest, and about lat. 1° 40' N. expands into Lake Ibrahim Pasha, discovered in 1874. On again contracting to the dimensions of a river it flows first west, then northeast to lat. 2° 15' N., where it forms the Falls of Karuma. It then turns west, and after forming the Murchison Falls, enters, at the town of Magungo, the Albert Nyanza, at an elevation of about 2,550 feet. Magungo lies on the east side of the lake, close to its northeastern extremity, and exactly at this latter point, about lat. 2° 35' N. and long. 31° 22' E., the river again leaves the lake, flowing in a northerly direction. Above Gondokoro, a town lying about lat. 5° N., the river forms a series of cataracts, and till 1876 the part of the river lying between these cataracts and the Albert Nyanza was never fully explored. In that year, under the direction of Colonel Gordon, a steamer was carried in pieces round the cataracts to Dufle, and on 7 March Romolo Gessi started thence to sail up the river, and on the 18th of the same month reached the Albert Nyanza. The whole of this part of the river, 164 miles long, is navigable, deep and broad, in many places with a breadth of upward of 700 yards.

Not far below Gondokoro, which is nearly due north of the outlet of the Albert Nyanza, the Nile begins to flow more to the west till it reaches lat. 9° N., where it receives the Bahr-el-Ghazal, the most important of the tributaries that flow into it from the left bank. On receiving this affluent it turns due east for about 100 miles, and then after receiving the Sobat from the southeast, a very important river draining the country between Abyssinia and the Victoria Nyanza, flows almost due north to Khartum. Here it is joined from the east by the Blue Nile or Bahr-el-Azrek, the source of which was discovered by Bruce in 1770 in the Abyssinian highlands, in lat. 11° N.; long. 36° 30'. It flows first north into Lake Dembea or Tsana, then emerges from it in an easterly direction, describes a great arc to the south extending below lat. 10° N., then turns to the west, after some distance receives its southern tributary, the Dedhesa, and lastly takes a northerly course. After receiving from the east the rivers Dender and Rahad, it joins the White Nile at Khartum. The united Nile then flows first to the northeast till at lat. 17° 30' N. it receives its last tributary, the Atbara, from the Abyssinian frontier. From its junction with the Atbara the Nile flows north, having on the west or left bank the desert of Bahiúda; on the east Mekheyr, which is commonly called Berber. Lower down it

NILE



1 Rapids of the first cataract

2 Nile boats near Cairo

forms several islands, one of which bears the name of Kandake (Candace), and also one or more cataracts; it then bends west by south, and passes by Jebel Barkal, where stand the remains of a temple, repaired by Tirhaka (700 B.C.), but probably 1,000 years older. Resuming its northerly course, it enters the plains of Dongola, and forms several islands of great extent. Quitting these plains by a cataract, the river flows through the districts of Mahas, Sukkot, Wadi, Kenúz and Batn-el-Hajar (or the Glen of Rocks), at the head of which is the second or great cataract, and entering Egypt at Philæ—the Pi-lakh or limit of the Egyptians—it descends the lowest cataract to Syene or Assouan, which is in lat. 24° 5' N. From Philæ, lat. 24° 3' N., the Nile flows through Egypt in a single stream as far as Batn-el-Bakara, the ancient Cercasorum, at the head of the Delta, in lat. 30° 15', where it divides into two branches, leading down respectively to Rashid (Rosetta) and Dimyat (Damietta), and entering the sea in about lat. 31° 35' N. These two mouths correspond, as is supposed, to the Phatnitic and Bolbitinic mouths of the ancients, which, however, in ancient times were not so important as the Pelusian mouth on the east and the Canopic on the west, between which, proceeding from east to west, there were other five mouths, named respectively the Tanitic, Mendesian, Phatnitic or Bucolic, Sebennitic and Bolbitinic.

The Nile received divine honors from the Egyptians, and at a later period also from the Greeks and Romans. By the Egyptians he was represented as a hermaphrodite, with a beard and woman's breasts, and a skin of a blue color. The Upper Nile was distinguished from the lower by a peculiar floral symbol. The Nile had a temple dedicated to himself at Nilopolis, and his principal festival is mentioned under the name of Niloa. In Greek and Roman art he is depicted in the attitude of a river god reclining, around whom sport 16 children, an allegorical representation of the height in cubits of the inundations of the river.

As rain scarcely ever falls in the valley of the Nile from the 18th nearly to the 30th parallel, and very scantily even lower down, the river owes its supplies wholly to the copious rains of the countries wherein it rises. In Egypt it begins to increase in June, attains its greatest height in three months, and then subsides as gradually as it rose. The ordinary rise at Cairo is about 25 feet. During the flood a great portion of the Delta and of the valley of Egypt higher up is inundated. In Sennaar also, and Dongola, extensive tracts are watered immediately by the river; but in general the banks of the Nile above Egypt are irrigated by means of the water-wheel. In early times the case was different, as is shown by the composition of the soil formed of alluvial deposits in places no longer reached by the stream, even in its highest state of flood. The changes of level which have taken place in relation to the river are demonstrated by the hieroglyphic inscriptions at Semneh, a day's journey beyond the second cataract, which attest that 4,000 years ago the average height of the Nile at its utmost flood was 23 feet higher than at the present day, while inversely the yearly inundations of the river in Egypt are continually raising the level of the whole surrounding valley. There are two

principal seasons of cultivation—winter from October to April and summer from April to August for land and basin irrigation, and extending to October in the perennially irrigated areas. As the perennially irrigated land receives less alluvial silt than the basin areas, artificially manuring is resorted to, and such crops as sugar cane and cotton in the basin are also chemically manured. Only in the delta of the river and below the first cataract at Assouan is there any great density of population along the banks. With irrigation, the vast areas of soil in the Soudan should make that province one of the most important cotton-producing areas of the world.

The Nile reservoir, for which the great dams at Assouan and Assiout have been constructed, enables wide tracts of land to bear two crops a year instead of one, brings waste districts into tillage, and greatly increases the area of sugar cultivation. See article and illustration under ASSOUAN, Vol. II; also EGYPT; IRRIGATION. Consult in addition to the travels of Bruce, Speke, Baker, Burton and Grant, Brown, R., 'The Story of Africa' (London 1893-94); Chélu, 'Le Nil, le Soudan, l'Égypte' (Paris 1891); Ebers, 'Egypt: Descriptive, Historical and Picturesque' (Eng. trans., London 1898); Hartmann, 'Die Milländer' (ib. 1884); Hayes, 'Sources of the Blue Nile' (ib. 1905); Johnston, H. H., 'The Nile Quest' (ib. 1903); Lyons, H. G., 'Physiography of the River Nile and its Basin' (Cairo 1906); Schweinfurth, 'The Heart of Africa' (Eng. trans., London 1895); Todd, J. A., 'The Banks of the Nile' (New York 1913); Wood, 'Egypt under the British' (London 1896).

NILE GROUP, a marble statue of the Alexandrine period now in the Vatican. It shows a half-reclining figure of a vigorous man representing the river Nile; he leans with his left arm on a sphinx; climbing over him are naked chubby children, intended, it is supposed, to typify the height to which the flooded river rises, namely, 16 cubits. The execution of the group is fine, and the whole treatment is peculiarly Alexandrine. The group was found at Rome near the church of Minerva, in the vicinity of a temple of Isis; but it was subsequently removed to the Vatican by the order of Pope Leo X.

NILES, Hezekiah, American publisher: b. East Bradford, Chester, Pa., 10 Oct. 1777; d. Wilmington, Del., 2 April 1839. From 1800-05 he was engaged in the publishing business in Wilmington, Del., then moved to Baltimore, Md., where with George Bourne he edited and published the *Evening Post*. In 1811 he founded *Niles' Register*, a weekly journal, which in 1837 he moved to Washington and published under the name of *Niles' National Register*. While in Washington he obtained a position in the Pension Office, and gave up the editorship of the *Register*, which was moved back to Baltimore in 1838 and continued by his son and others till 1849. He published 'Quill Driving,' a series of humorous essays; and 'Principles and Acts of the Revolution' (1822). The *Niles' Register* was devoted chiefly to the discussion of politics, and is regarded as one of the most valuable sources for the study of the American history of the period; the volumes for

1812-27 have been reprinted. Niles, Ohio, and Niles, Mich., were named for Hezekiah Niles.

NILES, nilz, John Milton, American journalist and politician: b. Windsor, Conn., 20 Aug. 1787; d. Hartford, Conn., 31 May 1856. At 20 he began the study of law privately, and in 1817 settled in Hartford, Conn., where with the co-operation of others he established the *Hartford Times*, of which he was principal editor for several years, and to which he contributed for 30 years; through this paper he warmly supported Andrew Jackson and the Democratic party. Appointed postmaster of Hartford in 1829 he resigned on receiving the executive appointment to the United States Senate, a post which he retained till 1839. In 1839 and 1840 he was Democratic candidate for governor of Connecticut, and in the latter year was postmaster-general under President Van Buren. He was again elected to the Senate in 1842, and on the expiration of his term in 1849 retired from public life. He published *The Independent Whig* (1816); 'Gazetteer of Connecticut and Rhode Island' (1819); 'Life of Commodore Oliver H. Perry' (1820); 'History of South America and Mexico, and a view of Texas' (1839); 'The Civil Officer' (1840), etc.

NILES, Nathaniel, American statesman: b. South Kingston, R. I., 3 April 1741; d. West Fairlee, Vt., 31 Oct. 1828. He was graduated from Princeton College in 1766 and subsequently studied medicine, law and theology, and he preached in various Congregational churches in New England. He settled in Vermont after the American Revolution and there conducted religious services in his own house for nearly 40 years. He served in the Vermont legislature and was its speaker in 1784, was a judge of the State Supreme Court and was a member of Congress in 1791-95. As "censor" he assisted in the revision of the State constitution and he was six times Presidential elector. He wrote the popular war song 'The American Hero' after the battle of Bunker Hill, and published 'Four Discourses on Secret Prayer' (1773); 'The Fountain of Good' (1777); etc.

NILES, Nathaniel, American lawyer: b. South Kingston, R. I., 15 Sept. 1835; d. 29 June 1917. Educated at Phillips Andover, he was admitted to the bar in 1857. He served for several terms in the New Jersey legislature of which he was speaker in 1872 and where he introduced important measures, notably those establishing 1,200 free school libraries and a free school fund of \$3,000,000 derived from all riparian rights in the State. In 1879 he became government director of the Union Pacific Railroad and in 1884-89 was president of the Tradesmen's National Bank of New York.

NILES, Mich., city in Berrien County; on Saint Joseph River, and on the Michigan Central and the Cleveland, Cincinnati, Chicago and Saint Louis railroads, about 110 miles southwest of Lansing and 90 miles east of Chicago, Ill. Niles is in the region traversed by the earlier explorers who followed the rivers which were inlets and outlets of the Great Lakes. The French missionaries founded here a mission in 1697. On the site of the city, or nearby, was Fort Saint Joseph, the ruins of which are still in existence. In 1782 Spain claimed the land for miles around Niles on account of the capture,

in 1781, of this fort by a force of Spanish soldiers. In 1828 a colony of eastern home-seekers located at Niles; in 1838 the village was incorporated, and was chartered as a city in 1859. Niles is the commercial centre of a productive agricultural region, and its good water power has made it a manufacturing city. The chief manufactures are flour, lumber, paper, lithographs, furniture, steel tanks, dairy products, poster printing, leather belting, canvas belting, metal store fronts, kitchen cabinets, exhaust fans and blowers, wire cloth, copper lightning rods, cables, automobile and railroad jacks, mole traps, doll beds, wire shovels and forks, coloring matter for packing plants, machine shop and foundry works. There is considerable trade in farm products, fruit and the manufactured articles. The government is vested in a mayor, who holds office one year, and a council. The city owns and operates the electric-light plant and the waterworks. Pop. (1920) 7,311.

NILES, Ohio, city in Trumbull County, on the Mahoning River and on the Baltimore and Ohio, the Erie and the Pennsylvania railroads, about 50 miles southeast of Cleveland. It is a manufacturing centre; the chief manufactures are galvanized iron, foundry and blast furnace products, automatic presses, oil tanks, electric and steam cars, chinaware, incandescent bulbs, metal lath, iron roofing, motor trucks, sheet steel, ice and milk cans and tin. The government is administered under a charter of 1895 and provides for a mayor, who holds office two years, and a council. The electric-light plant and waterworks are owned by the city. Pop. (1920) 13,080.

NILGAI, a large bluish-gray antelope (*Boselaphus tragocamelus*) of the plains and less forested parts of India, where it forms one of the principal game animals of the country. The short conical horns and general appearance of the head and body are somewhat ox-like; but the legs are long and slender, and a large tuft of hair depends from the chest. Nilgai both graze and browse, feed during the day, and are able to thrive with very little water. Where they are not much hunted they become so tame as to be troublesome to visitors; but when much disturbed grow shy and wary. Their chase is therefore often interesting, but the small horns make so poor a trophy that they are not often shot. The best sport is obtained by running them down on horseback and killing them by spearing. Consult works on East Indian zoology and sport, especially Kinloch, 'Large Game Shooting' (1895), and Baker, 'Wild Beast' (1890); Blanford, W. T., 'Fauna of British India: Mammals' (London 1889); Lydekker, R., 'The Game Animals of India' (ib. 1907).

NILGIRI, nil-gé-rē, or **NEILGHERRY, HILLS** ('Blue Mountains'), India, a southern plateau-like range of Madras, giving its name to a district, and owing to its great elevation and delightfully cool climate, much resorted to by invalided Europeans resident in India, the principal health-station being Ootacamund. The hills rise abruptly from the plains 40 miles from the west coast, to an average height of 6,000 feet, the highest peak shooting up to 8,760 feet. The mass is isolated, with the exception that a precipitous granite ridge leaves its western face

and connects with the Western Ghâts. The surface consists of grassy uplands with large groves of forest trees; but the lower slopes are heavily timbered. Coffee, tea and cinchona are cultivated. The Nilgiris are inhabited by five distinct tribes, of whom the Todas are the most interesting. They speak a Dravidian dialect and practise polyandry. The men are tall and athletic, with Roman noses, black bushy beards and eyebrows, but they are dirty in their habits. (See 'The Todas,' by Rivers (1900). Their sole occupation is tending cattle. The Nilgiris district has an area of 958 square miles. Pop. about 115,000.

NILOMETER, in *hydraulics*, an instrument for measuring the rise of the Nile during its periodical floods. On the island of Er-Ródah, south of Cairo, is a graduated pillar, upon which the height of the water is read off. The pillar stands in a well which communicates with the river. In the time of Pliny, a height of 12 cubits meant famine, 13 scarcity, 15 safety and 16 plenty. At present the canals are cut and distribution commences when the river reaches 18 cubits; 19 cubits is tolerable, 20 adequate, 21 excellent, 22 abundant, and 24 ruinous. In ancient times taxation varied according to the height of the inundations. See NILE, THE.

NILSSON, nîl'sôn, **Christine**, Swedish operatic soprano: b. Hassaby, near Wexiö, Sweden, 20 Aug. 1843; d. Copenhagen, 22 Nov. 1921. She was the only daughter of a poor farmer, at nine began to sing at village concerts, and educated for the operatic stage by Berwald at Stockholm, and Massé and Wartel at Paris. In 1864 she made her first appearance as Violetta in 'La Traviata' at the Theatre Lyrique, Paris; and she appeared in 1867 in that rôle for the first time in England at London. She sang in the United States in concert in 1870, in opera in 1871; and appeared there again in 1873-74 and 1882. She was last heard in New York on 16 April 1883. Among her most famous impersonations were Ophelia in Thomas' 'Hamlet,' and Marguerite in Gounod's 'Faust'; Elvira in 'Don Giovanni' and Elsa in 'Lohengrin.' In 1872 she married M. Auguste Rouzaud, a Parisian merchant, who died in 1882; and in 1886 she married Count A. de Miranda, who died in 1902. After 1888 she lived in retirement. Her voice was a soprano of moderate power, but very brilliant and even.

NIMBLE FLY, an insect that takes its name from its rapid movements. It belongs to the family Dexiidae. Its legs are extremely long. In its early stages this fly is parasitic and inhabits beetles and snails. About 50 species belong to North America. Consult Kellogg, Vernon L., 'American Insects' (New York 1908, pp. 301-357).

NIMBUS, (1) in painting, the halo or collection of rays with which artists surround the heads of sacred persons, in Christian art, of Christ, and the angels and saints. The use of this ornament is both ancient and widespread, being probably of astrological origin, and it is exemplified in the Indian, Egyptian, Etruscan, Greek and Roman religions. The ancient poets speak of their deities as being crowned with such a nimbus in their occasional appearances on earth, and in paintings this nimbus was

represented in the same way as in the paintings of Roman Catholic artists. The nimbus as represented in Christian art (beginning in the 5th century) is usually circular in form, but sometimes it is triangular; sometimes in the form of three rays, one proceeding from the summit of the head, and the other two from the sides, so that the three form three arms of a cross. The triangular nimbus symbolizes God the Father and the Trinity; it is sometimes enclosed in a circle, which symbolizes eternity. The nimbus with three rays is also a symbol of the Trinity. The Virgin is symbolized by a single ring, and sometimes by a crown or diadem. Another form of the nimbus is that in which one of the common circular shape supports a cross. In later times the nimbus was represented in a lighter or more aerial form, and melting as it were into the picture. (2) In meteorology, the word is applied to a rain cloud; sometimes classed as if forming a primary or fundamental variety of cloud; it is really a mixture of the stratus, the cumulus and the cirrus. It has a uniform gray tint and fringed edges.

NIMEGUEN, nîm'a-gên. See NIMWEGEN.

NÎMES, nêm, or **NISMES**, France, a south-eastern city, capital of the department of Gard, 62 miles northwest of Marseilles, noted for its ancient buildings and monuments of Roman origin, which are second only to those of Rome. It is situated in a delightful plain near the outspurs of the Cevennes and handsome boulevards occupy the site of the former ramparts. The city proper is small and irregularly laid out, with narrow streets and ill-built houses; but its three suburbs, one of which, called the Cours-Neuf, is larger than the city itself, present a finer aspect, having wide, straight avenues, fine public walks and handsome buildings. Among the edifices of the Christian era are the cathedral, begun in the 11th century but constructed chiefly in the 16th and 17th and occupying the site of a temple of Apollo; the church of Saint Paul; the new palace of justice; the general hospital; the Hôtel Dieu, rebuilt in 1830; the public library (112,000 volumes); the central house of detention, which is the citadel built by Vauban over the remains of the old Fort Rohan erected in 1629 by the Calvinists; and the fine monumental fountain by Pradier, erected in 1851, on the esplanade. The public garden, where is still to be seen the fountain that furnished the Roman baths with water, and the beautiful promenade known as the Cours Feuchères, are also attractive features. Nîmes is the seat of a Roman Catholic bishop, of a Protestant consistory, and has tribunals of primary jurisdiction and commerce, a departmental academy, several learned institutions, a lyceum or college, a normal school, a theological seminary, schools of drawing, chemistry and physics, geometry and mechanics as applied to the arts, and a museum of natural history.

The monuments of the Roman period are the Maison Carrée, so called from its rectangular form, a beautiful Corinthian temple nearly in the centre of the city. It stands on a stylobate, and is approached by 15 steps; the platform is 82½ feet long and 40¼ feet wide, and the building and platform together are 58½ feet high. It is surrounded by 30 columns, 10 of which are detached and form the portico. It suffered

greatly during the Middle Ages, but since 1789 it has been restored and surrounded by an iron railing. In 1823 it was converted into a museum of paintings and antiques. The amphitheatre, or Les Arènes, is the most perfect of its kind extant. Its height outside is from 68 to 104 feet, and its external circumference 1,174½ feet. It has from 32 to 35 ranges of seats, and was capable of accommodating from 17,000 to 23,000 spectators. It was used as a fortress by the Visigoths and the Saracens, when attacked by the Franks; during the following centuries it was also occupied as a stronghold. No fewer than 2,000 persons had established their abode within the walls of this building, when in 1809 it was cleared by order of the prefect; and it has since been protected against encroachments. The Tour Magne (*turris magna*) is the remnant of a tower which flanked the ancient walls. The boulevards now occupy the site of the ramparts, but portions of them are still extant in the Porte d'Auguste and Porte de France, two Roman gates, the former of which is ornamented with sculptures. To these monuments must be added a ruined *nymphæum*, a fane dedicated to the nymphs, which communicated with a neighboring bath for women, the remains of which have been mistaken for those of a temple of Diana. The magnificent aqueduct, known as the Pont du Gard, is in the vicinity of Nîmes.

In point of industry and commerce Nîmes holds a distinguished rank; it is the great southern mart for raw and manufactured silk. Its manufactures are principally silk shawls and hosiery; mixed silk, cotton, and woolen stuffs; blonde lace and tulles, galloons, ribbons, carpets and leather products. There are several large dyeing and printing establishments, vinegar factories and distilleries. Its trade is mostly in wine, brandies, vinegar, essences and oil. There are limestone quarries nearby.

Nîmes is supposed to have been built by a Greek colony, and was afterward for about 500 years in the possession of the Romans. In the 16th century it became a stronghold of Calvinism, and suffered much during the civil wars. The treaty known as the Pacification of Nîmes, concluded here in 1629, granted freedom of worship to the Huguenots, but deprived them of their fortified towns. In 1815 it was the scene of religious violence during the reaction that succeeded the fall of Napoleon. Guizot and Daudet were natives of this town. Pop. 80,437.

NIMRAVUS, a genus of large Tertiary fossil cats, typical of the family *Nimravidae*, or *Machærodontidae*, which includes the various sabre-toothed tigers (q.v.).

NIMROD, according to the Mosaic scriptures, the founder of the Babylonian monarchy, son of Cush (Gen. x, 8). He flourished about 2450 B.C.. He is styled a mighty hunter "before the Lord," a somewhat vague expression, but evidently referring to battle and conquest as well as to the chase. All that is definitely known about Nimrod is that he was a Cushite, that he established a kingdom in Shinar, the classic Babylonia, the chief towns being Babel, Erech, Accad, and Calneh, that he extended his kingdom northward along the Tigris over Assyria, where he founded a second group of capitals, Nineveh, Rehoboth, Calah and Resen. In the Chaldean epic of the deluge Nimrod has

by some scholars been identified with Gilgamesh, the heroic figure whose story is dated about 2200 B.C. and who is represented as fighting with a wild beast; and by others with Mero-dach, the Assyrian god.

NIMRUD, nīm'rood, Mesopotamia, the name given to a mound which is supposed to be the site of an ancient Assyrian city on the east bank of the Tigris River at the confluence of the Tigris and the Zab Ala, and 18 miles below Mosul. It is supposed to be the city Calah (q.v.) mentioned in Genesis x, 11, a suburb of Nineveh. Excavations have shown the city to have been five miles in circumference and surrounded by walls flanked with towers. Perhaps the most important of the archaeological treasure discovered here is the black obelisk of Shalmaneser II, now in the British Museum, and on which his military exploits are recorded. See NINEVEH.

NIMWEGEN, nīm'wā-gēn, or **NIMEGUEN**, nīm'ā-gēn (ancient NOVIOMAGUS; Dutch, *Nijmegen*), Netherlands, city in the province of Gelderland; on the Waal, about 12 miles south of Arnheim. Built in the form of an amphitheatre, on a series of hills, it overlooks a beautiful valley. It is in a productive agricultural region in which grain and grapes are prominent productions and much attention is given to stock-raising. The 13th century church of Saint Stephen, the ruins of the palace of the Carolingian kings, and the museum of Roman antiquities, are the principal places of interest in the city. The chief manufactures are leather, tin, cutlery and silverware, wine, eau de cologne, flour, and cigars. It has an extensive trade in wine, grain and cattle.

Nimwegen possesses many ruins showing its Roman origin. It was originally a Roman camp by means of which control was exercised over the Teutons living northeast of the Rhine. It was one of the Hanse towns. From 1585 for nearly 100 years it was in the theatre of much of the contentions, and also of the peace-makings among the Spaniards, Swedes, French, Dutch and Austrians. The "Peace of Nimwegen" in 1678-79 was the ending of the contest between the French and the Dutch, the great event in the life of Louis XIV. It marked the time when France became the chief of the Great Powers. Pop. (1910) 56,035, predominantly Catholic.

NINDE, William Xavier, American Methodist bishop: b. Cortland, N. Y., 21 June 1832; d. Detroit, Mich., 3 Jan. 1901. He was graduated from Wesleyan University, Middletown, Conn., in 1855, and was ordained in 1856. He was in charge of various churches in New York and Ohio, and in 1870 was called to the Central Church, Detroit. He accepted the chair of practical theology at Garrett Biblical Institute, Evanston, Ill., in 1873; in 1879-84 he was president of the institute and in 1884 he was elected bishop. He was the president of the Epworth League, 1896-1900. Consult biography by Mary L. Ninde, his daughter (1902).

NINDEMANN, Wilhelm Friedrich Carl, German-American Arctic explorer: b. Gingst, Germany, 22 April 1850. He removed to the United States in 1867 and in 1872 accompanied the *Polaris* expedition. When the *Polaris* was caught in the ice he with 18 of the crew drifted on an ice-floe for seven months. They were

rescued by the *Tigress* in 1873. He joined the *Jeanette* expedition in 1879, and when the vessel was crushed in the ice he was despatched for aid in 1881 by Captain De Long. He assisted in the search for De Long and his companions, whose bodies were discovered the next year. He served in the Spanish-American War. He published 'Eines deutschen Matrosen Nordpolfahrten' (1885).

NINE-BARK, an American shrub (*Opulasta opulifolius*), of the rose family, common throughout the eastern part of the United States. It has an ungainly form, glabrous twigs, bright green, three-lobed, crenate-lentate leaves and small white or purplish flowers in terminal corymbs. Its bloom, remarks Mrs. Lounsberry, is not very pretty, but it redeems itself by the beauty of the ripening pods. "They, hanging in quantities at the ends of its long, curving branches, produce something the same effect as the fruit of a species of *opulus* or cranberry-tree. . . . The common name which would naturally recall one of the hydrangeas, is in reference to a trick of the bark in peeling not nine but many times into dilapidated-looking strips." The hydrangea (q.v.) referred to is *H. radiata*, a showy wild shrub, which is given this name by the mountaineers of the Southern States on account of the ragged peeling of its bark. Both shrubs flourish in rocky and swampy places, and both are susceptible of cultivation. Consult Lounsberry, 'Southern Wildflowers and Trees.' (1901).

NINE-PINS, a game with nine pins or bottle-shaped pieces of wood set on end, at which a large wooden ball is rolled for throwing them down. See BOWLING.

NINE WORTHIES, romantic heroes, grouped together in Arthurian legend, especially in the 'Triumphes des neuf preux,' where the author describes a vision in which he saw three Jews (Joshua, David, Judas Maccabæus), three pagans (Hector, Alexander the Great, Julius Cæsar), and three Christians (Arthur, Charlemagne, Godfrey of Bouillon). These worthies, with occasionally a tenth, Bertrand du Guesclin, and with Guy of Warwick sometimes substituted for Godfrey of Bouillon, may be traced back to old Welsh legends; Brunet says the three triads are of Spanish origin; and Dunlop showed that the list appeared in an old Low German poem on Alexander. Shakespeare makes them the butt of some fooling in 'Love's Labour's Lost.'

NINEKILLER. See BUTCHER-BIRD.

NINETEENTH CENTURY. Some nation in Europe has been at war on the average every second year since 1450, that is, during modern times, but the 19th century had more than its share of these wars. They were, too, ever so much more costly in life than older wars, industrial development having favored the evolution of destructive agents. Napoleon filled the first 15 years. Made first consul (1798), President of the Italian republic (1802), emperor by overwhelming popular vote (1804), he proposed to Tsar Alexander at Tilsit (1807) in the raft conferences on the Niemen River to divide the world between them into eastern and western empires. It seems almost impossible to imagine the 19th century reverting to the dual Byzantine-Roman imperial scheme of things,

yet this was calmly proposed by the man who had made himself, in Freeman's expressive phrase, "the tyrant of Europe." Gibbon, scarce 10 years before, had declared it impossible for a military leader ever again to dictate the destiny of nations as had Alexander the Great, or Cæsar, yet had he but lived a few years he would have seen this almost an accomplished fact. Napoleon admitted, when Alexander seemed favorable to the scheme, that there was but one bar—England—but he felt that if the two emperors were loyal allies, even this obstacle could be made to disappear.

The events which led up to this were the battle of Austerlitz (1805), after which Napoleon became protector of the Federation of the Rhine; the victory at Jena over the Prussians (1806) followed by the appointment of Louis Napoleon as king of Holland and the victories of Eylau and Friedland (1807) over the Russians. After this came the conquest of Spain and Napoleon's attempt to make Joseph, his brother, its king, while Murat, one of his marshals, was made king of Naples. He received a setback in Spain, but won the battle of Wagram (1809) over the Austrians. The following year, divorcing the childless Josephine, he married Marie Louise, the daughter of the emperor of Austria, in the hope to found a dynasty, and the next year his son was crowned king of Rome. At the height of his power (1811) his empire reached from beyond Rome, through France, Holland and Belgium and all the western German states up to Mecklenburg and the Baltic Sea; he was besides king of Italy, to which the Illyrian provinces were subject, protector of the Federation of the Rhine and mediator of Switzerland. Only in Spain where, with the help of the English, a successful stand was made against Napoleon's generals, did his prestige fail. His star had set with this, however, and though in 1812 he won the battles of Smolensko and Borodino, Moscow, after its capture, was burned by the Russians and Napoleon's grand army was destroyed by the Russian snow and the troops which hung on his rear and flanks. With a new army of fresh levies, most of them were mere boys, Napoleon won the battles of Lutz, Bautzen and Dresden but lost the battle of the nations at Leipzig. The German spirit, at last aroused, drove him to the Rhine with the loss of his whole army. He abdicated and was sent to the island of Elba but with the title of emperor (1814). Just a year after his abdication, March 1815, Napoleon returned to France. The restored Bourbons had been tactless beyond even their wont and Napoleon was welcomed by France. Marshal Ney, sent to arrest him, threw himself into the arms of his old commander, and in a few days Napoleon was again firmly seated on the throne. The allies moved against him, but Napoleon, hoping to crush their forces in detail, marched into Flanders where he defeated the Prussians, but was held by the English for the long day (18 June 1815) at Waterloo, until Blücher with a fresh force of Prussians decided the battle. The Hundred Days, as they were called, were over. Napoleon surrendered to the English as the most magnanimous of his enemies, and was sent to Saint Helena, where he died (1821).

England was the supreme, constant factor against Napoleon. He realized this and was ready to make any sacrifice for "six hours' control of that wet ditch"—the Channel. He sold Louisiana to the United States to secure funds for an English invasion (1803) but Nelson's almost complete destruction of the combined French and Spanish fleets off Cape Trafalgar (1805) blocked this. Napoleon's one consolation was that he hoped by rounding out the territory of the United States "to raise up a rival to England that would sooner or later humble her pride." Meantime Robert Fulton had gone to him with his steamboat, but Napoleon failed to recognize the opportunity it would have given him. The one stain on English prestige was the bombardment of Copenhagen and the seizure of the Danish fleet in 1807. Fearful lest the Danes should join Napoleon and shut them out from the Baltic Sea and the rich markets of central Europe, an English fleet in position before Copenhagen, without warning, demanded that the Danes surrender all their ships and naval stores. They were to be held as a deposit and given back at the end of the war. The Danes refused to violate their neutrality thus and did not yield until some 2,000 houses had been destroyed, when their fleet was carried off by the English. The incident aroused the bitterest feelings against Britain and undoubtedly pushed the United States into the War of 1812. Madame de Staël, replying to Jefferson's explanation as to the United States practically helping Napoleon against England, that "America has nothing to do with the continent of Europe," pertinently asked, "Can you be indifferent to the cause of free nations—you the most republican of all?" Jefferson replied that "Bonaparte would die but a nation never dies," and added "the sword can never again be sheathed until the personal safety of Americans on the ocean, among the most important and vital of the rights we possess, is completely provided for." A century later, these expressions were, if possible, even more interesting than when originally written.

Napoleon will be remembered better for what he did for law and social order than as a victorious commander. He strove to be a beneficent autocrat. Professor Sloane terms him "one of the greatest social reformers of history." He healed the wounds inflicted upon France by the Revolution. He invited the Royalist exiles to return. Realizing that a France without religion was a contradiction in terms, he entered into a concordat with the Pope, recognizing him as the head of the Church with full authority. Under his rule prosperity came back to France. Bridges, roads, canals and ports were restored and Napoleon directed the construction of great highways and military roads, triumphs of engineering, across the Alps. Public buildings were restored, sadly needing it since the Revolution, and many magnificent monuments erected, so that Paris and other French cities became the most beautiful in Europe. He reformed the laws of France and the Code Napoleon set his name beside that of Justinian as one of the great lawmakers of history. What the French Convention began was perfected by Napoleon and his code secured the benefits of

the Revolution for the French people. It swept away the old, unequal, oppressive customs and regulations and decrees and laws that were an inheritance from the feudal ages. It recognized the equality of noble and peasant in the eyes of the law; it affected deeply the laws of other countries, and for it Napoleon's name will be honored much more than for his military glory as long as this stage of our civilization lasts.

The Napoleonic wars were followed by the formation of the Holy Alliance, under the inspiration of Tsar Alexander of Russia, its principal members being Russia, Austria and Prussia. Its purpose was announced as the maintenance of peace and order in Europe, the principles of Christianity to be the maxims of governments. All the rulers promised to use their authority "to promote the welfare and secure the happiness of their subjects." Undoubtedly the intentions were the best, and yet the Holy Alliance proved before long to be only a league for the maintenance of absolute government and the protection of the various states from the neutralizing tendencies which had been sown throughout Europe by the French Revolution. Metternich was the moving spirit in it. Entirely reactionary, he could not think that the people should have any share in the government. He was for the old order and his influence was greater than any other down to the middle of the century.

In spite of the Holy Alliance a series of minor wars occurred during the first half of the century, Russia and the sultan (1828), a quadruple alliance of England, France, Spain and Portugal against Don Miguel and Don Carlos (1834), France and Mexico (1838), England and China—to compel the renewal of the opium trade (1840), France with Algiers (1848). There was a much more interesting series of revolutions for popular liberty, most of which failed. The Greek Revolution was followed by the massacre of Scio (1822), Belgium secured its independence from Holland (1830), and the Poles began a struggle for their liberty the same year, but failed and thousands of families were sent to Siberia. The Polish Revolution was renewed (1848), but only to fasten the fetters tighter on the suffering people. In 1848 there were revolutions in France and Sardinia, in Bavaria, Prussia, Schleswig-Holstein, in Hungary, whence Kosuth escaped to the United States, and in various places throughout Italy, including Rome, where a republic was proclaimed 9 Feb. 1849, only to fall very shortly.

The spirit of liberty manifest in the French Revolution failed egregiously, but was destined to spread all during the 19th century. Between 1810 and 1826 all the South American colonies of Spain and Mexico (1836), after an imperial incident under Iturbide (1820), became independent republics. After a revolution Brazil became a constitutional empire of great liberty, independent of Portugal. The revolt of the Greeks against the Turks was unsuccessful, but it attracted the attention of Europe to an impossible situation that could not be permitted to endure, and Byron's romantic death for the cause of Greece at Missolonghi deeply stirred the spirit of liberty everywhere. The Bourbons continued their tactless rule in France and Charles X was forced to flee in 1830, to be

succeeded by Louis Philippe, no longer as king of France, but king of the French. Unfortunately, when his turn came to go (1848), while the French planned to have a republic and the temporary presidency of Lamartine raised high hopes, Louis Napoleon became the first actual President and the *coup d'état* gave him control of France, making his election as emperor (1852) only a matter of form. A cycle had been completed and France was once more destined to imperial domination.

The most important series of political events in the century was the rise of Prussia to the rank of a great power in Europe and of the German Empire under Prussian influence. Early in the century Prussia was prostrate at the feet of Napoleon, bitterly humiliated. This led to reaction and a strenuous military organization of the country, so that eventually Prussian troops were an important factor in the great battle of the nations at Leipzig and a Prussian army under Blücher came to the aid of the English at a critical moment at Waterloo, bringing about Napoleon's ultimate defeat. The king of Prussia had promised his people a constitution, but violated his promise, so Prussia appears in European history until the middle of the century only because of internal disturbances. The Revolution of 1848 sent many promising young Prussians into exile because of their patriotic efforts to secure a constitutional monarchy. Troublous times continued for 10 years, which kept Prussia from any advance in power, but when Wilhelm I became king (1861) he declared that Prussia ought not to be content with what she had, but should strengthen her army and extend her frontiers. As regent while his predecessor, Friedrich Wilhelm IV, was ill he had insisted that the Prussian army ought to be "the nation armed." The new king found himself hopelessly in opposition to the Prussian Parliament which annulled all measures for the provision of funds for the army. In the crisis Wilhelm called on Bismarck (1862) and thereafter Bismarck's spirit ruled Prussia. Disheartened by Parliament's opposition, the king seriously proposed abdication, but Bismarck appealed to his honor as a soldier for his country. The spirit of revolution among the people had brought some liberalization of the government, but Bismarck re-established autocracy and prosperity quieted the people. He steered a devious course as the ally of Russia, in spite of the unpopularity involved, in order to crush the Poles (1863). After defeating Austria's attempt to unify the German states under her leadership at the Frankfort Convention, the next year he formed an alliance with Austria to take Schleswig-Holstein from Denmark. Every consideration except the advancement of Prussia was disregarded. Through agents he led the Danes into thinking that England would surely come to their assistance in case of war, so that they attempted the unequal struggle with Prussian and Austrian armies to their defeat and humiliation (1864). Schleswig-Holstein was placed under the rulership of Prussia and Austria, and when Bismarck proceeded to establish a German naval station at Kiel, Austria was irritated, as he knew it would be, and war broke out (1866). It lasted seven weeks, the Austrians being badly defeated at Koeniggrätz or Sadowa and the road to Vienna lay open. The

intervention of Napoleon III brought a truce. Prussia, now the leading state in Germany, absorbing some of the German principalities which had allied themselves with Austria, proceeded to strengthen her army. France was the next opponent. The opportunity came over the Spanish succession. Queen Isabella was driven out in 1868 and the Spaniards offered the throne to Leopold of Hohenzollern, the head of the Catholic house of that name, related to the reigning house of Prussia. France was strongly opposed to the candidacy. The friction between the countries seemed past, however, when Bismarck, after consulting with Moltke, the head of the Prussian army, as to preparedness, deliberately falsified a telegram making it so irritating to the French as to precipitate the war. Bismarck, in furnishing material for his memoirs, cynically boasted of this afterward, as of other utterly dishonorable diplomatic transactions. Anything was justified so long as it was done for his country.

The Franco-Prussian War was declared 19 July 1870. The French Minister of War boasted that the army was so perfectly equipped that it would not require even a gaiter button for a year. It had been looked up to as the model military organization of the world, studied by all the other nations, but now proved rotten to the core. The Prussian army, on the other hand, was as Moltke had declared ready to the minute. Scarcely two weeks had passed before the series of Prussian victories began. France had counted on the jealousy of the other German states to keep them neutral at least, or perhaps ready to join against Prussia. All sided with Prussia except Austria, which remained neutral. On 3 August the French lost the battle of Wörth, and by 6 August when a rumor was current in Paris that the Prussians were defeated, French armies nearly everywhere were in disastrous retreat.

On 18 August Marshal Bazaine lost the battle of Gravelotte and shortly afterward was isolated at Metz. MacMahon with the emperor was caught at Sedan between two Prussian armies and on 1 September compelled to surrender. This led to the fall of the empire. Paris was soon invested. Gambetta, escaping in a balloon, organized the French Republic. The last hope of the French expired when on 27 October Metz, with 180,000 soldiers, was surrendered by Bazaine. He was tried for treason subsequently and condemned, but the verdict of history is that he was an overestimated man, outgeneraled by Moltke and hampered by confusion in the French military system. On 10 December the German Empire was voted by the Reichstag at Berlin and on 18 December, on the proposal of the king of Bavaria, the representatives of the German states meeting in the palace of Versailles chose King Wilhelm of Prussia as German Emperor, with the right of succession in his family. At the end of the war Bismarck insisted on the cession of Alsace and Lorraine, with their immense mineral wealth, to Germany and an indemnity of five milliards of francs (about \$1,000,000,000). This seemed such a huge sum, coming on the heels of the great losses inflicted by the war, that it was felt that it would cripple France forever. The sum was paid in five years, while France enjoyed unexampled prosperity. United Germany became the most powerful state in

Europe. After he had made the Triple Alliance with Italy and Austria, which somehow was brought to sink its long traditions of enmity so as to secure German support against the growing power of Russia, Bismarck was looked upon as the greatest statesman of Europe. He was quite literally a mere statesman. Everything had been done for Prussia without any thought of the rights of the people, still less of the rights of other peoples or other countries. The policy of "blood and iron," of which he was so proud, was the watchword of Prussianism, continuing its influence even after Bismarck's dismissal by the young emperor, Wilhelm II, in 1889. It worked itself out to its legitimate conclusion and was recognized for the supreme injustice it represented, only with the great War of 1914-18.

The contrast with Bismarck in the 19th century is his great English contemporary, Gladstone. He was the leader in more social reforms, correcting age-long abuses, than any statesman of history. The memorable session of the English Parliament during his first Premiership (1868-74) accomplished an almost incredible amount of legislation for popular benefit. The British Parliament, elected in 1865, dissolved in 1868, on the question of the disestablishment and disendowment of the Irish Church. To the surprise of the Conservatives, who had appealed to the country, the Liberals were returned with an overwhelming majority. The Irish Church bill was at once brought forward, passed by the Commons and when it would probably have been rejected by the House of Lords, the queen wrote to the archbishop of Canterbury, reminding him that the bill had been carried by a very large majority in a House of Commons elected on this issue, so the Lords yielded to the will of the people and the bill was passed. This was the prelude to far-reaching social reforms. In 1870 Gladstone secured the passage of a land act for Ireland and the beginning of justice for the Irish tenant farmers. This bill recognized that the Irish farmer had an estate in his holding and gave the sanction of law to the Ulster custom of tenant right. This session of 1870 was famous for its legislative achievements. Mr. Herbert Paul says that an example of activity so various and so successful can scarcely be found since the days of the Great Parliament (1640). "Between 8 February and 10 August Parliament took the first step, the step which counts, in remodeling the agrarian law of Ireland, established a permanent system of education in England and Wales, introduced into the army the principle of a short enlistment and a reserve, formed a code of neutrality in time of war, erected a scientific theory of naturalization, provided for the extradition of criminals, and abolished the punishment of the innocent with the guilty by the forfeiture of the felon's estate." The following year saw the abolition of the purchase of commissions in the army and of religious tests at the universities which had imposed a great injustice on all who were not prepared to sign the 39 Articles. Dissenters could not take degrees before this, unless prepared to sign the Articles. Gladstone's reforms made the universities national institutions. The Ballot Act reformed the franchise and Gladstone's Irish University scheme was meant to

remove another injustice in Ireland. The English people could not advance so fast as this and Gladstone was replaced as Premier by Disraeli. In contrast with the work of his great political opponent, Gladstone's achievements stand out in ever-increasing prominence as time goes on. Disraeli was a great politician; Gladstone a statesman in the best sense of the word, who realized that the statesman's highest privilege and duty was to provide opportunities whereby the people might secure all possible pursuit of happiness. Following this policy, Gladstone could even change opinions publicly expressed and adhered to for a long time. Toward the end of his life he became a convert to Home Rule for Ireland, in the hope to remove a stigma that had blotted the fair name of England for centuries, and though his purpose was not attained, what he accomplished brought the Irish question into such prominence that it could never again be at rest until properly settled.

For a generation after Napoleon's time, however, Europe, spent with wars, avoided them except for these unimportant conflicts. Immediately after the middle of the century, however, a series of costly wars was initiated. In 1851 when the World's Fair in London was held, the first of the modern universal expositions of which there were to be so many others before the end of the century, the keynote of the international addresses delivered was world peace which seemed to be surely impending. Nations were to make commerce with each other and not war, and exchange art and industrial treasures and not bullets. Littré, the great Positivist philosopher, looked up to as one of the great thinkers of the time, was particularly emphatic in his prophecy of peace. Such hopes were destined to bitter and immediate disappointment. The next 20 years saw a series of great wars. In 1853 Russia went to war with Turkey; England, France and Sardinia allying themselves with the Turks. In 1857-58 the Indian Mutiny imperiled British interests in Asia. In 1859 Sardinia and Austria went to war, with the French as the allies of the Sardinians. Napoleon III won the battle of Solferino and confirmed the impression that the French were the greatest military nation in Europe, for which it was destined to pay so dearly 10 years later. In 1861 the Civil War broke out in America, each side thinking it would be over in three months, but it lasted four bitter years and cost some 600,000 lives and set back American development for a decade. In 1864 Denmark dared to go to war with Prussia and Austria and was, of course, badly defeated, having to give up Mecklenburg and Schwerin to her opponents. In 1866 Prussia and Austria went to war over these Danish provinces and Austria was beaten to her knees in six weeks. In 1870 came the Franco-German War, and in 1877 the war between Russia and Turkey, Russia's victories being neutralized by the International Congress of Berlin which was intent on maintaining the balance of power.

The war in the Crimea had one very practical result which greatly benefited the next generation. The army medical department of the English troops broke down completely under the task of caring for the wounded in the bitter climate of the Crimea. Literally thousands of

wounded English soldiers lay absolutely untouched for many days in the midst of their excretions, almost unfed. The wounded on the deck of a vessel carrying them to the base hospital at Scutari were so crowded that the officers could not go below for their instruments of navigation and had to proceed at hazard. The fetid odor from the wounds was so offensive that some of the officers could not eat. Miss Nightingale, who had some experience in nursing, was asked to organize the nursing care of the soldiers and proceeded to the Crimea to solve the awful problems which had developed. She succeeded, and on her return the organization of nursing generally was taken up and the trained nurse of the present time was the result. Nursing had sunk to the lowest possible ebb, and the women attendants in the hospitals were looked upon as little better than menial servants, many of them actually recruited from the workhouse or the prisons; all that could be expected of them was to keep reasonably sober.

For two centuries hospitals had been running down and reached the lowest depths about the middle of the 19th century. The coming of the trained nurse, an educated woman with definite authority, soon brought reform in hospital organization and construction and Lister's discoveries lifted up surgery, so sadly degenerated for several centuries, until with hospital improvement there came reform also in medical education, with the reintroduction of bedside teaching. As a result of these movements, a great new epoch in hospital work developed which will be looked back upon by future generations as one of the most important landmarks in the history of the century.

The Civil War in the United States was one of the pivotal events of the century and seemed for a time to many a demonstration that a democracy could not endure. It was the culmination of a century of differences of opinion. After the Revolution, the great preponderance of the population was at the South. Virginia, one of the most populous of the States, had more than double New York's number of inhabitants. North Carolina exceeded New York in population by the total census of New York City and Long Island. Maryland was as large as New York and Tennessee followed very closely. The North grew rapidly, the South slowly. In 1810 New York was second in population and it surpassed Virginia by one-third in 1820. Of the first five Presidents, four were from Virginia. Early in the century New England and the Middle States, except Delaware, prohibited slavery and the importation of slaves to the United States was forbidden. The spread of population to the West, especially after the discovery of gold in California, raised the question whether slavery should be permitted west of the Mississippi. Legislative compromises were made, but with the election of Lincoln on a "free soil" platform, South Carolina withdrew from the Union, followed by Alabama, Florida, Georgia, Louisiana, Mississippi and Texas, and a Southern Confederacy was formed. Lincoln was inaugurated 4 March 1861 and the Confederates began the war by firing on Fort Sumter, in Charleston Harbor, 12 April 1861. Both sides were sure that the war would be

over in a few months, as President Lincoln's call for 75,000 volunteers for 90 days and President Jefferson Davis' declarations demonstrated, but it lasted four years, costing some 600,000 lives and two billions of money, the most important war of history up to this time. The South, fighting on an interior line, was not only able to maintain the struggle, but to bring the North near to defeat. During the year from July 1862 to July 1863, the North won no victories. Then came the turning point at Gettysburg 3 July and Vicksburg 4 July 1863. Grant's forceful thrusts gradually wore down the Southern armies, Sherman's march to the sea deprived them of reserves of men and means, but it was not until 9 April 1865 that Grant and Lee met at Appomattox to arrange the surrender of the Army of Virginia and bring the war to an end. Peace was sadly marred by the assassination of President Lincoln at Ford's Theatre on Good Friday night, 14 April 1865. A generation later, when the Spanish-American War came, there was scarcely a trace of the old bitterness left.

Except for some Indian troubles due to flagrant abuses of the Indians by Indian agents and the whites who lived near them, the United States was at peace for a generation after the Civil War, until the war with Spain. This was brought on by Spanish misrule in Cuba, but was precipitated by the unfortunate blowing up of the *Maine*, a United States man-of-war, in the harbor of Havana 15 Feb. 1898. Congress was rushed into war by popular sentiment. The events of the war were the capture of Manila by Dewey (1 May) and the battle of Santiago (3 July) in which the Spanish fleet was destroyed. By the treaty of peace Cuba became a free country under the protection of the United States and Porto Rico and the Philippines came under United States dominion.

The dream of centuries was realized in the second half of the century in a united Italy under Victor Emmanuel II. The kings of Sardinia ruled over Savoy and Piedmont on the Continent and were ambitious to increase their territory and, above all, push the Austrians out of Italy. King Charles Albert was disastrously defeated at Novara (1849) and resigned his crown in favor of his son, Victor Emmanuel, who, under the influence of Cavour, sent 15,000 Sardinians, as they were called, to help France and England against Russia in the Crimean War. The understanding was that France would in return help Italy against Austria. Cavour promised Savoy and Nice to Napoleon to round out his French territory, and in 1859 the war between Austria, Italy and France broke out. After the battle of Solferino, Napoleon made peace with the Austrian emperor at Villa Franca, disappointing Cavour's plans, but largely increasing Victor Emmanuel's kingdom, the capital of which now became Florence instead of Turin as before. The most significant result of the battle of Solferino came from the presence there by chance of M. Durant of Geneva, who saw all the suffering of the wounded soldiers under the broiling sun. It gave him the idea of organizing an international non-combatant association for the relief of suffering on the battlefield. Out of this came the Red Cross organization which has meant so much not only for war but also for the emer-

gencies of peace ever since. Napoleon refused to permit the Pope to be disturbed in the possession of Rome and maintained a French army there. With the fall of Napoleon, however, during the Franco-German War in 1870, Sardinian troops under Garibaldi entered Rome and this became the capital of a united Italy, which has been growing in solidarity ever since.

Two extremely important features of the history of the century are the rise into prominence of the great British colonies, Canada, Australia, New Zealand and South Africa. All of them have made wonderful strides, comparable to those made in the United States. At the end of our American Revolution, Canada had about 70,000, while the United States had some 3,000,000 inhabitants. By the end of the 19th century, Canada had multiplied over 100 times in population, the United States less than 35 times. Canada as a colony suffered from colonial abuses and in 1837 there were two revolutions, one in Upper, the other in Lower Canada. They brought reforms. After the famine in Ireland, a great many Irish emigrants came to Canada, and with the increase of population the need of federation was felt. It was brought about 1 July 1867. The opening up of the Northwest Provinces and the discovery that the finest kind of wheat could be grown there attracted immense numbers of people and the thorough democracy of the government brought many new citizens. Canada seemed to be drifting toward absolute independence of the mother country until Canadian volunteers served in the Boer War, a forecast of the sacrifices to be made a little later in the Great War.

Australia, discovered by Captain Cook in 1770, was proposed as a colony for American Royalists after the Revolution, but the plan fell through. It became a convict station, but in spite of this grew rapidly in population until at the mid-century there were some 350,000 free inhabitants, about 200,000 in New South Wales, and 75,000 each in Victoria and South Australia. In 1851 came the discovery of gold by a gold miner from California. The male population rushed to the gold fields, leaving only women and children in the cities. Immigrants came in swarms, and in 10 years Victoria grew from 70,000 to 600,000 inhabitants. Fortunately, gold was discovered in other parts of Australia, and this diverted population to them. For 50 years the annual gold output was some \$50,000,000. Six independent colonies came into existence, but the rise of Japan, Germany's entrance into the south Pacific, European spheres of influence in South Africa and tariff troubles forced them into union. Their Constitution is an imitation of that of the United States and the site of the Federal capitol, centrally located in a city (Canberra) to be built for it, repeats the history of Washington. The Confederation of Australia made the great southern continent ready to play an important rôle in the 20th century. The Boer War showed its loyalty to the mother country and the Great War consecrated it in blood.

The last year of the century saw a severe blow to English prestige in the Boer War. The Dutch South African settlers, known as Boers, trekked from the British dominions at the Cape of Good Hope into the Transvaal, or cross-river country. They were living in peace when the discovery of gold led to a great influx of Uit-

landers (foreigners). The Boers refused to share the franchise except under rigid conditions, and Dr. Jameson (1895) led a raid to secure reform. President Kruger, instead of court-martialing the captured raiders, gave them up to the British, who treated them with leniency. Chamberlain, the English minister, seemed intent on forcing the Boers into war, thinking this the easiest way to end friction. Sir William Butler's warning of the danger of such a mistake was unheeded. A period of severe political tension ensued, and Britain found herself in a war which proved costly in life and treasure. The Zulu War and its disasters had not proved a lesson. A tactless English agent pushed Cetewayo, king of the Zulus, into a war (1878-79) easily avoided but extremely costly in men and in prestige. The Zulus, brave to desperation, inflicted severe losses. The young French Prince Imperial lost his life in one of their incursions. The Boers proved quite as brave and even more successful in fighting. The dogged courage of English troops, pushed to frontal attack, only sacrificed them to the bullets of an enemy, all sharpshooters, ready to take advantage of every mode of concealment and using smokeless powder, so that the English saw their comrades fall scarcely able to discover what to shoot at in return. The public feeling of the world ran strong against Britain. "She was unjustly oppressing a small nation and coveting valuable territory which did not belong to her." (Oscar Browning.) All the resources of the empire had to be mobilized against this little people, after a series of severe preliminary losses. There was one compensation. Volunteers from Canada, New Zealand and Australia served with the English troops, showing that colonial attachment to the mother country was strong. The war continued in desultory fashion until April 1904. England's subsequent treatment of a brave enemy is the redeeming feature of the event.

The greatest chapter in the century's history is that of the discoveries in science. Father Piazzzi's discovery on the very first morning of the century, of Ceres, the first asteroid recognized, was a portent of the century's scientific advance. Treviranus' use of the word "biology" for the first time the same year marks an epoch. Lamarck suggested not only a theory of evolution but its factors. Biology became dominant. Schleiden and Schwann demonstrated the existence of cells in all living things, plants and animals, showing a bond between them. The cell doctrine became the foundation of physiology and pathology. Virchow's work in cellular pathology furnished the basis for a scientific study of the internal causes of disease, while Pasteur demonstrated the existence of microbes as the extraneous etiology of infectious diseases. Pasteur's work made possible the development of sanitary science and an immense reduction in the death rate of cities. His discoveries furnished Lister with the principles of antiseptic surgery, with all that they meant for the saving of life and suffering. Before Lister, only a few emergency operations to save life were done, while now many serious operations could be performed for the relief of suffering and the prevention of complications.

The second half of the century was in scientific circles largely taken up with the dis-

cussion of the theory of evolution. Independently Charles Darwin and Alfred Wallace hit upon the theory of natural selection as affording an explanation for the evolution of living beings. Darwin's book the 'Origin of Species' (1859), which Darwin himself would have preferred to call by its secondary title, 'The Preservation of Favored Races in the Struggle for Life,' for it discusses not origins but preservations, at once became the storm centre of discussion for scientists and theologians. There was a tendency to exaggerate what was called Darwinism, so that the second decade after the publication of Darwin's book came subsequently to be known as the "silly seventies." Huxley in 'The Coming of Age of The Origin of Species' (1880) reminded the world that so long as species were infertile with each other the missing link would continue to be a mystery. Abbot Mendel's discovery of a series of laws of heredity led biology from theory to observation once more, but preoccupied with evolution theories the significance of his work was not recognized until the end of a generation. Weismann's demonstration that acquired characters are not inherited left the subject of evolution in the air at the end of the century.

The purely physical sciences entered an era of great development. In 1846 a new planet, Neptune, was discovered by Leverrier at Paris and Charles Adams at Cambridge, through mathematics alone from the study of the variations of Uranus, which had been discovered by Herschel (1781). This was a great triumph for applied mathematics and with the development of astronomical spectroscopy which demonstrated that the universe was composed of materials with which we were familiar on earth gave a new confidence to students of science. The doctrine of the conservation of energy was demonstrated by Joule, Mayer and Helmholtz. Electricity was developed marvelously by Davy, Faraday, Clerk Maxwell and Lord Kelvin, who left imperishable monuments of successful research. Sir William Crookes' studies of radiant matter stimulated research in radiation and led to the discovery of the X-rays (Roentgen 1895) and of radium and the radio-active substances. Madame Curie's discovery proved valuable for physics as well as for medicine and surgery. The study of radiation opened up a new and wonderful chapter in chemistry and led to developments in chemical physics which revolutionized ideas as to the constitution of matter. Chemistry made the waste material of factories the source of valuable by-products. Coal tar yielded up the dyes and drugs which had been stored in prehistoric plants, the original discoveries in this field being made by the English and exploited by the Germans. Illuminating gas banished darkness and was succeeded by electricity which effected a revolution by which night was almost turned into day. Night life developed in the great cities and made great social changes. Men worked by day and could play far into the night, but the increase in insanity and suicide became alarming.

The 19th was above all the century of inventions. These concerned chiefly the transportation of the human body and human thought. The locomotive, the steamboat, electric motor appliances, the electric telegraph, the telephone and finally wireless telegraphy with the evolution of printing were all phases of

this movement. The development of bridges, tunnels, canals, were complements and the elevator and electric light supplemented the work. Photography was a phase of printing. After the solution of the transportation problem the most important inventions were destructive agencies. The rifling of fire arms, the machine gun, smokeless powder and high explosives seemed to promise to make war impossible and Alfred Nobel, the inventor of dynamite, under that impression established his peace prize. The steel bridge naturally suggested the steel building frame, the under water tunnel the use of caissons for deep foundations for high buildings. Applications of steam and electricity made labor-saving machinery possible, though John Stuart Mill declared that instead of saving human labor machinery added to the drudgery of mankind. The discoveries of science were all made available for the convenience and comfort of mankind. The great mass of men were not in a position however to enjoy them.

In literature the classical and didactic 18th century gradually gave way before the romantic early 19th, though not without a struggle. Percy's 'Reliques' aroused Sir Walter Scott first to romantic poetry and then to be the founder of a great movement in fiction, which had for moving spirits men like Manzoni, Dickens, Thackeray, George Eliot and Victor Hugo. America contributed two of the greatest fiction writers, Hawthorne and Poe. A really great period of fiction ran out in trivial realism. Dramatic literature followed the same course and though there was great theatrical development little that is expected to live was written in the field of drama. In poetry Wordsworth, Keats, Shelley, Byron, Coleridge, Longfellow, Whitman and Tennyson achieved reputations, some of which have endured though many of the literary lights of the period have already been extinguished by time.

The art of the 19th century began under classic influences in France encouraged by Napoleon, but the romantic movement in literature affected art also and the latter half was dominated by the Barbizon school, whose work is recognized as of enduring value. François Millet is one of the great painters of all time, though he nearly starved while doing his work. He has left a magnificent monument in his pictures of present life which are at the same time human documents of great significance. Some of his colleagues did work of only less import. Etching, with Haden, Whistler and Zorn, had a fine revival in the latter part of the century; the decorative arts came into their own once more and the arts and crafts derived a new stimulus from the more careful study of Renaissance and mediæval models.

The outstanding religious event of the century was the Oxford movement which Newman dated from a sermon of Pusey's in 1833. The younger generation at Oxford, hoping to bring the Church of England back to primitive Christianity, published a series of 'Tracts for the Times,' hence the term Tractarian Movement which drew wide attention. They continued from 1833 to 1841. It was felt, however, by the great majority of Anglican churchmen that the movement was out of sympathy with the Anglican Church and in 1845 the

chief figure among the leaders, John Henry Newman, became a convert to Catholicism. He took part in the foundation of a Catholic University at Dublin in the early fifties and later was made a cardinal.

The outlook for humanity at the end of the century was not promising. There were so many abuses in the social order that it seemed almost certain that severe internal troubles in many countries in the form of an uprising of labor against capital must occur before there could be any assurance of the end of discontent. A great part of the laboring population was not receiving a living wage, that is, such wages as would enable them to live decently and support their families properly. Prosperity in the sense of the accumulation of national wealth in many countries was very great, but there was an extremely unequal distribution of the wealth, so that a few families rolled in luxury and the great majority of the people, some of them having to work very long hours in extremely unsuitable conditions, were so poorly paid that they had to live in circumstances unworthy of civilization. Investigations conducted by Booth in London in the early nineties, showed that about 1,000,000 of people, nearly one in three of the population, were unable to obtain the necessities for healthy living. In many districts more than half the population were in distress or on the verge of it. London was said to be exceptional because of its overcrowding and the hard times were blamed for unfortunate conditions, but when Rountree made a careful survey of York in 1899 he found the people of that provincial town in nearly as bad a condition as that reported for the capital, though that year trade was unusually prosperous. More than one in four of the population was found to be living in poverty though the fixed standard of family wages below which the poverty line was drawn was only 21 shillings and 8 pence per week, just about \$5.25. Conditions were worse on the Continent. The United States Daily Consular Reports at the close of the century declared that of 2,000,000 of people in Berlin, 1,125,000 had an income, but nearly one-half of the incomes were exempt from taxation because they were below \$214 per year. Of the 600,000 taxed incomes, nearly 550,000 were less than \$700 a year, that is about \$2 a day. Conditions were better in America and yet many of our working people were compelled to live huddled together in slums under intolerable conditions, while a few enjoyed luxuries.

Spahr in 'An Essay on the Present Distribution of Wealth in the United States,' estimated (1896) that 125,000 families of the wealthy class in the United States held \$33,000,000,000 of the total wealth of the nation, while 5,500,000 families of the poorer class had altogether but \$800,000,000. Of every 100 families one possessed more than the remaining 99 put together. The industrial era culminated in the creation of monopolies and trusts in which men, sometimes by good luck, but oftener by illegal or unjust means, amassed vast fortunes, which when distributed by will served, as a rule, to do much more harm than good. Social unrest and threatening social revolution were impending at the beginning of the 20th century. The spirit of the French Revolution had made

itself felt all during the century. Its main purpose, to quote Hilaire Belloc, was to gain back for the lower classes, so-called, the rights which they had enjoyed in the Middle Ages. The proletarians that is, in the original sense of the word, the child raisers of the race, struggled all during the century to secure the essential rights of humanity, the rights, to use Carlyle's expression, to have what is not denied to the animals, proper nutrition and shelter for themselves and their offspring. At the end of the century better things seemed impending.

There remained, however, a number of political problems unsolved which boded ill for the time to come. In spite of more than 100 years of supposed denationalizing, the Poles were still intent on freedom with no prospect of an end to serious trouble in North Central Europe until Polish national feelings were satisfied. The age-long feud between the Irish and the English was active as ever, the source of serious friction between the two peoples. The Tsar broke the promise of his dynasty that the language and certain national rights of the Finns should be respected. In Bohemia the Czechs were in ever-increasing turmoil with the Germans and Austria was a seething cauldron of national disquiet with nearly a dozen nationalities claiming rights which the ruling caste was not willing to grant them. Finally there was *Italia irredente*, portions of Italy still held by Austria, and Alsace-Lorraine which had been taken by the Germans, but had not become Germanized during the generation. All these problems were clamoring for solution and could not be eliminated as political trouble factors until solved with right and justice.

JAMES J. WALSH,

Author of 'The Thirteenth, the Greatest of Centuries,' etc.

PRINCIPAL EVENTS OF THE NINETEENTH CENTURY.

1801. Piazzi discovers the planetoid Ceres, 1 January. Napoleonic wars continue. Battle of Alexandria, Egypt, 21 March. Battle of Copenhagen. British destroy the Danish fleet, 2 April. Peace treaty between France and Great Britain, 1 October. War between the United States and Tripoli.
1802. Napoleon re-establishes Christianity in France, 2 March. Treaty of Amiens signed, 27 March. Dr. Olbers discovers planet Pallas, 28 March. For the discovery of vaccination, British Parliament awards Dr. Jenner \$50,000. Treviranus enunciates the principles of biological development. Napoleon named consul for life, July. Prince of Orange abdicates, August.
1803. War renewed between England and France, 16 May. War in India. Scindia defeated, 10 August. The Great Mogul of Delhi deposed, September. Haiti, French negro colony, achieves independence, 19 November. France sells Louisiana to the United States.
1804. Napoleon proclaimed emperor, 20 March. Duke d'Enghien shot, 21 March. Code of Napoleon first promulgated. Francis II abandons title of emperor of Germany, and assumes that of emperor of Austria. Lewis and Clark expedition.
1805. War declared between England and Spain. Napoleon crowned king of Italy, 26 May. British defeat French and Spanish fleets, 22 July. Napoleon restores Gregorian calendar in France. Battle of Trafalgar and death of Nelson, 21 October. Battle of Austerlitz, 20 December. Peace between Tripoli and United States.
1806. Cape of Good Hope occupied by the British, 8 January. Burr's conspiracy. Confederation of the Rhine. Saxon Bavaria and Wurtemberg become kingdoms.
1807. Peace of Tilsit. British again bombard Copenhagen, 7 September. French occupy Portugal; the royal family emigrates to Brazil, 29 November. Fulton's first steamboat starts the great development of marine travel of the century. Slave trade abolished.
1808. Napoleon proclaims blockade of Great Britain. French occupy Rome. Murat made king of the Two Sicilies. Joseph Bonaparte king of Spain. Spain declares war

- against France, 1 May. Finland surrenders to Russia, 7 November.
1809. Battle of Wagram. Battle of Corunna. British destroy French fleet in Basque roads.
1810. Rebellion in Mexico. Napoleon divorces Josephine and marries Maria Louisa of Austria. Peace between France and Austria. France annexes Holland. Bernadotte becomes Crown Prince of Sweden.
1811. Indian war in West. Mamelukes massacred at Cairo. British take Java.
1812. Napoleon's disastrous invasion of Russia. War between United States and England. Spanish Peninsular campaign.
1813. United States troops invade Canada. Perry's victory on Lake Erie. Russia, Prussia and Bavaria confederate against France. Spain abolishes the Inquisition. Revolution in China. British victories in Spain. Napoleon defeated at Leipzig.
1814. British troops burn capital at Washington. British under Wellington invade France and capture Bordeaux. Allied sovereigns enter Paris. Napoleon abdicates and is exiled to Elba. General treaty of peace. England acquires Cape of Good Hope, Malta, Mauritius, Tobago and Saint Lucia. Norway annexed to Sweden. Peace signed between England and America.
1815. Battle of New Orleans and British defeat. Napoleon escapes from Elba. The 100 days campaign ends with the battle of Waterloo. Napoleon exiled to Saint Helena. Holy Alliance established. Americans suppress Algerian piracy. Brazil made an empire. Lamarck propounds the theory of evolution.
1816. British fleet destroys Algiers.
1817. Bolivar becomes dictator of Venezuela.
1818. Chile achieves independence.
1819. Colombia proclaims a republic. Purchase of Florida. Steam navigation begins between Europe and America.
1820. The Missouri Compromise. Rebellion in Spain. Death of George III of England. Austrians suppress Italian Carbonari. Meeting at Troppau of sovereigns of Russia, Austria and Prussia. First king of Haiti commits suicide.
1821. Mexico, Colombia, Venezuela and Ecuador proclaim republics. Greek war of liberation. Napoleon dies at Saint Helena.
1822. Brazil separates from Portugal. Greece strikes for freedom. Constitutionalists triumph in Spain, but are condemned by the Congress of Verona. Liberia founded by American Colonization Society.
1823. The Monroe Doctrine formulated. French army invades Spain and suppress the Constitutionalists.
1824. Argentina gains independence. Peru is made free by Bolivar. War between England and Burma. English acquire Singapore.
1825. Erie Canal completed. Gas used for lighting New York streets. Drummond invents the limelight. Bolivia becomes a republic. Steam railroad development begins with the opening of the Stockton and Darlington line in England 27 September.
1826. War between Russia and Persia. Great Britain and United States arbitrate on damages for the War of 1812.
1827. Treaty of London creates the kingdom of Greece. Turkish-Egyptian fleet destroyed at Navarino by the allied fleets.
1828. Greece gains independence. Uruguay becomes a republic. Russia effects peace with Persia, and declares war against Turkey.
1829. Peace treaty between Russia and Turkey. Spain attempts to recover Mexico. Venezuela separates from Colombia.
1830. Revolt in Paris. Separation of Holland and Belgium. France conquers Algiers. Revolution in Poland.
1831. Polish rising defeated. Brazilian revolution. Reform bill introduced into British Parliament. The Abolition movement acquires importance in the United States.
1832. Black Hawk War. Nullification in South Carolina. Reform bill passed in England. Abd-el-Kader leads Arabs against French occupation of Algiers.
1833. Migrations of the Boers begin. Abolition of slavery in the British colonies. American Anti-slavery Society founded. Carlist insurrection in Spain. Civil war in Portugal. Royal fleet defeated by insurgent fleet. Treaty of peace and alliance between Turkey and Russia.
1834. Quadruple alliance of England, France, Spain and Portugal. Education in England receives its first parliamentary grant.
1835. The second Seminole War. Texans revolt against Mexican rule. Conference of Topitz between the emperors of Russia and Austria and the king of Prussia. Halley's comet reappears.
1836. The Alamo massacre. Texas gains independence and proclaims Houston President. Revolts in Spain and Portugal.
1837. Chicago incorporated as a city. Financial crisis in the United States. Rebellion in Canada. Queen Victoria ascends the British throne.
1838. Peru proclaims independence. International Copyright Act passed. *Great Western* steamship makes her first transatlantic voyage. Daguerre introduces photography.
1839. Gold found in Australia. Central American confederacy dissolves. Egyptian forces defeat Turkish army and acquire its fleet. Russia wars successfully in Caucasasia; disastrously against Khiva. Anglo-Indian force invades Afghanistan. Anti-Corn Law and Chartist agitations in England.
1840. Penny postage inaugurated in Great Britain. Marriage of Queen Victoria to Prince Albert of Saxe-Coburg. Revolt in Syria. Occupation of Acre and Beirut by British and Austrian expedition. Peace established by the Treaty of London. Opium war between England and China.
1841. Union of Upper and Lower Canada. Successful revolt of the Afghans against British rule.
1842. British disasters in Afghanistan. Khyber Pass massacre. Dorr Rebellion in Rhode Island. Seminole War ends. Maine boundary settled by Ashburton Treaty. British punitive expedition reoccupies Afghanistan and retires. Treaty of Nanking opens Chinese ports to British commerce. Boer Republic in Natal occupied by the British.
1843. Irish Home Rule and Repeal agitation under O'Connell. Free Church formed in Scotland. Scinde captured by the British. Thames tunnel opened. Botta discovers site of Nineveh.
1844. Electric telegraphy is practically developed. French subdue Algiers and Morocco. United States and France make treaties with China. Santo Domingo establishes a republic.
1845. Texas admitted to the Union. Mexico declares war with the United States. British war with the Sikhs in India.
1846. Defeat of Mexico. Occupation of California and New Mexico. Repeal of the English Corn laws. New Zealand acquires constitutional charter. Great Irish famine, and large emigration to the United States. Leverrier and Adams by applied mathematics discover the planet Neptune.
1847. War between Mexico and the United States. Mexican capital captured. Jesuits expelled from Switzerland. Salt Lake City founded by the Mormons.
1848. Gold discovered in California. Revolution in France; republic proclaimed; Louis Napoleon becomes President. Risings in Italy, Germany, Austria, Hungary, Denmark, Poland and Ireland. War between Italy and Austria. Second Sikh War in India. British occupy the Orange River State. Boers migrate and establish Transvaal Republic.
1849. Gold miners rush to California. Prussia defeats Danish attack on Schleswig-Holstein. Austrians suppress Hungarian revolt. Also the Italian revolt. French army restores the papal temporal power in Rome. British conquer Sikhs and annex Punjab. Livingstone discovers Lake Ngami.
1850. Russia starts its career of conquest in Asia. German Confederation becomes effective. Clayton-Bulwer Treaty between the United States and Great Britain provides for transisthmian canal. Taiping Rebellion in China. McClure discovers Northwest Passage.
1851. *Coup d'état* in France; Louis Napoleon elected president of the Republic for 10 years. The Great Exhibition in London.
1852. Empire restored in France. Napoleon III proclaimed emperor. British war with Burma and annex Pegu. Buenos Aires secedes from Argentina. Opening of Japan.
1853. Russo-Turkish War. Revolution in Mexico. The Taipings take several Chinese cities.
1854. The Crimean War. Commercial treaty between the United States and Canada. Commodore Perry effects a treaty between Japan and the United States. The Orange River Republic is established.
1855. Walker's filibustering expedition to Nicaragua. Fall of Sebastopol to the allies. Capitulation of Kars to the Russian forces. Bessemer steel process patented. Transisthmian Panama Railway opened. Zambesi Victoria Falls discovered by Livingstone.
1856. Settlement conflicts in Kansas. Crimean War ends. Britain annexes Oudh. British wars with Persia and China.
1857. The Indian Mutiny. France and England invade China. Business panic in the United States.
1858. Great Britain suppresses the mutiny and annexes India. China defeated, makes treaties with England, France and other powers, and cedes Amur to Russia. First Atlantic submarine cable laid. Evolutionary theory of Darwin and Wallace announced.
1859. The John Brown raid at Harpers Ferry. Franco-Italian War with Austria. Austrians defeated at Magenta and Solferino. Treaty of Zürich ends war and Italy acquires Lombardy. Livingstone extends exploration in Africa.
1860. Oil wells discovered in Pennsylvania. Abraham Lincoln elected President of the United States. South Carolina secedes. Anglo-French War with China and

- occupation of Peking. Garibaldi's campaigns in Italy. French occupy Syria after massacres of Christians. Spain wars with Morocco and acquires Tetnan.
1861. Civil War in United States commences. Victor Emmanuel becomes king of Italy. Russian serfs freed. Austrian Empire receives a new constitution. France, England and Spain send fleets to Mexico to enforce claims.
1862. British government demands release of Mason and Slidell, Confederate commissioners, taken from the British steamer *Trent*. Numerous battles fought between Northern and Southern forces. First battle of ironclads in Hampton Roads. France declares war against Mexico. France acquires Cochinchina. In expedition against Rome, Garibaldi is defeated, wounded and captured.
1863. Civil War in United States continues. Emancipation of slaves proclaimed. Poles unsuccessful revolt against Russia. France conquers Mexico, proclaims an empire with Maximilian of Austria as emperor.
1864. Civil War in the United States continues. Austro-Prussian War with Denmark ended by the Treaty of Vienna. Russia conquers Circassia. Spanish-Peruvian War. The Taiping Rebellion in China suppressed.
1865. Civil War ends in United States. Lincoln assassinated. Crank and pedal bicycle invented. Mendel's theory of heredity established. Fenian Rebellion in Ireland. War between Paraguay and Argentina. Alliance between Argentina, Brazil and Uruguay.
1866. Fenians from United States invade Canada. Prusso-Italian forces defeat Austria; treaties of Prague and Vienna effect peace. Venetia united to Italy. German Confederation dissolved. North German Confederation formed. Spain attacks Chile and Peru and bombards Valparaiso and Callao. Second and successful Atlantic cable laid.
1867. Purchase of Alaska by United States. Maximilian shot in Mexico. Abyssinian War with England. Suez Canal opened to navigation.
1868. Revolution in Spain, Royalists defeated. Insurrection in Cuba. Shogunate of Japan overthrown. Defeat of Paraguay.
1867. The Pacific Railway completed. General Grant becomes President of the United States.
1870. Franco-Prussian War; German Empire formed. Napoleon III deposed; France becomes a republic. Italy annexes Papal States. Mont Cenis tunnel completed.
1871. William I proclaimed emperor of Germany at Versailles. The war of the Commune in Paris. Emancipation of slaves in Brazil. Disastrous fire in Chicago. Dry plate photography introduced.
1872. Geneva Convention settles *Alabama* claims in favor of the United States. Germany expels the Jesuits. British Parliament passes the Ballot Act. Revolution in Spain.
1873. Spain forms a republic when King Amadeus abdicates. Egypt receives autonomy. Ruma occupies Khiva. British expedition subdues Ashantis.
1874. *Coup d'état* in Spain and Alfonso XII proclaimed king. Great Britain annexes Fiji Islands.
1875. Great Britain acquires control of the Suez Canal. Carlist revolt in Spain suppressed. Egyptian-Abyssinian War.
1876. Centennial Exposition at Philadelphia. Sioux War. Custer massacre. Bell's telephone introduced. Ruma annexes Khokand. Turkish atrocities in Bulgaria. Queen Victoria proclaimed empress of India. Abyssinians defeat Egyptians. Kaffirs defeat Transvaal Boers.
1877. Diaz becomes President of Mexico. Japanese Samurai revolt suppressed. Russo-Turkish War. British annex Transvaal Republic. Stanley descends Kongo River and crosses Africa. Edison invents phonograph.
1878. Russians occupy Adrianople. British fleet steams through the Dardanelles to stem Russian advance, and British forces occupy Cyprus. European situation adjusted by Treaty of Berlin. Russian embassy received, British embassy rejected by Afghans, British troops enter Afghanistan and place Yakub Khan on the throne. Half-tone process revolutionized; engraving methods.
1879. British Ambassador and suite massacred at Kabul. British expedition avenges deaths and restores prestige. Specie payment resumed in United States. Chile wars against Bolivia and Peru. Zulu War in South Africa.
1880. Partition of Africa begins. France annexes Tahiti. Spain abolishes slavery in Cuba. Chinese coolie immigration restricted in the United States. Transvaal revolt against British suzerainty.
1881. French begin digging Panama Canal. Assassination of President Garfield. British defeated by Boers who win independence. French protectorate over Tunis. Revolt in Egypt under Arabi Pasha. Assassination of Alexander II of Russia.
1882. Murder of Lord Cavendish and secretary in Phoenix Park, Dublin. Europeans murdered in Egypt. Bombardment of Alexandria followed by British control of Egypt. French Tonquin expedition. Anti-polygamy bill enacted in United States. Pasteur isolates hydrophobia bacillus. Koch isolates tuberculosis bacillus.
1883. Civil service bill passes Congress. Brooklyn bridge opened. French protectorate established in Anam. French aggression in Madagascar. The Mahdi annihilates Egyptian army led by Hicks Pasha.
1884. Russia annexes Merv. War between France and China. Convention between Great Britain and the Transvaal Republic.
1885. The Mahdi captures Khartum and General Gordon is killed as British troops near city. Revolt in Canada; Riel, the leader, captured and hanged. Russo-Afghan-Indian difficulties settled by British concessions. War between England and Burma. War between Serbia and Bulgaria. Kongo Free State established.
1886. Earthquake at Charleston. Anarchist riots at Chicago and Milwaukee. Great Britain annexes Upper Burma. Greece threatens Turkey. Great powers blockade Greek ports. Talking machine perfected.
1887. Centenary of United States Constitution celebrated. Queen Victoria's jubilee celebration. Neutrality of Suez Canal confirmed. Great Britain annexes East Zululand. Stanley's second expedition through Africa.
1888. William II becomes emperor of Germany. Boulangerist agitation in France. Chinese Exclusion Act in United States. Canadian Fisheries Treaty signed in Washington. Retaliatory measures against Canada advocated by President Cleveland creates stir. Abyssinians defeat Italians. Imperial British East Africa Company is chartered. Hertzian waves developed.
1889. Flood devastates Johnstown, Pa., with loss of over 2,250 lives. Japan inaugurates a new constitution. Brazil revolts, proclaim a republic and exiles Dom Pedro. British South Africa Company is chartered. Automobile improved and becomes of practical use.
1890. Heligoland transferred by Britain to Germany in return for African concessions. McKinley tariff bill becomes law. Linotype printing improved and adopted.
1891. Revolution in Chile. Australasian federal convention at Sydney. Triple alliance renewed for six years.
1892. Bering Sea Treaty ratified. Saint John's, Newfoundland devastated by fire. French forces occupy Dahomey, Panama scandals in France.
1893. Chicago's Columbian Exposition, World Fair and Parliament of Religions. French ultimatum to Siam. South African War opens Matabeleland. Rio Janeiro bombarded by Brazilian rebels. Business depression in United States. Edison invents kinetoscope.
1894. Chino-Japanese War. British establish protectorate in Uganda. Dreyfus falsely convicted of treason against France. President Carnot of France assassinated. Great railway strike in Chicago.
1895. Treaty of Shimomoseki ends Chino-Japanese War. French campaign in Madagascar. Abyssinians defeat Italians. Cuba revolts against Spain. Jameson's abortive raid in the Transvaal. President Cleveland's Venezuelan message. Roentgen X-rays discovered.
1896. British forces occupy Ashanti. Anglo-French Siamese complications settled. General Weyler's suppression measures in Cuba increases revolt. Italy's disastrous defeat at Assua ends war with Abyssinia. France annexes Madagascar. Anglo-American agreement over Venezuelan difficulty. Wireless telegraphy practically developed by Marconi.
1897. Diamond jubilee of Queen Victoria. United States rejects Olney-Pauncefote Treaty. Gold rush to Yukon commences. Famine and pestilence in India. Greek action in Crete precipitates intervention, war with Turkey and defeat. Canada introduces differential tariff bill.
1898. United States battleship *Maine* blown up in Havana harbor. Spanish-American War. Annexation of Hawaii. Occupation of the Philippines, Cuba and Porto Rico. Treaty of Paris ends Spanish-American difficulties. The "Dreyfus affair" agitates France. Khalifa defeated at Omduram and Sudan reoccupied. Fashoda affair complicates Great Britain and France. Peace conference at The Hague. China leases Port Arthur and Dalny to Russia. Chile and Argentina agree to perpetual peace and arbitration. The Curies discover radium.
1899. The Philippines revolt against United States rule. Hostilities in Samoa. Boers invade Natal and the South African War begins.
1900. The Hay-Pauncefote Treaty facilitates construction of the transisthmian canals. Great Britain annexes the Transvaal and Orange River republics. Boxer Rebellion in China; siege and relief of the foreign legations. Russia occupies Manchuria. Australia becomes a commonwealth.

NINETY-SIX, Fort, a former Revolutionary fort in Abbeville County, S. C., near the Saluda River. It was so-called on account of being 96 miles from the frontier fort of Prince George. During the Revolutionary War it was held by Lieutenant-Colonel Cruger and 500 men for King George. General Green laid siege to

it and attacked it on 25 May 1781, and had seized the outlying works, when sometime after it was reported that Lord Rawdon with 2,000 men had arrived at Charleston and was marching to its relief. Green accordingly pressed home his attack, but was unsuccessful, and the reinforcements arrived on 21 June; but Rawdon was ultimately, through Green's Fabian tactics and danger to his communications, forced to abandon the fort.

NINETY-THREE ('Quatre-Vingt-Treize'), a novel by Victor Hugo, published in 1874. It bears the sub-title 'Premier Recit. La Guerre Civile,' and was intended to form the first part of a trilogy. The edition of 1882 contains several remarkable designs signed by the author. The story deals with the French Revolution and the civil war in La Vendée.

NINEVEH, nīn'ē-vē, the ancient capital of the Assyrian Empire. The site of the city, which was destroyed about 606 B.C. by the Babylonian Nabopolassar and the Mede Cyaxares, has been identified with the modern Kouyunjik. It stands on the left bank of the Tigris, opposite to the town of Mosul. The first historic notice of Nineveh is in Genesis x; it is described as "a great city" in the time of the prophet Jonah (8th century B.C.). Ezekiel at the beginning of the 5th century B.C. speaks of its desolation in the most vivid imagery. "The Assyrian was a cedar in Lebanon, with fair branches"; "All the trees of Eden that were in the garden of God envied him"; and "strangers, the terrible of the nations, have cut him off"; "upon the mountains and in all the valleys his branches are fallen and his boughs are broken by all the rivers of the land; and all the people of the earth are gone down from his shadow and have left him."

It was known to travelers that vast mounds covered the banks of the Tigris opposite Mosul and extended to a considerable distance inland. They were long considered to cover the ancient site of the Assyrian capital, but it was not until 1841 that M. Botta, the French consul at Mosul, began excavations with the result that he obtained a few fragments of brick and alabaster. He renewed his efforts at Khorsabad, 12 miles to the northeast, in 1843 and discovered an Assyrian edifice which had remained buried in the sand for thousands of years. The work was continued by Layard, who explored the lofty mounds of Nimrūd, situated 18 miles south-southeast of Mosul at the point where the tributary Zab joins the Tigris. This was the beginning of a series of the most remarkable discoveries. He immediately came upon numerous slabs covered with cuneiform inscriptions of unique importance. A chamber in the ancient ruins was lined with these, and they were found to be in excellent preservation. He unearthed, moreover, gigantic figures of various kinds—winged bulls and lions with human heads and winged sphinxes, which stood as guardians at the gates of stately palaces. It was evident that the old city had been destroyed by fire, for the stone images in many cases were calcined and crumbled into dust on exposure to the air. The fire had not, however, desolated what the explorer designated the northwest palace. Here he discovered in excellent preservation 28 rooms, decorated with bas-reliefs, carvings and moldings which told the

tale of the art and civilization which had flourished at Nineveh in its palmy days. Returning to Kouyunjik, Layard met with even more important results from his excavations. When he pierced the mounds at this point he was enabled to explore nine vast rooms, one of them 130 feet long, and all replete with interesting and valuable sculptures, inscriptions and carvings. In 1849, after returning to England and arousing the interest of the learned world in his magnificent discoveries, he renewed his work at Kouyunjik and found an almost inexhaustible treasury of antiquities in the sand mounds of the plain. He was now acting as agent for the British Museum, whose Assyrian collection he enriched with some of its most precious examples of art and inscriptions. Loftus and Hormuzd Rassam continued the work in 1853 and 1878-82, and the excavations at Nimrūd were renewed by George Smith in 1873. Wallis Budge in 1888 and L. King in 1902 have continued the work of excavation.

There can be no doubt that some of these monuments represent the remains of ancient Nineveh and scholars have arrived at the conclusion that the city of Ninus occupied the site of Kouyunjik and Nebbi Yunus on the left bank of the Tigris at the confluence of the Zab. Asur, an even earlier capital of Assyria, was undoubtedly built on the site of the modern Kalah Sherghat. The palaces of Sennacherib and Assurbanipal have been unearthed from the mounds of Kouyunjik, and a second palace of Sennacherib and Esarhaddon from the mounds of Nebbi Yunus. It is concluded from these discoveries by some archaeologists that Nineveh proper was one of a cluster of cities and royal residences that stood on the banks of the Tigris. Nineveh proper was built in the shape of an irregular trapezium. The palace of Sargon at the northern angle had a façade 400 yards in width. The chief sculptures and inscriptions which are now stored in the British Museum belong to palaces and temples in the northwest of the city. The principal palace was built in the 9th century B.C. by Assurnasirpal. Near by he built a great tower, rising with narrowing stages. His son Shalmaneser II built the central palace of the group. The statue of Nebo in the British Museum was brought from what has been called the southeast palace, but was really a temple.

Nineveh was not the earliest capital of Assyria and only came into importance in the time of Sennacherib, who is recorded on the inscribed bricks to have built its walls. From his time it was the chief seat of empire, and may have given its name to the whole group of cities between the Tigris and the Zab. Hence Jonah describes this Nineveh as a city of three days' journey, and Diodorus declares its circuit was 480 stadia.

Consult the works of Layard, Botta, Rassam, Flandin, Oppert and George Smith; also Hilprecht, 'Exploration in Bible Lands in the 19th Century'; Hogg, 'Recent Archaeology' (Philadelphia 1903); Kaulen, 'Assyrien und Babylonien' (Freiburg 1899); Perrot and Chipiez, 'Art in Chaldea and Assyria' (London 1884); Rawlinson and Pinches, 'The Cuneiform Tablets in the Kouyunjik Collection of the British Museum' (ib. 1889-99), and the 'Guide to the Assyrian Antiquities of the British Museum.'

NINEVEH, Va., Cavalry Engagement at. After the battle of Cedar Creek (q.v.) in Virginia, General Sheridan on 9 Nov. 1864 withdrew his army to Kernstown, and General Early followed him as far as Middletown. Sheridan ordered Torbet, commanding his cavalry, to move on Early at noon of the 12th, Merritt's and Custer's divisions to the right, on the Back and Middle roads, against Rosser, and Powell's division to the left, on the Front Royal road, against Lomax. Powell moved down the road as directed, and thence across toward Middletown, and at Nineveh met McCausland's cavalry brigade, which charged him; but he made a counter-charge and routed it, capturing two guns, three wagons, two battle-flags, and 161 prisoners, and pursuing eight or nine miles up the Luray Valley. Six regiments were engaged on either side. The Union loss was two killed and 15 wounded; the Confederates lost 20 killed and 35 wounded. Meanwhile the column on the right drove Rosser across Cedar Creek, and under cover of the night Early again retreated up the valley to New Market. Consult 'Official Records,' Vol. XLIII; Pond, 'The Shenandoah Valley in 1864.'

NINGPO, nǐng'pō', China, a city and treaty-port in the province of Che-Kiang, in a fertile plain on the left bank of the Takia or Ningpo River, 13 miles from its mouth, and about 100 miles south of Shanghai. It was opened to foreign trade by the Treaty of Nankin in 1842. It is surrounded by walls five miles in circuit, 25 feet high and 15 feet wide at top, and, besides, has extensive suburbs outside. Though highly extolled by the Chinese as one of the most beautiful cities of the Celestial Empire, it consists of narrow filthy streets and one-storied houses, sometimes of stone, but mostly of brick. Its most remarkable edifice is a brick tower, formed of seven stories, and above 160 feet high, but now a mere ruin, and it contains numerous temples, colleges, etc., chief among them the temple of the Queen of Heaven founded in the 12th century, but the present building, elaborately and richly ornamented, dates from 1680. Shops and immense store-houses occupy the quarters near the river, while eating-houses and tea shops abound near the gates and in the suburbs. The manufactures consist chiefly of silk and cotton goods, carpets, furniture, salt, etc. The fisheries are important. The principal exports are tea, silk and raw cotton; and the principal imports, besides manufactured goods, sugar and opium. The great bulk of the trade is carried on with the other treaty ports. Ningpo was the site of a Portuguese settlement in 1522, has been an important missionary centre, and was taken by the British without resistance in 1841. Pop. estimated at 450,000.

NINIAN, nín-ī-an, Saint, the apostle of the southern Picts. He labored in evangelizing northern England and southern Scotland at the end of the 4th and the beginning of the 5th centuries. He was a Briton by birth, but had been thoroughly educated in language and philosophy at Rome. The field of his activity extended as far north as the Grampian Hills, and his see church, dedicated to Saint Martin of Tours, was Candida Casa, now Whithorn, the modern Wigtonshire, the southwestern county

of Scotland. His death is placed by hagiologists in 432 and his festival is 16 September. After his death the Picts relapsed into paganism; but after the revival of Christianity under David I the shrine of the saint at Whithorn became a famous place of pilgrimage. Consult the biography by Ailred of Rievaulx, printed in Forbes' 'Historians of Scotland' (1875).

NINIGRET, an American Indian sachem of the Niantics, one of the Algonquin tribes. In 1637 he assisted the colonists in the Pequot war; and in 1647 began a war against the Mohegan, which was concluded by a peace at Boston. In 1667 he sold much of his land on Long Island to the colonists. He refused to allow Christianity to be preached to his people, saying "Go make the English good first." He died in 1677.

NIÑO, Pedro Alonso, pā'drō ā-lōn'sō nē'ñō, Spanish navigator: b. Moguer, Spain, about 1455; d. about 1505. He piloted one of Columbus' ships in the expedition of 1492, and accompanied him on his third voyage in 1498 to Trinidad and the coast of Paria, and returned to Spain filled with the project of making an expedition to the new country in search of treasure. He was granted the royal permission, one-fifth of the spoils to be the share of the Crown. The voyage was a successful one; he peaceably obtained from the Indians a great store of treasure, but was accused of withholding the share belonging to the king and died before the suit was ended.

NINON DE L'ENCLOS, nē-nōn dē lōn-klo, or LENCLOS. See LENCLOS, ANNE.

NINTH CENTURY. The crowning of Charlemagne in Rome by the Pope (800), and his magnificent constructive administration and ability as a lawgiver for the Empire of the West promised greatly for the 9th century, but the promise was not to be fulfilled. He made the mistake of dividing the empire between his three sons, but they quarreled over it and only one of them, Louis I, called the Pious, or le Débonnaire, the Easygoing, lived to survive him. It needed a genius like the founder to maintain the empire that he had created, and genius is not hereditary. Louis after an inglorious and turbulent reign, divided the empire among his three sons. It was not long before internal and external peace were at an end. Louis' sons turned their arms first against their father and then against one another. Finally the famous Treaty of Verdun was made (843) by which France, Germany and Italy became separate and independent states. This represents the beginning of France and Germany as we know them at the present time.

Other troubles were brewing even during Charlemagne's lifetime. The Norsemen came down on the Channel coast in 808 and returned at intervals in ever-increasing numbers, until in 841 they plundered Rouen and advanced toward Paris. They secured a foothold on the mainland, which, for the sake of peace, was recognized, and the Normans became an important factor in the politics of both France and England. They represent the disturbing element of the time. During this century, their hardy brethren secured a foothold in Sicily and southern Italy and set up a kingdom of their own in Russia under Ruric, who is looked back

to as the founder of the Russian dominions. Everywhere they went, the Northmen, instead of maintaining their own nationality, fused with but became the dominant element of the people whom they invaded. After a time they were the most French of the French, the most English of the English, and those who went to Ireland are often said to have become more Irish than the Irish themselves.

The frontiers of all the more civilized states suffered severely from the incursions of these barbarians and the 9th century represents another such a migration of nations as constituted such an important element in the history of Europe in the 5th century, when German tribes were pouring down upon the Western Empire and brought about its fall. The rulers were not such as to be able to maintain themselves in the face of these attacks. The very titles given the kings and emperors of the time indicate how low they had fallen in popular estimation. Louis I, le Débonnaire or the Easy-going, had among his successors men who received such titles as Charles I, the Bald; Louis, surnamed the German, somewhat at least in derision; Louis II, the Stammerer; Charles the Fat, and Charles III, the Simple, at the end of the century. The Eastern Empire was scarcely better off, for there was Michael II, called Balbus or the Stammerer, and Michael III the Drunkard, though at the end of the century came Leo VI, called the Philosopher, if that may be considered a title of respect for a king at a time when what is needed is not reflection but resolution and action. In the East the Caliphate declined, relieving the pressure somewhat on the Eastern Empire, but the northern nations now began their incursions and there was war with the Lombards, the Bulgarians, the Saracens and, a little later, the Russians.

The Norsemen were making all the coasts of the North Sea and for some distance inland unsafe and after a time wandered into the Mediterranean Sea to carry on the same devastation. The Saracens were, however, making life utterly miserable for the Mediterranean coast cities. All the islands, Malta, Sicily, Corsica, Sardinia, were attacked over and over again by them, and the Italian peninsula was often invaded. They captured Brindisi, Bari and Tarentum, burned Ostia and Civita Vecchia, invaded even some of the suburbs of Rome, destroyed the rich Abbey of Monte Cassino and threatened Naples, Salerno and Amalfi, so that some of these cities had to treat with them to be spared. They landed in southern France toward the end of the century, pillaged Arles and Marseilles (889) and founded a military colony in Provence from which to make incursions to various parts of the country. Between the Northmen and the other Teutonic barbarians from the North and the Saracens from the South, it is easy to understand what little peace or chance for the cultivation of the arts of life there was.

With weak rulers everywhere and invading barbarians, north and south, east and west, special provision had to be made for some sort of protection for the people. Charles Martel in the 8th century had organized a body of cavalry, rapidly moving troops, which could be sent from one part of the country to another to repel such invasions. They were available,

besides, to quell internal dissensions and came to be an important part of the government resources for peace. This was the origin of chivalry (cheval, horse), and it is easy to understand what a great development such a means of protection would take during the disturbed times after Charlemagne's death. These men on horseback came to be the resource of the weak from invading foreigners and rascally fellow countrymen. When justice failed, the knights errant often redressed grievances, and above all, protected the weak against the strong, and the innocent from imposition. Such an institution was open to the most serious abuses. Many a knight errant became an arrant knave, though most of them took their duties quite seriously and tried to right the wrongs they knew. A high sanction was given to knighthood by the institution of a solemn initiation after a novitiate as a squire. The knights assumed their duties and station very much as the members of a religious order. After a day of fasting and a night of prayer, the knight was solemnly invested with the insignia of his order under the patronage of some chosen lady. The high reverence for womanhood which it inculcated did much to lift knighthood to the highest plane. On the whole, our word chivalrous still enshrines a great historical truth with regard to this institution.

In the midst of the disturbances, due to barbarous incursions while kings and emperors were too weak to protect their subjects or to repel invaders, another institution, feudalism, arose, that was to have a deeper influence on history even than chivalry. The word *feudum* or *feodum* occurs first toward the end of the 9th century, but the institution had been gradually coming into existence for several generations. It means property held in consideration of service, the word probably being derived from the same root as the German *vieh*, cattle, with a secondary sense, property. Men were willing to hold their property on condition of service because this secured them protection from the owner in time of invasion or distraint. Like chivalry, this was subject to many abuses and degenerated in certain places to what was little better than slavery. Maine ('Early Law and Custom') said, however, "The feudal tenure which was certainly at first the tenure of servants, who but for the dignity of their master might have been called slaves, became in the Middle Ages the tenure of noblemen." Under this system everything belonged to the king or the lord, and all others held from him or from those who were holders from him, with specified obligations in return. The weaker man, in certain phases of feudalism, placed himself under the personal protection of a superior without altering his title or divesting himself of his estate. He became a vassal and did homage. The placing of his hands between those of his lord was the typical act by which their co-relation was established. The oath of fealty was taken at the same time. Feudalism was an institution needed for mutual protection in the disturbed times, which degenerated into a serious imposition and an infringement of rights in more peaceful times, and then had to be abolished. It still survives as a basis of the law relating to land both in England and Scotland.

The particular bright spot in the history of

the century is the life of King Alfred of England (849-901), who so well deserves the name of Great, the only English monarch ever given the epithet. The Danes had gained a foothold in England in the second quarter of the century, shortly after the seven kingdoms of the Saxon Heptarchy were united by the King of Wessex under the name Anglia (England), some 10 years after he had defeated the Britons decisively (813). The securing of rich booty was so easy in Britain that the Danes returned some 10 years later and under the weak Ethelwulf ravaged the country unmolested and burned the city of London (838). Ethelwulf made a pilgrimage to Rome, and some years after his return defeated the Danes on the Isle of Thanet. He was succeeded by his sons, Ethelbald and Ethelbert, who reigned jointly, and under whose reign the Church gained a great deal of influence. Under Ethelred, the Danes, no longer satisfied with incursions into the country, settled down in Northumberland and proceeded to add to their territory until defeated by Alfred, who ascended the throne (871). Alfred was only half-heartedly supported by his subjects, however, who had grown tired of the never-ending conflict, and only his indomitable character, rendered still braver by adversity, saved England from the northern invaders. Alfred was, however, much more than a warrior. He was a great constructive administrator and lawgiver, deeply interested in education both for himself and his subjects, a writer of no small capacity, one of those geniuses who are raised up to lift a period and a people from obscurity. Nothing so well illustrates how utterly independent of its environment the human spirit is in its capacity to do things than the careers of such men. Alfred's life has of course been a favorite subject of study to Englishmen ever since but it amply deserves all the attention that has been given to it.

Around Alfred's name have gathered a number of legends but with a core of historical truth which shows him at all times in life a really great man. Though the subject of internal disease, Alfred was most active in work. By measured candles he divided his day into three parts of eight hours—one for sleep, one for work, and one for recreation of the body and diversion of mind. His evenings were given to study or dictation or intellectual intercourse with friends. He was no mere bookman but an active administrator. He repaired the fortifications destroyed by the Danes, cleared the land of robbers and increased the fleet, laying the foundation of England's naval greatness. Justice was his hobby and he severely punished unjust judges. He compiled a code of laws from preceding customs, modestly refusing to add much of his own. His chief interest in the midst of all this activity was letters and he felt that the royal example would do more than anything else for the encouragement of literature, so he made translations of the Latin authors into English, and he was the founder of our literature. He translated Pope Gregory's work on 'Pastoral Care' and sent a copy to every diocese as a sort of standard of the English of the time. He made translations of Orosius and Bede. His favorite work was Boethius' 'Consolations of Philosophy,' the free

translation of which by him gives the best insight into Alfred's own character and his outlook on life. It is just over a thousand years since the death of this "darling of the English," of whom historians agree that he was "the wisest and the best and greatest king that ever reigned in England." Alfred was very much interested in travel and through him we have the account of the Norsemen who sailed around the North Cape to explore the coast of the White Sea and from end to end of the Baltic. These undaunted spirits reached the Faroë Islands (861) and Iceland (870). Iceland, in the course of the next three centuries, separated from the warring elements on the Continent, developed so that in the 11th and 12th centuries the island gave birth to a great literature which has attracted wide attention in modern times. Iceland was the first step to Vineland (America).

Alfred found it impossible to drive the Danes from England, so after establishing his own kingdom, he recognized their settlement of the northeastern part of England in the treaty of Widdemer (872). Here they continued to receive accessions from their home country, and this part of England came to be known as the Danelaw or Danelagh, and as it occupied practically all of the east coast of England and stretched well beyond the middle of the country, only a comparatively small territory was left for Alfred, and yet it is his rule over this that has given him immortal fame. His intellectual and spiritual influence and not the number of people that he ruled revealed his greatness. The Danes continued to grow in number and power all during the next century, until finally the Danish king, Canute, came to rule over all England as well as the Norse countries, and was really the head of an empire.

The 9th century saw the extirpation of the Picts or early inhabitants of Scotland, by Kenneth, king of the Scots, bringing another people with a destiny into history. The greatest Pictish monarch of history, by name MacFergus, after a contest with a series of rivals, gained the supremacy which he held in the second half of the 8th century. It is not known just how, at the middle of the 9th century, Kenneth MacAlpin, called by all Scottish records a Scot, succeeded in reversing this conquest of the Picts and putting a Scottish man on the throne of Scone, but this was the beginning of modern Scotland.

There are traditions of the foundation of Oxford and Cambridge as universities at the end of the 9th or the beginning of the 10th century, but they are not substantiated. Schools were founded at both of these places, perhaps in Alfred's time, and they continued to be centres of the intellectual life for England, but neither of them deserves the name of university even in the loosest sense that can be given to that term, until the 13th century. Alfred's interest in literature and the intellectual development of his people did much for education, but the seeds thus planted needed long cultivation before flowering into higher institutions of learning. Some would trace the tradition of a foundation at Oxford back to Brutus in Roman times, but the rejection of such legends as of those of Alfred's foundering of Oxford should not prevent students from recognizing how

much the great king actually accomplished, even though it were not all that the myths which have gathered around his name would assert.

A great scholar of the century, whose work has been revived to have far reaching influence in our time was John Scotus Erigena or Eriugena (Erin born). Wales and Scotland both claimed to be his birthplace, but it is now generally admitted that he was born in Ireland. His knowledge is interesting as an index of the scholarship of the time. His work shows that he knew Latin well and also Greek, in which he even wrote some poetry, that he knew some Hebrew at least, though it is doubtful that he had any knowledge of other Oriental languages sometimes attributed to him. His principal work is the *'De Divisione Naturæ'* in which in dialogue form, he treats the principal problems of philosophy and theology. "He declares that the creation of the world is in reality a theophania or revelation of the essence of God in the things created. Creation is a process of the unfolding of the divine nature. His system is a combination of neo-Platonic mysticism, emanationism and pantheism which Erigena strove in vain to reconcile with Aristotelean empiricism, Christian creationism and theism." (Turner, *'History of Philosophy'*). His pantheism was condemned at the Council of Paris in the 13th century after having been the subject of a number of ecclesiastical censures before. His works lived on, however, to influence the German mystics in the following centuries, and his ideas have a fascination for certain minds. A thousand years after his death, at the end of the 19th century, one of the most popular systems of philosophy among German university men of a certain type, that of Transcendental idealism, recurs to Erigena's mode of thought and forms of expression, and the confirmed adherents of this school recognize in Erigena a kindred spirit and speak of him in the highest terms. A thousand years is often supposed to be a sufficiently long interval for the progress of human thought to a position far advanced beyond previous modes of thinking, yet here is one of these phases of recurrence of interest which is so often to be met with.

In connection with Erigena we hear of Gottschalk, a German monk, whom Erigena answered, but in doing so fell into errors himself, and Rabanus (Hrabanus) Maurus, who after some years with Alcuin at Tours, became a teacher at Fulda and then headmaster of the school there. He made Fulda the best-known school in Europe. He wrote a pedagogical work, *'De Universo'*, a sort of encyclopædia in 22 books. His works show how broad were the interests of his time. He became Abbot of Fulda and proved a magnificent practical administrator, adding to the buildings and equipment. He took a determined stand in supporting Louis the Pious against his rebellious sons, and afterward supported Lothair the eldest, in the hope of having a single strong government. After the defeat of Lothair he resigned his abbacy, but later was reconciled with Louis the German and then was made archbishop of Mainz, doing much in that position to make that city the enduring seat of ecclesiastical authority it was for so many centuries. Rabanus is a typical example of a great scholar who was a fine force for good of many kinds in his time.

The first mention of the episcopal school at Paris later to become the brilliant university was 882. Rulers and the Church did all in their power to maintain the schools founded by Charlemagne and to extend them, but the constant necessity of being ready to fight the barbarians, north and south, and the destruction of schools and of religious houses by them utterly precluded any idea of educational progress and very soon brought decline. The surprise is that anything was accomplished under the disturbing conditions. Libraries were founded, however, and that of Saint Requier (831) is known to have contained a number of volumes of the Latin classics, at least one of which, *'Trogus Pompeius'*, is lost to us.

The Venetians come prominently into history in this century. The people of the neighborhood of Aquileia who in the 5th century took refuge from the Huns under Attila in the lagoons of the northern Adriatic came very naturally to be a seafaring people, and as the medium of exchange between the East and Italy, achieved prosperity. How great this was in the 9th century, and how high the standard of æsthetic taste had come to be among this merchant people, is very well illustrated by the fact that the great cathedral of Saint Mark's was built in the second half of this century. Its style was that of Roman architecture, modified by contact with the East and known commonly as Byzantine. Without such a monument it would be almost impossible to believe that in the midst of these bitter, troubled times, when Venetian trade by sea must have been seriously disturbed by Saracenic and Norse pirates, there were men thinking in terms of fine art for a people whose own tastes were so well developed that they were thoroughly capable of appreciating such work and helping liberally in the construction of it.

While Charlemagne at the beginning of the century was doing so much for education and the beginning of culture in the West, his great Eastern contemporary, Haroun Al Raschid, was encouraging intellectual development in the Caliphate in such a way that he has been deservedly famous for it ever since. His successor, Al Mamun, the seventh Abasside Caliph of Bagdad (813-933), the youngest son of Haroun, followed his father's example so well that he bears the title of "the father of letters and the Augustus of Bagdad," while his reign is spoken of as the Augustan Age of Mohammedanism. As governor of Khorassan before the death of his father he founded the college there and attracted a number of distinguished teachers. After he had unseated his elder brother and quelled some insurrections and especially a religious war that at one time threatened to uncrown him, he made his capital, Bagdad, a centre of intellectual activity. He was himself an ardent student of mathematics and astronomy and the first Arabic translation of Euclid is dedicated to him. He founded observatories at Bagdad and near Damascus, caused a degree of the meridian to be measured on the plane of Shimar and had astronomical tables constructed, which are said to be wonderfully accurate. He was an author of no little merit, some of whose books are well known to Mohammedan scholars. With him ended the period of Arabian encouragement of letters so far as the Caliphs were concerned. There

seems no doubt now that the influence exerted by himself and his father in letters and education have been exaggerated by the very surprise of finding anything of this kind under the Caliphs. From this time forth Eastern Mohammedanism represents a dreary lack of interest in things intellectual, except for a period in Persia in the 11th century, when native genius triumphed over an unfavorable environment and wrote a series of works that have lived. Moorish culture in Spain came as a later growth.

JAMES J. WALSH,
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PRINCIPAL EVENTS OF THE NINTH CENTURY

800. Charlemagne crowned Emperor of Western Europe. The golden period of the Arabian or Saracenic Empire under Haroun-al-Raschid, Caliph of Bagdad. The Arab University and library of Cordova, famed for science throughout Europe. The Turks or Tartars of the Altai Mountains advance westward.
808. Normans invade northern France.
813. Al-Mamun, youngest son of Haroun-al-Raschid, succeeds as Caliph of Bagdad.
814. Death of Charlemagne.
827. Egbert overlord in England unites the seven Anglo-Saxon kingdoms.
832. Normans and Danes infest England.
833. Death of Al-Mamun, Caliph of Bagdad.
838. Danes invade England and burn London.
840. Employed as mercenaries by the Arabs, a bodyguard of Turks dispose of the throne and limit the Caliph to Bagdad.
843. Division of Charlemagne's Empire. Treaty of Verdun. The independent beginnings of the kingdoms of France, Germany and northern Italy.
845. Northmen threaten Paris.
849. Alfred the Great of England born.
850. Venice rises in power; the cathedral of St. Mark's built.
862. Rurik becomes first king of Russia.
868. Achmet the Turk seizes Egypt and Syria.
870. Northmen discover Iceland and later settle there.
871. Alfred becomes king of Wessex, England.
878. Alfred of England defeats the Danish invasion; forms a navy; enacts wise laws; cultivates learning and science, and founds schools at Oxford and Cambridge.
882. The episcopal school at Paris spreads education.
886. Northmen besiege Paris.
889. Saracens attack and sack Arles and Marseilles.
897. Basilus I, Macedonian legislator and economist, defeats Arabs and Bulgarians.
899. Louis IV last emperor of Charlemagne's line.

NINUS, nī'nūs, eponymous king of Nineveh and founder of that city. His name is nowhere mentioned, apparently, in Assyrian monuments, and the story that he extended the Assyrian Empire to India and to Egypt is historically false. But he figures largely in Greek myth and "history," where Nineveh is said to have been founded by him and named for him; he married Semiramis, wife of Onnes, but his wife murdered him, and ruled as regent for her son Ninyas, who is as mythical a personage as his father. For Semiramis alone in these stories does history show any actual existence.

NIOBE, nī'ō-bē, in Greek mythology, the daughter of Tantalus, was the wife of Amphion, who, in common with Zethus, governed Thebes, which they had built. According to the common accounts she had seven sons and seven daughters, and, proud of her blooming offspring, so far forgot herself as to exalt herself above Latona, the mother of only two children—Apollo and Artemis; and in punishment for her presumption she had to witness the destruction of her children by the arrows of the twin deities. Anguish and despair petrified the wretched mother, after long wanderings, into a stone. Amphion and Zethus also fell, pierced by the arrows of Apollo, when, full

of wrath, they penetrated into the sanctuary of the god. This is the most common account of the fate of Niobe, in the circumstantial details of which poets frequently differ, who have taken this story for a subject as often as artists. The origin of the fable seems to lie in the ancient figure of speech by which it was said of young people who died suddenly that they had been struck with the arrows of Apollo or Artemis; and in almost all languages, petrification is the natural image of the highest degree of torpid despair.

NIOBE OF NATIONS, The, a name applied to Rome, the "lone mother of dead empires."

NIOBIUM, in chemistry, a metallic element discovered in 1801 by Hatchett and called by him columbium, but more fully investigated by Rose, who gave it its present name. Niobium is present in tantalite, euxenite, pyrochlore and in other minerals. The metal may be prepared from the fluoride of niobium by heating it in a covered crucible with sodium and dissolving out the soluble salts with water. It is insoluble in nitric acid, soluble with difficulty in hydrochloric acid, but dissolves in hot hydrofluoric acid. It forms two oxides of a chlorus character, uniting with basylous oxides to form salts.

NIOBRARA, nī-ō-brā'ra, a river which has its rise in Laramie County, Wyo., and which flows east into Nebraska, crosses the northern part of the State, making regular, long north and south curves, and flows into the Missouri River at Niobrara in Knox County. It is about 450 miles long, flows rapidly in the upper part of its course, but moves slowly through the almost level prairie country of the northern part of Nebraska.

NIOBRARA STAGE, in geology, a subdivision of the upper Cretaceous division, forming with the Benton stage the Colorado Epoch. It has a thickness of from 400 to 1,000 feet and includes chalk, calcareous marls, shales, sandstones and limestones, which in most of the area are in two formations—Timpas limestone below and Apishapa shale above. These formations are especially conspicuous in Kansas, eastern Colorado, South Dakota, Wyoming and northern New Mexico. Large numbers of fossil bones and shells occur in the group, notably huge reptiles and fish and birds with teeth. Elasmosaurus, a reptile from the Niobrara chalk beds in Kansas, was over 40 feet long, half of its length being a slender neck. The Tylosaurus, a great marine lizard, is also found.

NIORT, nyôr, France, the capital of the department of Deux-Sèvres, 42 miles east of La Rochelle, 40 miles southwest of Poitiers and 254 miles southwest of Paris by rail. Niort lies on the left bank of the Sèvre Niortoise, partly in the valley and partly on the surrounding hills. Until the 7th century the Niort plain formed part of the Gulf of Poitou and the mouth of the Sèvre was at the foot of the hills where the town subsequently developed around the castle erected in 1155 by Henry Plantagenet. It was captured by Louis VIII in 1224. By the Peace of Bretigny (1360) it was ceded to the English; but the inhabitants revolted against the English and the Black Prince took the town, by assault and massacred many of the

inhabitants. In 1373 the French, under Du Gesclin, regained possession of their city. Niort became a centre of Protestantism and Gaspard de Coligny, having made himself master of the town, resisted the Catholic forces after the battle of Jarnac (1569) but surrendered after the battle of Moncontour (1569). Henri IV took Niort and the town suffered severely by the Revocation of the Edict of Nantes (1685). The town consequently is full of historical associations, not the least of which is that it was the birthplace of Madame de Maintenon. Of the ancient castle there remains only the donjon—two large square towers joined by a central building flanked by turrets—said to have been built by Henry II or Richard Cœur de Lion. From the turrets a superb view is obtained of the valley of the Sèvre and the beautiful public garden (which ranks as one of the finest in France). The church of Notre Dame, dating from the 15th and 16th centuries, is a splendid example of late Gothic and Renaissance architecture. Its spire rises to a height of 246 feet and is beautifully adorned with statues of the evangelists. Saint André, noted for a fine window in the apse, and Saint Hilaire, noted for its fine frescoes, were built in the 19th century. The town hall, named Aliénor Palace, after Eleanor of Guienne, is Renaissance in style. It houses a fine collection of antiquities. In the vicinity of Niort are the ruins of the feudal fortress of Coudray-Salbart. Niort is the seat of a prefect and a court of assizes. It has a board of trade-arbitration, lycées for girls and boys, a chamber of commerce and a school for drawing. It also has a branch of the Bank of France. The public garden and the nurseries are celebrated. The town has a large trade in gloves, dressed chamois, oil, brushes and leather. Pop. 23,775.

NIOX, ny-ôks', **Gustave Léon**, French soldier: b. Provins, Seine-et-Marne, in 1840. He was the son of an army officer, was educated at the Prytanée Militaire de la Flèche and served in the Mexican campaign of 1862-65. In 1870-71 he was in high command during the siege of Paris. After this period he taught in the École Supérieure de Guerre and became commandant of the Invalides and director of the army museum. His 'Simple secit de la guerre de 1870-71' (1897) was crowned by the Academy. He also published 'Recit historique de l'expédition du Mexique' (1874) and edited 'Collection d'ouvrages de géographie militaire' (6 vols., 1876) and 'Atlas de géographie générale' (1887).

NIPA, an East Indian palm (*Nipa fruticans*) of the order *Palmae* and the only species of its genus and frequent at the mouths of rivers from the Philippines to Ceylon and Australia. It is a low-growing tree with creeping, smooth stems and large clusters of fruit. Its abundant sap is used for sugar and wine making and its feathery leaves for thatching or roofing. These leaves are often 20 feet long and form the principal material for house-building in the farms and villages of the Philippines and East Indies generally. It abounds in the salt marshes and, like the mangrove (q.v.) with which it is commonly associated, it is an important land-builder.

NIPAL, nē-pâl'. See **NEPAL**.

NIPHER, Francis Eugene, physicist: b. Port Byron, N. Y., 10 Dec. 1847. He was graduated from the Iowa State University in 1870 and became instructor there. In 1874 he went to Washington University as professor of physics. In 1877 he organized the Missouri Weather Service which he conducted at private expense for 10 years. During the summer months from 1878 to 1882 he made a magnetic survey of Missouri. The results of an active life of study, experiment and achievement in various scientific lines are embodied in his works: 'Theory of Magnetic Measurements' (1886); 'Electricity and Magnetism,' a mathematical treatise (1895); 'Introduction to Graphical Algebra' (1898); 'Experimental Studies in Electricity and Magnetism' (1914). He has contributed many scientific papers to the *Transactions* of the Academy of Science of Saint Louis, of which he is a member. He is a fellow of the A. A. A. S., member of the American Physical Society, the Physical Society of France and of the Royal Society of Arts, London.

NIPHON, nîf-ôn'. See **NIPPON**, or **NIHON**.

NIPIGON, a lake in Canada. See **NEPIGON**.

NIPISSING, nîp'i-sîng, or **LAKE NEP-ISSING**, in Ontario, Canada, lies at an altitude of 644 feet above sea-level, northeast of Georgian Bay, Lake Huron, with which it communicates by French River. It is irregular in coast-line, is 48 miles long, has a maximum breadth of about 30 miles and an area of 330 square miles. Its chief feeder is Sturgeon River, draining from the north a group of smaller lakes. The lake contains numerous islands, one of which is an Indian reservation. The Canadian Pacific, Grand Trunk, Canadian Northern and Timiskaming and Northern Ontario railways touch its shores. Steamers ply on the lake and the region has become a favorite sporting and hunting ground. The watershed separating it from the Mattawa River and the Ottawa Valley marks the summit level of the proposed Georgian Bay Canal. The route from Montreal via the Ottawa River and Nipissing to Georgian Bay was that taken by the old *voyageurs*.

NIPISSING INDIANS, an American tribe of the Algonquin family residing, when discovered by the French in 1613, on the shores of Lake Nipissing, in northern Ontario, Canada. In the 17th century they were one of the most important tribes of British America and were regarded by the Jesuit missionaries as the typical Algonquins. After their dispersion by the Iroquois they fled to Nipigon and some settled at Three Rivers. They were semi-nomadic and comparatively unwarlike, and staunch friends of the French. Their chiefs were elective. The Indians on the reserve at Lake Nipissing are classed as Chippewas.

NIPMUC INDIANS, or "fresh water people," an American tribe residing chiefly in colonial days in central Massachusetts. The majority of the Nipmucs did not at first join with Philip in his war against the colonists, but were active against the English during the struggle in Connecticut in 1675. In January 1676 the remnant of Philip's tribe, with the Narragansetts, the Quaboag and River Indians, effected a junction with the Nipmucs. On the overthrow of Philip some of the Nipmucs fled to

Canada and others dispersed westward on the Hudson River.

NIPPER, Susan, in Dickens' 'Dombey and Son,' a young maid, nurse to Florence Dombey. She marries Toots. The sharpness of tongue whereby she justifies her name is offset by fidelity to her charge.

NIPPERDEY, nĭp'pĕr-dĭ, **Karl Ludwig**, German philologist; b. Schermin, Germany, 13 Sept. 1821; d. Jena, Germany, 2 Jan. 1875. He was educated at the universities of Berlin and Leipzig and in 1852 accepted a professorship at Jena. He made translations of Cæsar, Nepos, Tacitus, etc., with critical notes, which have been widely used. See Schöll's biography (1875), and his collection of his works, 'C. Nipperdeii Opuscula' (1877).

NIPPON, or NIHON, the Japanese pronunciation of the name Jih-pĕn, which is the Chinese pronunciation of the characters meaning "sun-origin," that is to say "the place the sun comes from." This name was given to Jih-pĕn (or Japan) by the Chinese on account of the position of the islands to the east of China. Marco Polo's Zipangu and the poetic Cipango are from the same Chinese compound with the addition of the word *go* (or *kico*), which means country. The name Nihon (Japan) seems to have been first officially used by the Japanese government in A.D. 670. Before that time the usual designation of the country was Yamato, properly the name of one of the central provinces. Another designation is O-mi-kuni, "the Great August Country." Yamato and O-mi-kuni are the names the Japanese prefer in poetry and belles-lettres. Japan has other ancient names, some of which are curiously long, for example: Toyo-ashi-wara-no-chi-aki-no-naga-i-ho-aki-no-mizu-ho-no-kuni, which means "the Luxuriant-Reed-Plains-the Land-of-Fresh-Rice-Ears-of-a-Thousand-Autumns-of-Long-Five-Hundred-Autumns." Consult *Asiatic Transactions* ('Kojiki'), Vol. X, Supplement.

NIPPUR, nĭp-poor', Mesopotamia, an ancient city of Babylonia, between the Tigris and Euphrates, 120 miles southeast of Bagdad, its site now marked by the numerous mounds and excavated ruins at Nuffar. It was built on both sides of the Shatt-el-Nil Canal, one of the early sources of the Euphrates. Nippur was a great and flourishing city 4000 B.C., and the tablets of its great library discovered since 1888 antedate Abraham's departure from Ur of the Chaldees for the Promised Land. Nippur is identified with the Calneh of Genesis x, 10, and was the most northerly and easterly of the four conspicuous centres of Babylonian civilization and religion, literature and science. It was the seat of the worship of En-Lil, the father of the gods and Lord of the Storm, the cause of all the weather troubles of mankind and the original conception of a god of anger and a religion of fear. Marduk, the supreme god of Babylon, superseded him about 2300 B.C., and there were 24 subordinate deities.

Nippur was overthrown and its buildings ruined by the Elamite hordes under Kudur-Nankhundi, 2285 B.C., who destroyed nearly every city of Babylonia. Favored by the permission and protection of the sultan and his administration, the University of Pennsylvania

has since 1888 excavated and laid bare many of its important ruins. The western half represents the remains of the city proper, the eastern half the great temple sites. The work was supervised first by Dr. John Punnett Peters and latterly by Dr. J. H. Haynes and Prof. H. V. Hilprecht. Considerable attention was paid to the excavation of the great temple of En-Lil, the foundation of which was laid between 6000 and 7000 years before Christ. Nine strata can be distinguished in the temple courts, dating from 3800 to 350 B.C. An ancient government palace of immense proportions, where the kings lived, belonging to the fifth millennium before Christ, and one of the ancient gates and walls of the city, were uncovered. A government palace erected about 3000 B.C. was completely and systematically excavated, besides numerous other buildings of less importance. Most valuable inscriptions in stone belonging to the earliest rulers of Babylonia, by the help of which the early history of mankind in the valley between the Tigris and Euphrates, will be reconstructed, were discovered. Antiquities in coins, jewelry in gold, silver and bronze in great quantities; vases in enameled and plain pottery of all periods; seals and seal cylinders, such as the Babylonians used in connection with their business transactions; images of gods, playthings in terra-cotta, bas-reliefs, weights, utensils in bronze, iron and silver, etc., were also found. These were a few of the important relics recovered, without mentioning the numerous facts ascertained and the many questions solved through study in the trenches, which have important bearing upon the religious ideas and customs of the daily life of the Babylonians. But chief of the important discoveries made during 1889-1900 were those in connection with the famous library of the sanctuary, which was found beneath 25 feet of accumulated débris, representing several millenniums of history. In the uppermost stratum of this mound the excavators found coffins which had been buried in the early centuries of our Christian era. A great many antiquities were also gathered which belonged to the Jews who continued to live at Nippur after the return of Ezra and Nehemiah. Prominent among them were terra-cotta bowls containing incantations and charms inscribed in Hebrew and Mandæan. At a depth of 25 feet were found a series of rooms, a number of which contained ledges or shelves built out from the wall, for the purpose of laying out the tablets in rows. The library seems to have been divided into two parts. There was a business section for keeping accounts, and the educational quarters, with a vast library of a literary character.

Nearly 20,000 tablets were recovered, illustrating practically every branch of literature known to the Babylonians. Among the inscriptions are hundreds of historical texts, dictionaries or lists of Sumerian words with Semitic equivalents; lists of birds, animals, plants and stones; lists of words for chairs, stools and other articles of furniture; hymns, astronomical and mythological inscriptions, tablets which refer to the service and functionaries of the temple—how many garments the god En-Lil wore, how many temples and shrines there were at Nippur besides those dedicated to En-Lil, and what the revenues of the temples were; tablets containing

grammatical sentences written by students, arithmetical calculations, etc.

In appreciation of Professor Hilprecht's valuable services, the sultan presented him with, among other important antiquities, the largest part of the find of the library, which is now deposited in the University of Pennsylvania.

Only a small portion of the mounds at Nippur has thus far been completely excavated. Considerable work yet remains to be done on the temple. Only one side of the ancient government palace has been cleared, and about one-twentieth part of the library, but arrangements have been effected for a continuance of the work of excavation until completed. (See ASSYRIA; BABYLONIA). Consult Fisher, C. S., 'Excavations at Nippur' (New York 1905-06); Geere, 'By Nile and Euphrates' (ib. 1904); Hilprecht, 'Old Babylonian Inscriptions, Chiefly from Nippur' (ib. 1893-96), and 'Explorations in Bible Lands During the Nineteenth Century' (ib. 1903); Peters, 'Nippur, or Explorations and Adventures on the Euphrates' (ib. 1897); Zehnfund, 'Babylonien in Seinen wichtigsten Ruinenstätten' (Leipzig 1910).

NIRGUA, nēr'gwa, Venezuela, city in the state of Yaracuy, 110 miles southwest of Caracas. Nirgua was founded in 1554 and in 1565 rich gold mines were discovered in the neighborhood. Copper, coal and other minerals exist here and sulphur is also abundant. Hence the region is peculiarly rich. The neighboring country also produces coffee, cacao, sugar, tobacco and cotton as well as livestock. Pop. about 10,000.

NIRUKTA, nī-rook'ta. See VEDA.

NIRVANA, nīr-vā'na, a term which originally denotes the blowing out or extinction of a flame, and is used in the metaphorical language of Buddhist philosophy to mean that condition which succeeds to the long process of metempsychosis to which imperfect souls are subjected before they reach the end of Karma, the active life of earthly effort and struggle after perfection. Nirvana, according to Rhys Davids, was originally intended by Buddha to indicate extinction of existence, annihilation, as an escape from the perturbations of passion and the miseries of life. The utterly negative character of this conception seems later on to have undergone a change. Buddha has said, "It is enough to know that Nirvana is an advance beyond life; it is a condition of fearless security and happiness." But there is no definite implication that this happiness is conscious, or that a sense of personal identity accompanies it. Annihilation may be quite consistent with "Freedom from the pang of earthly existence," and even prove "a region or condition of peace." This peace in Nirvana results from the fact that no transmigration into baser forms of wretched ghost, beast or demon is possible for the enfranchised spirit. The "extinction" in this case will only mean the extinction of the baser elements in the individual. The great and pure elements are developed in inverse ratio; there follows a calm and sinless state of mind, such as even Lucretius sometimes caught sight of when he speaks of "vita dis digna" as the object of the philosopher. "The life worthy of Gods"—holiness, purity, freedom, wisdom—this is nirvana in the true Buddhist sense;

though when and where it is to be realized is left one of the misty problems of oriental mysticism. Consult Dahlmann, 'Nirvana' (Berlin 1897); Rhys Davids, 'Origin and Growth of Religion as Illustrated by Indian Buddhism' (London 1881), and 'Buddhism' (ib. 1896); Max Müller, 'The Meaning of Buddhism' (ib. 1857); Oldenberg, 'Buddha, sein Leben, seine Lehre, und seine Gemeinde' (Eng. trans., 1882); Poussin, 'Bouddhisme' (1909). See BUDDHA; BRAHMAN; HINDUISM; JAINS.

NISAMI, nī-sā-mē. See NIZAMI.

NISAN, nī'sān, in the Jewish calendar, the first month of the sacred year and seventh of the civil year, answering nearly to our March. See CALENDAR.

NISARD, Jean Marie Napoléon Désiré, zhōn mā-rē nā-pō-lā-ōn dā-zē-rā nē-zār, French author: b. Châtillon-sur-Seine, 20 March 1806; d. San Remo, Italy, 27 March 1888. He became professor of eloquence at the Collège de France, Paris, in 1843; in 1852 inspector-general of education; in 1857 director of the École Normale Supérieure, and in 1867 a senator. In 1850 he was elected to the Academy. He belonged to the doctrinaire school of criticism, which he tried to exalt into an exact science. His reputation as a historian of literature was established by his 'Les poètes latins de la décadence' (1834). Others of his works are: An excellent 'Histoire de la littérature française' (1844-61); 'Mélanges d'histoire et de littérature' (1859); the distinguished study, 'Les quatre grands historiens latins' (1875), and 'Nouveaux mélanges' (1886). Consult his 'Souvenirs et notes biographiques' (1888).

NISBET, nīz'bēt, Hume, Scottish artist and novelist: b. Stirling, Scotland, 8 Aug. 1849. Leaving Scotland at 16, he spent six years in Australian travel and on his return was for eight years prior to 1885 art master in Watt College, Edinburgh. He has since twice revisited Australia and has published 46 romances, including 'Bail Up'; several volumes of verse, and various works on art, such as 'Where Art Begins,' and also of travel, such as 'A Colonial Tramp.'

NISBET, John, Scottish forester: b. Edinburgh, 2 Oct. 1853; d. 1 Dec. 1914. He was educated at Edinburgh University and also studied in Munich. Entering the Indian forest service in 1875, he became conservator of forests, Burma, in 1895, retiring in 1900 and receiving the Kaiser-i-Hind gold medal for his services. In 1912 he was appointed adviser to the Scottish Board of Agriculture. He has published 'British Forest Trees' (1893); 'Studies in Forestry' (1894); 'Our Forests and Woodlands' (2d ed., 1908); 'The Management of Forests in Theory and Practice' (1901); 'Burma under British Rule and Before' (1901); 'The Elements of British Forestry' (1911).

NISBET, Robert Buchan, Scottish painter: b. Edinburgh, 1 July 1857. He was educated at the Edinburgh Institution and chose as his profession that of landscape painter in water colors. His success was attested by the awards made to him at three international exhibitions—Dresden (diploma) 1892; Antwerp (medal) 1894; Vienna (medal) 1898. He was elected an associate of the Royal Scottish Academy in 1893 and a full member in 1902. Among his

most notable works are 'Evening Stillness' (purchased by the Chantrey Bequest) 1890; 'Thundery Weather'; 'Harrowing'; 'Waiting for the Tide' (1898); 'Between Showers' (1898); 'November Evening' (1899); 'A Fishing Village' (1900). Many of his works are in public collections.

NISH, nēsh, or **NISSA**, nēs'sā, Serbia, a fortified city on the Nishava, a tributary of the Morava, 130 miles southeast of Belgrade. It has Turkish and Serbian sections, but holds a position of strategic importance on the Vienna-Constantinople and Salonika Railroad routes. It was the seat of the National Assembly until 1901, and is the see of a Greek bishop. It has hot springs and baths, celebrated since the Roman era, when Nish is mentioned as Naissus by Ptolemy. Constantine the Great was born at Nish. Situated at the junction of many of the main highways of the Balkan Peninsula, it has had a turbulent history, in 1456 being captured by the Turks; in 1878 it was taken by the Serbians under king Milan. The unsuccessful attack in 1809 is still perpetuated by the "Tyele-Koula" (Tower of Skulls), erected by the Turks half a mile east of Nish, and consisting of the heads of Serbians killed during the battle. Pop. 24,949, including 2,000 Moslems. It became the temporary location of the Serbian government after the outbreak of the Great War in July 1914, and on 6 Nov. 1915, during the successful campaign of the Central Powers against Serbia, fell to their forces after three days of heavy fighting.

NISHAN EL-AAMAN, nī-shān' ēl ā-mān' (Ar. *Nishan al-āman*, order of the best), Tunisian order of honor founded by Mohammed-es-Sadok in 1859. It commemorates the adoption of the constitution and has but one degree.

NISHAN EL-IFTIKHAR, ēl-if-ti-kār', a Tunisian order of merit.

NISHAN EL-IFTIKHAR, Turkish order founded by Sultan Selim III and revived in 1827. It is conferred upon foreigners who have rendered services to the Turkish state. There are no classes of honor, but the value of the medal differs with the degree of the recipient.

NISHAN I-IMTIAS, ēm-tē-ās', Turkish order of merit founded in 1879 by Sultan Abdul Hamid. It is conferred upon Turkish officials who have displayed at least three of the attributes: patriotism, fidelity, bravery and zeal, these names being engraved on the medal.

NISHAN I-SHEFKIAT, ē-shēf-kāt' (Ar-Pers. *Nishān-i-shifqat*, order of clemency), Turkish order of three degrees established by Sultan Abdul Hamid in 1878. The medal is conferred upon women who have rendered aid to their country in times of war or peril.

NISHAPUR, nīsh-ā-poor', Persia, the capital of a province of Khorasan, situated in the northeast of the country in a fertile plain at an altitude of 3,900 feet, 50 miles west of Meshed. Anciently it was of great commercial and political importance. An active domestic trade is still carried on, and the city has long been celebrated for the quality of the turquoises found in the district. Omar Khayyam was born here in 1123, and his unpretentious tomb is shown in a mosque among the ruins of the old town. Pop. about 15,000.

NISHGAR. See **NASS INDIANS**.

NISI PRIUS, (1) *in law*, authority for the judges to proceed on their circuits and try causes by jury. (2) Formerly, a writ ordering the sheriff to have the jurors in a civil case at Westminster on a day named unless the judge should previously go to the proper county in which to try the cause. (3) A general term for the trial of civil causes before a jury. It is applied to-day in England to actions before the King's Bench Division of the High Court of justice in London, and also popularly in the country districts to designate proceedings in certain civil courts in the circuits under the Judicature Acts. The term is used in the United States also, mostly to designate civil courts whose judges travel in circuits and which try cases with the aid of a jury.

NISIBIS, nīs'i-bīs, Asia Minor, anciently an important town, the capital of Mygdonia, Mesopotamia, now the town of Nisibin, in the district of Diarbekir. The cuneiform inscriptions found here refer to it as Nasibina. It held a commanding situation on the road between the Tigris and the Mediterranean, and was frequently taken and retaken in the wars between the Romans and the Parthians and afterward between the Romans and Persians, until it was given up to the latter by the Emperor Jovian in 363. The Persians were defeated here by Belisarius in 451 and by Marcian in 573. Pop. 4,000.

NISQUALLI (nīz'kwā-lē) **INDIANS**, an American tribe of the Salishan family formerly residing on Puget Sound, Washington. They joined the Puyallup and other tribes in signing the Medicine Creek Treaty of 1854. In 1858, the Nisquallis took part in the general Indian war in the Northwest. There are to-day rather over 100 survivors.

NISROCH, nīs'rōk, in Assyrian mythology, a god, in whose temple, and in the very act of idolatry, Sennacherib was slain by his own sons (2 Kings xix, 37). The name signifies "the great eagle"; and the earlier Assyrian sculptures exhumed at Nineveh have many representations of an idol in human form, with the head of an eagle. Among the ancient Arabs, also, the eagle occurs as an idol. Historians long accepted Joseph Halévy's conjecture that the word is a corruption of Nusku; while it has also been held to be identical with Marduk of the latter Babylonian pantheon, and by others again as a corruption of Asur.

NISSA, nēs'sā, Servia. See **NISH**.

NISSEN, Heinrich, hīn'rīh nīs'sēn, German archaeologist; b. Hadersleben, Germany, 3 April 1839; d. March 1912. He was educated in Kiel and Berlin, and in 1869-76 was professor of ancient history in Marburg and subsequently held professorships in Göttingen, Strasbourg and Bonn. He wrote 'Kirtische Untersuchungen über die Quellen der 4 und 5. Decade des Livius' (1863); 'Italische Landeskunde' (1883-1902); 'Grieschische und römische Metrologie' (1887); 'Studien zur Geschichte der Religion Ourlentation' (1906-11); etc.

NISUS, nī'sūs, Greek mythological king of Megara. His life depended upon a lock of gold or purple hair and of this his daughter Scylla deprived him when Minos, of whom she was enamored, laid siege to Megara. This act of

treachery enabled Minos to take the city, but shocked by the conduct of Scylla, he had her tied to the stern of his ship and by some accounts she was drowned in the Saronic Gulf. Another legend makes her swim after Minos' ship and she is then pounced upon by her father in the form of a sea-eagle, whereupon she changes into the sea-bird Ciris, and is ever after pursued by him. Consult Frazer, 'The Golden Bough' (1900).

NITHARD, nē-tär', Frankish historian: b. about 795 A.D.; near Angoulême, 15 May 843. He was a grandson of Charlemagne. He was in the service of Louis the Pious, and later of Charles the Bald, whose cause he espoused during the dissensions between the sons of Louis. He fought in the battle of Fontenay, and was killed in a battle against the Northmen. At the command of Charles the Bald, he wrote a history of the times 'De dissensionibus filiorum Ludovici pii ad annum usque 843,' which, though naturally partisan, is a valuable source for the study of early mediæval history. It is contained in the 'Monumenta Germaniæ Historiæ,' published by Pertz (1870); and was also published by Holder (1882), and in German by Jasmund (1889).

NITHSDALE, niths'däl, William Maxwell, 5th EARL OF, Scottish Jacobite: b. Scotland, 1676; d. Rome, Italy, 20 March 1744. He joined the Jacobites in 1715 and served under Forster and Derwentwater at Preston where he was captured. He was imprisoned in the Tower and sentenced to death, but assisted by his wife he made his escape in woman's clothing the night preceding the day set for his execution, and after remaining in hiding for two days, escaped to France, disguised as a footman in the livery of the Venetian ambassador. He was the "Willie" of 'Kenmure's up and awa'; and the story of his escape written by his countess will be found in 'Transactions of the Societies of Antiquaries of Scotland (Vol. I).

NITOCRIS, nī-tō'krīs, Egyptian queen, the last of the Sixth Dynasty. She succeeded her brother Menthuophis, whose assassination she avenged by drowning all who had any complicity in it. She was buried in the third in size of the greater pyramids, which she had enlarged. She was supposed by the Greek historians to be Rhodopis, "rosy-checked," a Greek courtesan, with whom the king fell in love from the sight of her lost slipper—the original of the Cinderella legend.

NITON, a chemical element generated by the element radium. It was discovered in 1900 by Dorn and called radium emanation. Gray and Ramsay gave it the name niton, from the Latin *nitere* to shine, in 1911. The molecular weight was determined by Perkins in 1908; by Debierne in 1910; and by Gray and Ramsay in 1911. All agreed that this weight is 222.4. Sir William Ramsay proved in 1912 that the curative value of the famous spring at Bath, England, is due to the niton contained in its waters. Niton liquifies at low temperatures and may, therefore, be isolated from its mixtures with helium. Pure liquid niton boils at 62° C. and 79.6° F.

"The proof that each atom of radium yields an atom of the gas helium," writes Dr. Leonard Keene Hirschberg of the Johns Hop-

kins University, "was settled for all time by Sir William Crookes and Professor Rutherford. They covered a screen with crystals of sulphate of zinc. As the miniature explosions take place during the escape of helium from radium, the helium is shot out with much force. As the atoms strike the screen, flashes of light appear. Those, of course, are the alpha rays, so called. After these particles of helium have broken away, the atom of radium is really radium no longer, but a gas which is now known as the new element *niton*. The rate of change of radium into *niton* progresses in a slow, geometrical disintegration. After a period of 1,760 years, one ounce of radium will have changed into half an ounce of niton and helium while one-half an ounce of unchanged radium will remain. Allowing another 1,760 years to elapse and one-half of the half ounce or a quarter of an ounce of radium will be changed to niton and helium. The next 1,760 years would make an eighth of an ounce change and an eighth of an ounce remain unchanged. Thus this curious half period of decay will go on indefinitely. Niton, like helium and argon, is practically inert. It forms no chemical salts or other compound, and its existence is temporary, lasting a little less than four days. To be exact, after 3.86 days it in turn disappears and changes into something new.

"Sir William Ramsay proved that 75 per cent of the wonderful powers of radium is due to niton. He has also shown that, like most other gases, niton is compressible and can be converted at room temperatures into a liquid by a simple compression. Pressed into a silica glass tube of very fine bore, it will become solidified into a microscopical stick of ice-like material. Though it cannot be seen, it causes a light in the tiny glass tube as brilliant as an arc-lamp.

"Liquid niton also causes a faint violet incandescence. In the dark it is most beautiful. The liquid itself, however, in a lighted room, appears quite clear. Ramsay and his assistant, Whytlaw Gray, found that the atomic weight of niton is equal to that of an atom of radium minus an atom of helium. Since radium is 228 and helium 4, niton has the atomic weight of 224. Like radium, niton decays in that curious geometrical ratio, called 'half-period of decay.' Thus, niton changes one-half in four days, in eight days a quarter of it is left, in twelve days an eighth, sixteen days, a sixteenth, twenty days a thirty-second, twenty-four days a sixty-fourth, so that practically at the end of one month it has all changed." Consult Ramsay, Sir William; RADIUM; RADIO ACTIVITY.

NITRATE OF SILVER, a compound of silver and nitric acid, having the formula AgNO_3 . It may be prepared by dissolving pure silver in warm nitric acid that has been diluted with two or three times its own weight of water. The solution is evaporated to dryness and the residue gently heated until all the nitric acid has been expelled, after which it is dissolved in water and crystallized; the silver nitrate being then obtained in the form of colorless rhombic tabular crystals. The commercial product is usually the result of the separating of silver from gold bullion, and in this case it often contains copper. This is removed by boiling with freshly precipitated silver oxide which throws down the copper in the form of

oxide. Nitrate of silver is readily soluble in water and in a somewhat less degree in alcohol. It melts at 424°F. , and when cast into sticks it constitutes lunar caustic, being used in this form as a cauterizing agent. Its cauterizing effect depends upon the fact that it forms, with the albumen of the flesh, an insoluble albuminate of silver. It is sometimes combined with two parts of potassium nitrate to form what is known as "mitigated caustic." Dry silver nitrate will absorb ammonia with the evolution of a degree of heat sufficient to melt it, and with the formation of the ammonio-nitrate of silver. Nitrate of silver, especially in the presence of organic matter, is blackened by exposure to light, and on account of this property it is used in the preparation of indelible inks for marking linen, and as a basis for dyes to color the hair black. It was much used in photography in the days of the old "wet-plate" process and is still employed in sensitizing some kinds of paper upon which positive pictures are printed. The black stains that it leaves upon the hands may often be removed by the application of cyanide of potassium; but it should be remembered that cyanide of potassium is a violent poison and that it must be used with extreme care.

Medical Uses.—Nitrate of silver is official in two forms, the heavy crystalline salt, readily soluble in its own weight of water, and the lunar caustic above mentioned. Applied to the skin, it produces a brownish-black stain due to the formation of chloride of silver, through combination with the sodium chloride of the perspiration. The crystals only are used internally either in pills or solutions. Nitrate of silver as ordinarily applied to an inflamed mucous membrane is more of an astringent than of an irritant. Applied locally as a caustic, its action is superficial, coagulating the albumen and so forming a protective coating. Internally it is used (combined with an anodyne) in gastric ulcer, gastritis, intestinal ulcerations and dysentery. Salt and soap checks its action. Externally in stick form, it has been used to prevent the pitting of smallpox. In solution it is employed to quiet the pain and relieve swelling in cases of felon, orchitis and epididymitis; in inflammation of the mouth, pharynx and larynx; in whooping cough, pruritus ani, bedsores, boils, granular lids, conjunctivitis, etc. Nitrate of silver should not be used internally for too long a time, as it is not readily eliminated from the body. Argyria or chronic poisoning is liable to result from such use of the remedy. See SILVER-POISONING.

NITRATE OF SODA, SODIUM NITRATE, or CHILE SALTPETER, a compound of sodium and nitric acid, having the formula NaNO_3 . It may be prepared by neutralizing nitric acid with sodium hydrate or sodium carbonate and evaporating the solution; but it occurs native and in large quantities, in the northern part of Chile and in the neighboring parts of Peru and Bolivia. Deposits of it are also known in Humboldt County, Nev., and in San Bernardino County, Cal. The Chilean deposits occur at a height of 3,300 feet above the sea, but they are undoubtedly of marine origin, since they contain the remains of recent shells. Nitrate of soda, as it occurs in nature, may be purified by repeated crystallization from its aqueous solution. It crystallizes

in rhombohedral forms and is isomorphous with calcite; but in nature it is usually found massive, or in beds, or as an incrustation. The crude substance is valuable as a fertilizer (see MANURES AND MANURING), and it is also used extensively as a source of nitric acid and of nitre (q.v.), and for the production of the cheaper grades of gunpowder.

NITRATES, salts of nitric acid. See NITRATE OF SILVER; NITRATE OF SODA; NITRE; NITRIC ACID.

NITRE, *nit'ér*, **NITER**, **NITRATE OF POTASH**, **POTASSIUM NITRATE**, or **SALTPETER**, a compound of nitric acid and potassium, having the formula KNO_3 . It occurs native in many places as an incrustation upon the soil, notably in Spain, Egypt, Persia and India. It is formed, either naturally or artificially, by the action of a nitrifying bacillus on decaying nitrogenous matter in contact with potassium compounds (see NITRIFICATION). It also occurs in considerable quantities in the caverns of Kentucky and Tennessee, and elsewhere along the Mississippi Valley. It is obtained on a commercial scale from these various sources, but it is also prepared in vast amounts from native nitrate of soda (q.v.). When hot concentrated solutions of nitrate of soda and potassium chloride are mixed, nitrate of potash and chloride of sodium (common salt) are formed, the latter separating out in the form of crystals when the solution cools, while the nitrate of potash remains in solution. Nitre has mild antiseptic properties and it is also used in dyeing, in metallurgy, in medicine (as a diuretic and diaphoretic), and in the preparation of fluxes. It is used in the arts most commonly, however, in the manufacture of gunpowder (q.v.). For "sweet spirits of nitre" see NITROUS ETHER.

NITRIC ACID (Latin, "from nitre"), in chemistry, a compound of nitrogen, oxygen and hydrogen, having the formula HNO_3 , and possessing strongly acid properties. It appears to have been discovered in the 9th century, by Geber, the "father of chemistry," who describes a method of preparing it by distilling a mixture of nitre, alum and copperas (sulphate of iron). The modern method of preparing it by the action of free sulphuric acid upon nitre was apparently first described by Glauber, about the middle of the 17th century. Lavoisier proved that the acid contains oxygen, and Cavendish, in 1785, succeeded in preparing nitre by passing electric sparks through a mixture of oxygen and nitrogen, in the presence of a solution of caustic potash. Free nitric acid occurs in rain-water in exceedingly small amounts, and its salts are formed, in the soil, by the bacterial oxidation of nitrogenous organic matter. (See NITRIFICATION). Commercially, nitric acid is manufactured by distilling sodium nitrate ("Chile saltpetre") with strong sulphuric acid. The sulphuric acid (H_2SO_4) unites with the sodium nitrate (NaNO_3) to form nitric acid (HNO_3) and acid sulphate of sodium (HNaSO_4), as indicated by the equation: $\text{NaNO}_3 + \text{H}_2\text{SO}_4 = \text{HNO}_3 + \text{HNaSO}_4$. When the temperature is sufficiently raised, the acid sulphate of sodium combines with another molecule of the sodium nitrate to form normal sodium sulphate (Na_2SO_4), another molecule of nitric acid being

liberated at the same time, as indicated by the equation:



The temperature is not always carried to the point where this last reaction occurs, however, because although the yield is larger, the product is more largely contaminated with objectionable impurities, and the residual "cylinder cake," or "nitre cake," left in the retorts, is harder to remove. The distillation is commonly carried out in iron retorts, iron not being seriously attacked by concentrated sulphuric acid. The nitric acid which distills off is washed by passing it through a series of double-necked iron bottles ("Woulfe's bottles"), containing, each, a small quantity of water. The distillate is finally condensed, then constituting the crude, fuming acid. Nitric acid, as thus manufactured, is yellowish in color, and contains, as its principal impurities, chlorine, hydrochloric acid, iodic acid, peroxide of nitrogen, sulphuric acid, sodium sulphate, and iron compounds—some of these being distilled over, and others carried over mechanically. Most of the impurities may be removed by re-distillation. A third distillation then follows, after the addition of an equal volume of concentrated sulphuric acid to retain the major part of the water. By this means a tolerably pure nitric acid can be had, though it is still yellowish from the presence of lower oxides of nitrogen. These may be removed by warming the acid slightly, and passing through it a stream of air, or (preferably) of carbon dioxide gas. Any nitrous acid that may be present may be removed by distillation with a small quantity of urea, which decomposes the nitrous acid with liberation of carbon dioxide, water and free nitrogen.

The method of manufacture described above is the usual one, but other methods are also used, and the Valentiner process, in which the distillation is conducted in a vacuum, is strongly favored by many modern manufacturers. (Consult Rogers, 'Industrial Chemistry'). Nitric acid and its compounds are also made by the oxidation of the nitrogen of the air (see NITROGEN), either by the direct action of the electric arc, or by catalytic combination at high temperature and pressure. The cost of manufacture by the electric arc method has been practically prohibitive in the past, except in Norway, Sweden and Switzerland, where the needful electric current can be generated very cheaply, by water power. The catalytic method is growing in favor, and during the war immense plants were constructed in the United States, at Muscle Shoals and elsewhere, to provide, by this and other synthetic methods, the nitric acid that was needed in the manufacture of explosives. Germany could not have conducted the war except for the fact that she was able to manufacture synthetic nitric acid in large quantities by the Haber process and modifications thereof.

Nitric acid, perfectly free from water, has not yet been prepared, although specimens have been obtained containing from 99.5 to 99.8 per cent of HNO_3 . When free from all impurities except water, nitric acid is a colorless liquid, which gradually decomposes in a strong light, with evolution of oxygen, water and nitrogen peroxide (N_2O_4) becoming yellow from the presence of the peroxide. The most highly concen-

trated acid freezes at about 50°F . below zero, and boils at about 187°F ., although it begins, below the boiling temperature, to decompose into nitrogen peroxide, water and free oxygen. Concentrated nitric acid may have a specific gravity as high as 1.552. Nitric acid was formerly known as "spirit of nitre," and (when diluted) also as "aqua fortis" (that is, "strong water"). It is an active oxidizing agent, especially when warmed, owing to the facility with which it parts with oxygen. When mixed with hydrochloric acid, it is known as "nitrohydrochloric acid," "nitromuriatic acid," or "aqua regia," the latter name being given on account of the power that the mixture has of dissolving gold. The powerful solvent action of nitrohydrochloric acid is due to the fact that it contains free chlorine gas, liberated from the hydrochloric acid by the oxidizing action of the nitric acid upon the hydrogen of the hydrochloric acid. Nitric acid and nitrohydrochloric acid are both used in medicine, in a highly dilute state, as appetizers and diuretics.

Nitric acid is used in large quantities in chemical industries of all kinds. It is of the greatest importance in the manufacture of the coal-tar colors, and of many of the modern high-power explosives. (See for example, NITROGLYCERIN and GUNCOTTON). In using strong nitric acid, either alone or mixed with sulphuric acid, great quantities of nitrous fumes are often liberated, and it is extremely important to protect the workmen from them. When nitrous fumes are inhaled (even though largely diluted with air) they cause strangulation and loss of consciousness—often followed, after seeming recovery, by fatal edema of the lung tissues, or at a later time by pneumonia. It is, therefore, customary to use the nitric acid, so far as possible, in closed tanks, and to transfer it from tank to tank through pipe lines, by means of gravity or air-pressure.

With the metallic bases, nitric acid forms a series of exceedingly important salts known as "nitrates." Practically all of the nitrates are crystalline and readily soluble, and they are characterized by marked decrepitation when heated upon charcoal before the blowpipe. Several of the nitrates are used in dyeing, notably those of aluminum, iron and lead. Aluminum nitrate, $\text{Al}(\text{NO}_3)_3$, may be prepared by dissolving aluminum hydrate in dilute nitric acid, and crystallizing by evaporation. It crystallizes in rhombic prisms which contain nine molecules of water, are readily soluble, and melt at 99°F . Ferrous nitrate, $\text{Fe}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$, is prepared by dissolving ferrous sulphide in dilute nitric acid, and slowly evaporating the solution at as low a temperature as possible. Ferric nitrate, $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$, crystallizes in rhombic prisms, and may be prepared by dissolving metallic iron in nitric acid, adding more acid, and finally cooling the solution. It is readily soluble in water, but nearly insoluble in cold dilute nitric acid. Normal lead nitrate, $\text{Pb}(\text{NO}_3)_2$, may be obtained in the form of octahedral crystals, by evaporating a solution of lead carbonate in dilute nitric acid. The nitrates of barium and strontium are used to a large extent in pyrotechny, on account of the beautiful colors that they yield. They may be prepared by adding, to the corresponding carbonates, not quite enough dilute nitric acid to decompose the whole of the salt, and subse-

quently filtering and crystallizing. See also NITRATE OF SILVER; NITRATE OF SODA; NITRE.

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NITRIDES, in chemistry, compounds consisting of nitrogen and one other element. They are usually prepared by the action of ammonia upon metallic oxides or chlorides, but in some cases they may be prepared by the direct combination of free nitrogen with the other constituent. Hydrogen nitride or triazic acid has the formula N_3H . It forms salts with the metals. Its sodium salt is formed by treating the compound $NaNH_2$ with nitrogen chloride, NCl_3 . Triazic acid and its salts are highly explosive. Nitride of boron ("athogen"), for example, has the formula BN and is formed when boron is heated in nitrogen gas. Magnesium nitride, a crystalline substance having the formula Mg_3N_2 , is also formed when metallic magnesium is heated to redness in an atmosphere of nitrogen in the presence of calcium-carbide. Ramsay, Raleigh, Travers and others took advantage of this latter fact for effecting the absorption of the nitrogen of the air, in their researches upon argon, helium and the other rare gaseous elements of the atmosphere. (See ARGON). The nitrides of the metals are mostly decomposed by heat and sometimes with explosive violence. Magnesium nitride, however, is quite stable.

NITRIFICATION, the process by which nitrates are formed, either in the soil or elsewhere, by the putrefactive or fermentive decay of nitrogenous organic matter, or by the oxidation of nitrogen itself. It has long been known that nitrates are formed in the soil and in India, as well as in Spain and certain other parts of Europe, nitrate of potassium ("nitre") is still manufactured to some extent by mixing porous soil with manure and other organic refuse, adding wood ashes (as a source of potassium) and allowing the mass to stand in heaps for two years or so. Under suitable conditions of temperature and moisture, the yield may be as much as 10 pounds of crude nitre per ton of earth. Analogous changes go on, from year to year, in all fertile soil, and it was formerly believed that the natural conversion of nitrogenous matter into nitrates is due to the fact that the soil, by a sort of capillary action, condenses air within its pores; oxidation being thereby promoted because the air held by the soil, being denser than normal atmospheric air, contains more oxygen per unit of volume. In 1862, however, Pasteur suggested that nitrification is effected through the agency of bacteria, or other forms of microscopic life; and in 1877 Schlösing and Müntz established this view upon a firm foundation, by means of many ingenious experiments. It has also been further and most convincingly established by Warington, Munro, Winogradsky, P. F. Frankland, G. C. Frankland and others. It has been shown, for example, that nitrification is arrested by powerful antiseptics and that it proceeds most actively at about $100^\circ F.$, and less rapidly both at higher and at lower temperatures. Furthermore, if soil or sewage be raised in temperature to $212^\circ F.$, so as to destroy all life that may be present, nitrification at once stops, and it will not proceed again when the temperature is restored to $100^\circ F.$, even in the presence of

abundance of air that has been passed through germ-proof filters. If the sterilized mass be "sown" with the nitrifying agents, however, by the addition of a small quantity of unsterilized soil or sewage, nitrification is at once resumed, and thereafter proceeds normally. Certain conditions are essential to active nitrification, in addition to a suitable temperature, the free access of oxygen, and the actual presence of a sufficient number of the live and active organisms. It is essential, for example, that the soil or other medium in which the nitrification occurs shall be slightly alkaline, and this implies the presence of a base such as potash or carbonate of lime, in sufficient quantity to fix the nitric acid as it is formed; for if no such base is present, the medium soon becomes acid, so that the organisms cease their activities. It is usually held that some quantity of organic carbon must also be present, in order to furnish food for the nitrifying organisms; but it appears that this is not essential in all cases, because certain forms of life have been found to be capable of nitrifying inorganic solutions, obtaining their carbon from carbon dioxide gas. In the presence of a considerable amount of organic carbon, especially when the conditions are otherwise unfavorable to nitrification, an inverse process, known as "denitrification," is likely to result, such nitrates as happen to be present being thereby reduced to compounds that are less highly oxidized. Denitrification also appears to be due to the activities of special micro-organisms and whether the nitrates of a soil increase or decrease depends upon which of the two antagonistic kinds of organism is most highly favored by the conditions. Moisture is essential in both cases; but its absolute amount is of the greatest importance. Nitrification may be proceeding rapidly in a soil that is moderately moist and well aerated, and yet the same soil, when thoroughly waterlogged, may be a vigorously denitrifying medium. Nitrification proceeds best in the dark and strong light checks it in a marked manner, or even stops it altogether. In nature, nitrification is most active within a few inches of the surface of the ground, and it takes place only with exceeding slowness at a depth of two or three feet. Some micro-organisms transform nitrogenous compounds into compounds of ammonia, some transform ammoniacal salts into nitrites and some transform nitrites into nitrates. In nature it is probable that all these processes go on simultaneously. It was long believed that the free nitrogen of the air does not take part in the nitrification processes of the soil. It is now pretty generally admitted, however, that certain micro-organisms actually possess the power of absorbing free nitrogen and fixing it in the form of a chemical compound. We do not yet know how general this power may be, but it appears to be exhibited, beyond dispute, by some of the microscopic forms of life that live, perhaps parasitically, upon the roots of the pea and certain similar plants. Consult Conn, 'Agricultural Bacteriology' (Philadelphia 1909); Kellerman, in *United States Bureau of Plant Industry, Circular No. 113* (Washington 1913); Lipman, 'Bacteria in Relation to Country Life' (New York 1908); Löhnis, 'Handbuch der landwirthschaftlichen Bacteriologie' (Berlin 1910).

NITRILE, *in chemistry*, a compound which may be regarded as derived from ammonia, NH_3 , by replacing the three hydrogen atoms by a single trivalent organic radical. (Compare **AMIDE**). They have the general formula XC_n , where X represents methyl (CH_3), ethyl (C_2H_5), or some similar monovalent alcoholic radical, and they may therefore be regarded as alkyl cyanides. They may be prepared by distilling potassium-alkyl sulphates with potassium cyanide, the general reaction being $\text{XKSO}_4 + \text{KCN} = \text{K}_2\text{SO}_4 + \text{XC}_n$. A similar reaction takes place between alkyl palides and potassium cyanide. Acetonitrile, for example, which has the formula CH_3CN , may be prepared by distilling dry potassium-methyl sulphate, CH_3KSO_4 , with dry potassium cyanide, KCN . Acetonitrile is also known as methyl cyanide, and is a colorless, inflammable liquid with an ethereal odor, mixing readily with water and with alcohol, having a specific gravity of 0.80, and boiling at about 178°F . The nitriles can be hydrolyzed to form acid amides, the ammonium salts of organic acids, and finally the acids themselves. This, together with the fact that it is possible to replace a halogen atom in an organic compound by a cyanogen (CN) radical, furnishes a fertile method of synthesizing long chains of carbon atoms.

NITRITE OF AMYL. See **AMYL NITRITE**.

NITRITES, salts of nitrous acid (q.v.).

NITRO-BENZENE, or **NITRO-BENZOL**, a liquid chemical substance having the formula $\text{C}_6\text{H}_5(\text{NO}_2)$, which is formed by the action of fuming nitric acid upon benzene. See **ANILINE** and **BENZENE**.

NITRO-CELLULOSE, a compound of nitric acid with cellulose, in which the hydroxyl of the cellulose is more or less completely replaced by molecules of NO_2 . An exchange of NO_2 for OH always occurs when cellulose is treated with nitric acid, but the extent of the nitration depends upon the circumstances of the treatment. The nitro-celluloses are more properly described as "cellulose nitrates," and several of them are known. Those found in collodion pyroxyline and guncotton are the most important. The molecular formula of cellulose is not precisely known, but on the hypothesis that it is $\text{C}_{12}\text{H}_{20}\text{O}_{10}$, we may consider collodion pyroxyline as a mixture of the tetra-nitrate and trinitrate and guncotton as the hexanitrate, its chemical formula being $\text{C}_{12}\text{H}_{14}\text{O}_4(\text{NO}_2)_6$. See **CELLULOID**; **COLLODION**; **EXPLOSIVES**; **GUNCOTTON**.

NITRO-COMPOUNDS, *in chemistry*, compounds in which one or more atoms of hydrogen are replaced by an equal number of nitroxyl (NO_2) radicals, the nitroxyl radicals being directly connected with carbon by means of their nitrogen atoms. Many of the nitro-compounds are of great importance in the chemistry of coal-tar derivatives. Nitro-benzene, $\text{C}_6\text{H}_5\text{NO}_2$, for example, which is obtained by the action of nitric and sulphuric acids upon benzene, is the source from which commercial aniline is manufactured. (See **ANILINE** and **BENZENE**). Consult, also, Benedikt, 'Chemistry of the Coal-Tar Colors.'

NITRO-DYESTUFFS. See **COAL-TAR COLORS**.

NITRO-HYDROCHLORIC ACID, **NITRO-MURIATIC ACID**, or **AQUA REGIA**, a mixture of nitric and hydrochloric acids, formerly known as "aqua regia," or "royal water," on account of its power to dissolve gold. See **NITRIC ACID**.

NITROGEN. See **LIQUEFIED AND COMPRESSED GASES**.

NITROGEN FIXATION. See **ELECTRO-CHEMICAL INDUSTRIES**.

NITROGENOUS FERTILIZERS. See **FERTILIZERS**.

NITROGLYCERIN, or **GLONIN**, a powerful explosive discovered by Ascanio Sobrero in 1846, and first produced commercially by Emmanuel and Alfred B. Noble, at Helenborg, Sweden, in 1862. The process of manufacture was much improved by George W. Mowbray of North Adams, Mass., and Walter N. Hill of the United States Torpedo Station, at Newport, R. I., these improvements yielding a product of greater purity, and also overcoming many of the dangers attending the manufacture, transportation and use of the substance. Nitroglycerin is manufactured by treating glycerin with a mixture of concentrated nitric and sulphuric acids, but the proportions of the material used and the methods of operation are different in different countries. In the United States the acids are usually mixed in the proportion of two parts by weight of nitric to three parts by weight of sulphuric, so as to contain 61.9 per cent of real H_2SO_4 , 34.5 per cent of HNO_3 , and not more than 0.7 per cent of N_2O_5 . These "mixed acids" are shipped from the acid works in iron drums holding 1,500 pounds each, this weight being a convenient charge for one run in the nitroglycerin converter. The "converter" or "nitrator" is a closed cylindrical vessel of lead, standing within a wooden one. The mixed acids are introduced by a pipe at the top of the converter, and the glycerin is forced into the vessels at the bottom, by means of compressed air. The fumes produced by the reaction are carried off through a "fume pipe," which is provided with a window to view the gases. The reaction between the glycerin and the acids causes the evolution of considerable quantities of heat; and to prevent the temperature of the converter from rising to the danger point, cold water is continually passed through the space between the lead cylinder and the wooden one, and also through a cooling coil of lead pipe, which is placed within the lead cylinder. Compressed air is also injected directly into the mixture to aid in the cooling, and extra air pipes are provided, for use in case the rise of temperature cannot be controlled by the means that are normally sufficient. The temperature of the mixture is continuously observed, by means of sensitive, specially constructed thermometers, which enter the converter through the top. In operating the process, the mixed acids are run into the converter first, the cooling water is next turned on, and, lastly, the glycerin is slowly introduced at the bottom. When the materials are pure, and no particle of water is allowed to enter the mixture and the temperature is not permitted to rise above 86°F ., this part of the operation may be regarded as reasonably safe. In recent years this is ensured by the use of ice machines to cool the water and the mixture.

When the conversion is completed, the charge of the converter is run off into a "separator," which is a cylindrical leaden vessel provided with windows, with a vent pipe for the escape of vapors, and with an injector pipe, through which compressed air may be introduced for cooling purposes, in case any tendency toward rise of temperature is observed. When the charge is allowed to stand, the nitroglycerin rises to the top of the separator, and the spent acids, by reason of their greater density, sink to the bottom. The separation being nearly complete, the nitroglycerin is drawn off through an upper spigot, and the spent acids are drawn off at the bottom and passed to a second separator, for the removal of the last traces of nitroglycerin that they contain. A vessel called the nitrator-separator is now in use in which conversion and separation are both carried on. The nitroglycerin is now repeatedly washed with water, then with a solution of soda ash, and again with water, until the last traces of acid are removed from it. The spent acids are sent to the "regaining" works, where the sulphuric acid (which is not destroyed in the process) is recovered for further use. The small quantity of nitric acid that remains unused is also recovered in a dilute form, and used for other purposes. Theoretically, 100 parts by weight of glycerin should yield 246 parts of nitroglycerin; but the yield in the United States is only from 200 to 220 parts.

Nitroglycerin is also known as "glonoin," "Nobel's blasting oil" and "trinitroglycerin." It was originally supposed to be a nitro-substitution compound, like many other substances produced by the action of nitric acid upon organic compounds; and hence the name it now commonly bears. But Berthelot has shown that its reactions are those of a salt or ester of nitric acid, and its correct chemical name is now admitted to be "glyceryl trinitrate," or "propenyl trinitrate." "Glyceryl" or "propenyl" is the name of the organic radical C_3H_5 , and ordinary glycerin, $C_3H_5(OH)_3$, is the hydrate of this radical. Nitroglycerin has the formula $C_3H_5(NO_3)_3$, and is formed from nitric acid and glycerin in accordance with the equation $C_3H_5(OH)_3 + 3HNO_3 = C_3H_5(NO_3)_3 + 3H_2O$.

When chemically pure, glyceryl trinitrate is a colorless, odorless, transparent, oily liquid, but commercial nitroglycerin varies in color between a hock-wine and a dirty yellow. It has a specific gravity of 1.599 when liquid, and 1.735 when frozen. Kast and Hibbert find it, when pure, to exist in two crystalline forms. Hence it is tautomeric. The stable form freezes at $56^\circ F$. if exposed for a long time to this temperature, forming long, whitish crystals, and the labile form at $34.04^\circ F$. It boils at $293^\circ F$. It is slightly volatile at ordinary temperatures and according to Hess it volatilizes completely upon continuous exposure to a temperature of $158^\circ F$., and Guttman has found that dynamite (see below) loses 10 per cent of its nitroglycerin by an exposure of several days to a temperature of $104^\circ F$. Nitroglycerin is almost insoluble in water, but dissolves readily in wood alcohol, grain alcohol, ether, benzene and many other organic liquids. It undergoes dangerous decomposition with explosion upon contact with sulphuric acid (except under the condition of manufacture described above), and it is also de-

composed by alkalis and by alkaline sulphides. The safest way to destroy it is by treating it with a solution of ammonium sulphide, or, where the quantity is large, with spent lime from the purifiers of gas works. Nitroglycerin has a sweetish, burning taste, and is poisonous, producing extremely violent headaches when taken by the mouth, absorbed through the skin or inhaled as vapor; though some persons, by constant association with it, become immune to its physiological effects. The antidotes are cold compresses, fresh air, black coffee and morphine. It is used in medicine as a heart stimulant, in the treatment of angina pectoris, in the revival of the drowned and as an antidote in cases of poisoning by carbon monoxide and water gas.

Nitroglycerin begins to decompose at $122^\circ F$. and at $158^\circ F$ it will react to the Abel test in 15 to 20 minutes. At $293^\circ F$. it may be distilled and at $424.4^\circ F$. it explodes. Pure nitroglycerin is not very sensitive to friction or moderate percussion, except when pinched between metallic surfaces, or struck a glancing blow. If placed upon an anvil and struck with a hammer, only the particle struck, as a rule, explodes, the remainder being scattered; but this is an unsafe experiment to try with a quantity of the explosive, because in some cases the whole mass will be exploded. Frozen nitroglycerin is in general less sensitive to shock than the liquid, but explosions have occurred which were believed to be due to the breaking of a crystal of the solid substance. When a small quantity of nitroglycerin is freely exposed to a flame, it burns brilliantly and without explosion; but when the experiment is tried with a larger quantity, explosion is likely to follow. A drop of nitroglycerin, when placed upon an iron plate and slowly heated, may volatilize completely without exploding; and if the drop is placed on an iron plate that is previously heated to incandescence, it will assume the spheroidal condition and volatilize without explosion; but if the plate be heated to a temperature just below incandescence the drop explodes violently upon contact with it. Nitroglycerin was at first exploded, in blasting, by means of a gunpowder fuse, and this method is still used to a limited extent with dynamite; but it is chiefly fired by means of a powerful detonator, by which its greatest explosive efficiency is realized.

Commercial nitroglycerin is not pure. It may contain among other impurities mono- and dinitro-glycerins and tetra-nitropoly glycerin.

Nitroglycerin is principally used in the manufacture of dynamite, explosive gelatine, gelatine dynamites and smokeless powders such as ballistite and cordite. The liquid substance is used in torpedoes for oil wells, to remove the paraffin which clogs them or to shake the oil-bearing sandstone so as to secure a better flow of oil. Owing to the difficulty and danger of transporting and handling liquid nitroglycerin, attempts were early made to absorb the liquid by means of some substance which would not interfere with its explosive action, but which would form with it a solid body, or a powder, which could be handled more conveniently and safely. Many such absorbents have been tried, charcoal being the first; but Nobel found that a kind of infusorial earth, consisting chiefly of

the silicious remains of diatoms and known as "kieselguhr," is much superior to charcoal, and this substance is now largely used as an absorbent, in the manufacture of common "dynamite." Sawdust, especially in combination with certain chemical substances, is used as an absorbent to a considerable extent. "Dualin," for example, is a mixture of 50 parts of nitroglycerin, 30 of sawdust and 20 of saltpetre, and "Atlas powder" and "Hercules powder" consist of nitroglycerin, carbonate of magnesia, wood fibre and sodium nitrate. "Blasting gelatine," invented by Alfred Nobel, consists of nitroglycerin gelatinized by the addition of nitrated cotton fibre; its manufacture being based upon the fact that a mixture of mononitro-cellulose and dinitro-cellulose, when free from unnitrated cotton and from trinitro-cellulose ("gun-cotton"), dissolves in warm nitroglycerin with the formation of a gelatinous substance. "Gelatine dynamite" consists of a mixture of thin blasting gelatine with wood meal and saltpetre.

Because of the low freezing point of nitroglycerin the dynamites made from it are prone to freeze at natural temperatures. Frozen dynamite is difficult to handle and explodes with detonators and thawing it is a dangerous operation. To avoid this low freezing, dynamites known as L. F. dynamites have been invented, in which nitrobenzenes, nitrotoluenes, nitronaphthalenes and substances of an analogous nature have been incorporated and now are quite widely used.

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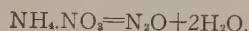
NITROSO-DYESTUFFS, or QUINONE-OXIMES. See COAL-TAR COLORS.

NITROUS ACID, an acid which has the formula HNO_2 , but which is too unstable, in the free state, to admit of isolation. A blue, aqueous solution of it may be prepared by dissolving nitrogen trioxide in ice-cold water (see NITROGEN); but when this solution is warmed the nitrous acid decomposes into nitric acid, nitric oxide and water, as indicated by the equation $3\text{HNO}_2 = \text{HNO}_3 + 2\text{NO} + \text{H}_2\text{O}$. The salts of nitrous acid (which are known as "nitrites") are more stable, and certain of them occur in the soil as a result of the oxidation of organic matter. (See NITRIFICATION). The nitrites of the metals are mostly soluble in water and in alcohol, their solutions being decomposed by boiling, or by the addition of dilute sulphuric acid. Potassium and sodium nitrites may be prepared by melting the corresponding nitrates with metallic iron, and crystallizing from solution in water. Silver nitrite, AgNO_2 , may be prepared by heating starch with nitric acid, passing the resulting gas into a solution of caustic potash, neutralizing this with acetic acid, and finally adding a solution of silver nitrate. It crystallizes in small white crystals, is one of the most insoluble nitrites, and may be used in the preparation of many of the others. Ammonium nitrite, NH_4NO_2 , for example, may be

obtained by adding a solution of silver nitrite to one of ammonium chloride (sal ammoniac). Nitrite of ammonium is used as a source of nitrogen, since it is decomposed by the action of heat into water and free nitrogen. Many of the organic derivatives of nitrous acid are also of importance. (See, for example, AMYL NITRITE and NITROUS ETHER).

NITROUS ETHER, or **ETHYL NITRITE**, the nitrite of the organic radical "ethyl." It has the chemical formula $\text{C}_2\text{H}_5\text{NO}_2$, and is usually prepared by acting upon ethyl alcohol with nitric acid. It is a yellowish liquid having a specific gravity of about 0.90, and boiling at 64°F . It mixes readily with alcohol, but only to a slight extent with water. It decomposes when kept in contact with water, evolving nitric oxide (NO). When mixed with about 20 times its own volume of alcohol (rectified spirit), it is known as "spirit of nitrous ether," or "sweet spirit of nitre," and is used in this form as a diuretic, diaphoretic and febrifuge, and for angina pectoris.

NITROUS OXIDE, or **NITROGEN MONOXIDE**, a gaseous substance having the chemical formula N_2O , and obtained by heating ammonium nitrate, NH_4NO_3 , as indicated by the equation



Care must be exercised in its manufacture, as ammonium nitrate, when heated, is liable to explosive decomposition. Nitrous oxide is a colorless gas, with a slightly sweet taste. It supports combustion nearly as well as oxygen, and when subjected to a pressure of 30 atmospheres at 32°F , it condenses into a colorless, mobile liquid. When inhaled, it is apt to produce exhilaration, for which reason it is commonly called "laughing gas." Sir Humphry Davy, in experimenting with nitrous oxide about the year 1801, discovered that it produces insensibility when inhaled for a sufficient time, and in recent years it has been used as an anæsthetic for dental work and other minor surgical operations. Davy himself suggested this use in the following words: "As nitrous oxide, in its extensive operation, seems capable of destroying physical pain, it may probably be used with advantage in surgical operations in which no great effusion of blood takes place." It does not appear that the gas was so used, however, until 1844. On 10 December of that year Dr. Gardiner Q. Colton gave a lecture on "Laughing Gas," in Union Hall, Hartford, Conn., administering the gas to several of his auditors, for the purpose of illustrating its peculiar properties. Horace Wells, a Hartford dentist, was present at the lecture, and was impressed by the practical possibilities that appeared evident to him. On the following day Wells obtained a supply of the gas from Colton, inhaled it himself until he became unconscious, and while he was in this condition Doctor Riggs extracted one of his teeth. When consciousness returned, a few minutes later, he exclaimed, "I didn't feel it! The greatest discovery of the age!" About the same time Dr. William T. G. Morton and Dr. Chas. T. Jackson, of the Massachusetts General Hospital, at Boston, introduced ether as an anæsthetic, and a patent for its use was issued to them in November 1846. There has been much bitter controversy concerning the priority of Wells and of Morton and Jackson,

as regards the introduction of anæsthetic methods in surgery; but so far as nitrous oxide is concerned, the evidence appears to favor Wells. Morton and Jackson experimented chiefly with ether, a substance which Wells appears to have used in his practice only upon one occasion. Nitrous oxide acts by causing partial asphyxiation and by a direct action on the nervous system. It raises the blood-pressure, and so should not be used where fatty heart or a diseased condition of the blood-vessels exists. Nitrous oxide is notable in that it leaves no bad after effects, and that it is not so unpleasant to take as most other anæsthetics. It is sometimes used as a primary anæsthetic for major operations, being followed by ether or chloroform. See LIQUEFIED AND COMPRESSED GASES.

NITTIS, nî'tès, **Giuseppe de**, Italian painter, etcher and engraver: b. Barletta, near Naples, in 1846; d. Paris, 22 Aug. 1884. After studying at the Naples Academy he went to Paris and placed himself under Gérôme and Meissonier. Soon he became influenced by Manet and turned from landscapes and genre to the painting of scenes of out-of-door Parisian life and other subjects of the Impressionist School. From 1879 he cultivated the art of pastel painting. His London pictures took the same rank as his Parisian studies. Nittis was distinguished for his observation, fine taste, skill in drawing, transparency of color, atmospheric effects and beautiful women. His etchings, engravings and water colors are highly valued. He received the third class medal at the Paris Salon in 1876, the first class in 1878, and was given the Legion of Honor in 1878. His best works include 'Road from Naples to Brindisi'; 'Descending Vesuvius'; 'Place de la Concorde, Paris'; 'Place des Pyramides, Paris'; 'Luxembourg Museum'; 'Boulevard Haussmann, Paris'; 'In the Bois de Boulogne, Paris'; 'Place du Carrousel, Paris'; 'At the Races'; 'Westminster, London'; 'Cannon Street, London,' and 'The Victoria Embankment, London.' Consult Renan, A., 'Joseph de Nittis' in *Gazette des beaux-arts* (Paris 1884); Burty, Ph., 'J. de Nittis' in *L'Art* (Paris 1880); Lostalot, Alfred de, 'Les pastels de M. de Nittis au cercle de l'Union artistique' in *Gazette des beaux arts* (Paris 1881); 'Une eau-forte inédite de J. de Nittis' in *Gazette des beaux arts* (Paris 1913); and Pica, Vittorio, 'Guiseppe de Nittis e la scuola napoletana di pittura' in *Emporium* (Bergamo 1914).

NITZSCH, nî'tsh, **Karl Immanuel**, German theologian: b. Bornä, Germany, 21 Sept. 1787; d. Berlin, Germany, 21 Aug. 1868. He was a son of Karl Ludwig Nitzsch and was educated in Wittenberg, becoming professor of a theological seminary in Berlin in 1817 and in 1822-47 he was professor at Bonn. He then returned to Berlin where he was professor and rector, university preacher and a member of the high consistory. He was one of the foremost advocates of the Evangelical Union, and was of moderate views and ethical rather than dogmatical in his teaching. He published 'System der Christlichen Lehre' (1829; Eng. trans. 1849); 'Praktische Theologie' (3 vols. 1847-67), etc.

NIU-CHUANG, nū-chwäng', **NEW-CHWANG**, or **YING-TSE**, China, a city of Manchuria, on the left bank of the Liao-ho

River, formerly at its mouth, but owing to silting up, now about 14 miles from its mouth. It is practically an inland city, but was chosen as one of the ports to be opened to foreign commerce by the treaty of Tien-tsin (1858). Pop. varies from 70,000 to 100,000. The foreign settlements and the trade, however, are at Ying-tse, near the river's mouth, which is known to Europeans as Niu-chuang. The port is connected by railway with Tien-tsin, and also with the great Siberian Railway. Though closed by ice in the winter months, it carries on an important trade. Ying-tse imports cotton, woolen and silk goods, sugar, paper, metals, opium, tobacco, etc. Large quantities of salt are manufactured in the vicinity and there are also coal mines. The port was captured by the Japanese in March 1895, and was part of the territory ceded to Japan which the latter power afterward relinquished. It was occupied by the Japs during the Russo-Japanese War in 1904, and, while nominally Chinese, is in reality under Japanese control. See MANCHURIA. Pop. 54,380.

NIUE, nē-oo'ā, **NIUE-FEKAI**, or **SAVAGE ISLAND**, in the South Pacific Ocean, politically dependent to New Zealand since 1901, is of ancient coral formation, 14 miles long, 10 miles wide, with a maximum altitude of 200 feet, and an area of about 100 square miles. The soil is very productive, yielding coconuts, taro, yams and bananas. Copra fungus and straw hats are exported. Pop. 3,943, Malayo-Polynesians, all Christians, due to the labors of the London Missionary Society.

NIVELLE, nē-vèl', **Robert Georges**, French general: b. Tulle, 1856; d. Paris, 21 March 1924. His father was an army officer and his mother was an Englishwoman, a Miss Pennington. He was educated at Saint Cyr and the École Polytechnique in Paris. He appears to have adopted all three branches of the service, being equally an expert in artillery, cavalry and infantry. His first active service years were spent in China and the French possessions in Northern Africa. Before the absorption of Korea by Japan Nivelle was sent on a special mission to Seoul. At the outbreak of the European War Nivelle was a colonel. He distinguished himself during the Charleroi retreat and again at the battle of the Marne. He was made general of brigade in October 1914 and a few weeks later was placed in command of the 61st Infantry division. The German Crown Prince's onslaughts at Verdun gave General Nivelle his great opportunity. As General Pétain's right-hand man he contributed more than anyone else, with his consummate skill in handling artillery, to the successful defense of the right bank of the Meuse. When General Pétain left Verdun to command the central group of armies his mantle naturally fell upon General Nivelle, whose brilliant continuation of the defense of Verdun is already an epic of the great war. It was on 23 June 1916, during the second battle of Verdun, that General Nivelle issued the order which gave rise to the famous expression, "Ils ne passeront pas" (They shall not pass!). Equally remarkable with the defense was the subsequent recapture by Nivelle's army, inside of a few days, of nearly all the ground that the Germans had taken in six months at the cost of half-a-million men. In December 1916 General Nivelle succeeded General (Marshal) Joffre in the com-

mand on the French front with the title of "Commander-in-Chief of the Armies of the North and the East." He held that post till May 1917, when he was placed in command of a group of armies and General Pétain became Commander-in-Chief. See WAR, EUROPEAN: VERDUN CAMPAIGN.

NIVELLES (Nyvel in Flemish), Belgium, town in the province of Brabant, on the Thines River, 19 miles south of Brussels. A convent founded here in the 7th century by Ita, wife of Pepin of Landen, is supposed to have been the foundation of the town. On its site stands the Romanesque church of Saint Gertrude, named for Ita's daughter, dating from the 11th century. It has two choirs and on the high altar stands the beautiful 13th century reliquary of Saint Gertrude (died 659), to whom the church is dedicated. The treasury possesses an ancient crystal goblet said to have belonged to the saint. The tower was restored in 1859 after a fire. On the top stands a man of iron who strikes the hours with a hammer, representing Jean de Nivelles, a celebrated baron of the 15th century, whose title eventually became merged into that of the Count of Horn. At Nivelles the French under Marceau defeated the Austrians in 1794. Nivelles was, prior to the War 1914-18, a busy little town with manufactures of parchment, paper, cotton, lace, carpets, furniture, agricultural implements, art goods, and a considerable trade in grain and livestock. The town also has a railway repair shop. Portions of the town were destroyed by the Germans. Pop. 12,624.

NIVEN, William, American mineralogist: b. Bellskill, Lanarkshire, Scotland, 6 Oct. 1850. After a common-school education in Scotland, he came to the United States in 1879, and pursued mineralogical investigations. He discovered four new minerals,—yttrialite, thorogummite and nivenite in Llano County, Texas, in 1889, and aguilrite at Guanajuato, Mexico, in 1891. In 1891 he also found the remains of a prehistoric people, covering several hundred square miles in the state of Guerrero, Mexico, also discovered a buried prehistoric city beneath the Valley of Mexico comprising over 2,000 square miles in September 1911. He was assistant commissioner of Arizona to the New Orleans Exposition. He is a member of the American Museum of Natural History and of the New York Academy of Sciences.

NIVENITE, a variety of the mineral uraninite, high in uranium and carrying 10 per cent or more of ytterbium earths and 6.7 to 7.6 per cent of thoria. Occurs sparingly with other rare minerals at Baringer Hill, Texas.

NIVERNAIS, nē-vēr-nā, France, an ancient central province corresponding nearly to the present department of Nièvre, held by the Counts (afterward Dukes) of Nevers.

NIX, or **NIXIE**, in German folk-lore, the name of water spirits (male and female), haunting rivers, brooks, ponds and lakes, and occasionally passing into the form of a horse or fish. See also NICKER.

NIXON, John, American military officer: b. Framingham, Mass., 4 March 1725; d. Middlebury, Vt., 24 March 1815. In the expedition against Cape Breton in 1745 he fought under

Sir William Pepperell and was at the capture of Louisburg. He joined the colonial forces at the outbreak of the American Revolution and fought at the battle of Lexington, and at Bunker Hill he commanded a regiment. He was made brigadier-general in 1777 and was given command of Governor's Island in New York harbor. He served under General Gates in the battle of Stillwater, and retired in 1780.

NIXON, John, American soldier: b. Philadelphia, Pa., 1733; d. there, 31 Dec. 1808. He was early prominent in opposing the taxation demands of England, and in 1774 became a member of the first committee of correspondence in Pennsylvania; and was also a member of the committee of safety. In 1775 he became lieutenant-colonel of a battalion which he led at the battle of Princeton in 1777. In 1776 he commanded at Fort Island, and later in the same year was placed in command of the guard of the city of Philadelphia; he was the first to publicly proclaim the Declaration of Independence in the city on 8 July. He served in the army till 1780, and was a member of the navy board and director of the provision supply. He was one of the organizers of the Bank of North America, and its president from 1792 to 1808.

NIXON, Lewis, American shipbuilder: b. Leesburg, Va., 7 April 1861. He was graduated from the United States Naval Academy in 1882, and was then sent to the Royal Naval College at Greenwich, England, to take a special course in naval architecture from which he was graduated in 1885. In 1884 he had been appointed to the construction corps of the navy, and on his return from abroad was ordered to duty in connection with the building of the cruisers *Chicago* and *Boston*; he was later superintending constructor for the navy at the Cramp shipyard, and assistant constructor at the Brooklyn Navy Yard. In 1890 he designed the battleships of the *Indiana* class, and when the contract for these vessels was awarded to the Cramp shipyard, he resigned from the navy to become superintending constructor there. He retained this position until 1895, when he leased the Crescent shipyard at Elizabeth, N. J., where he built 100 vessels within six years, including the sub-marine torpedo boat *Holland*. In 1902 he became president of the United States Shipbuilding Company, which includes the Crescent shipyard, the Eastern Shipbuilding Company, and others; and he is also connected with other manufacturing interests. In politics he has been allied with the Democratic party; was appointed a commissioner of the East River Bridge in 1898; and in November 1901 succeeded Richard Croker as leader of Tammany Hall, resigning the position in May of the next year; he has also been chairman of the finance committee of the Democratic Congressional Campaign Committee. He was made commissioner of public works for Richmond Borough, New York City, in 1914. In 1919 he became State Commissioner of Public Works and later Commissioner of Public Utilities of New York City. He is the author of 'The Canal Tolls and American Shipping' (1914).

NIXON, Oliver Woodson, American journalist: b. Guilford County, N. C., 25 Oct. 1825; d. 1905. He was graduated from Farmers' College, Ohio, in 1848, and from Jefferson Medical College, Philadelphia, in 1854. During the Civil

War he was medical director of the Army of Missouri and in 1870 established the Cincinnati *Evening Chronicle*. With his brother, W. P. Nixon (q.v.), he merged it with the Cincinnati *Times*, and in 1878 they purchased the *Inter-Ocean* of Chicago, of which he was for many years literary editor. He published 'How Marcus Whitman Saved Oregon for the Union' (1895).

NIXON, William Penn, American journalist: b. Fountain City, Wayne County, Ind., 19 March 1833. He was graduated from Farmers' College, Ohio, in 1854 and from the law school of the University of Pennsylvania in 1859. He practised his profession in Cincinnati till 1860 and sat in the Ohio legislature 1865-68. He was business manager of the Cincinnati *Chronicle*, 1868-72, after which he was associated with the Chicago *Inter-Ocean*, which he purchased with his brother O. W. Nixon (q.v.) as publisher, manager and editor. In 1897 he was appointed collector of the port of Chicago. He was president of the Associated Press for several years, was a delegate at large to the Republican National Convention of 1896.

NIZA, nē'sā, Marcos de (also called FRAY MARCOS), Italian missionary in America: b. Nice at the beginning of the 16th century; d. between 1550 and 1570. He gets his name, de Niza, from the city of Nice, where he lived and entered the Franciscan Order. His governor-general Antonio de Mendoza, on the request of Marcos' bishop and friend Bartolome de las Casas, sent him about 1531 to New Galicia in order to reassure the Indians there that the purpose of the Spaniards was simply to convert the natives, not to enslave or conquer them. Fray Marcos lived successively in Peru, Guatemala and Mexico, and in 1539 undertook to explore the Northwest and to discover the truth of the story told by Cabeza de Vaca of the seven cities of Cibola and their golden wealth. Niza probably made his way into Arizona, and is frequently called the "discoverer of Arizona." Upon his return he published a book locating the "seven cities," for which he must have mistaken the Zuñi pueblos. But the hopes to which he roused Mendoza were shattered by the expedition led by Coronado in 1540, which found no gold in Cibola. Previously Niza had become provincial of his order and was a member of Coronado's expedition to New Mexico and Arizona in 1540. Niza's 'Descubrimiento de las siete ciudades' was edited by Ramusio, but is most accessible in a French version. (1838).

NIZAMI, nī-zā-mē' (full name ABU MOHAMMED BEN YUSUF SHEIK NIZAM-ED-DIN), Persian poet: b. Western Persia, 1141; d. Ganjah, 1203. Besides a 'Divan,' or collection of lyrics, he wrote five larger poems, upon which his poetic fame rests, and which in Persia are regarded as masterpieces. These poems are (1) 'Makhzan-al-asrar' ('Storehouse of Mysteries'), a didactic poem, in which theoretical doctrines as to ethics alternate with historical details, anecdotes and fables; (2) 'Khusrau and Shirin,' a romantic epic, which has for its subject the love of the Persian king Khusrau for Shirin; (3) 'Laila and Majnun,' which describes the love of Majnun, a son of the Arabian desert, for the beautiful Laila; (4) 'Haft Paikar' ('Seven Portraits'), a collection of

seven novels in a kind of poetical heptameron. The most famous of these tales is the fourth, called Turandocht, which, after being subjected to various changes, furnishes the materials of Gozzi's and Schiller's well-known dramas; (5) 'Iskandar Namah' ('Alexander Book'), a traditional and embellished history of Alexander the Great, taken from the Greek poem on that subject by the pseudo Callisthenes. These five have been assembled in a collection known as 'Panj Ganj' ('The Five Treasures'). Nizami is not so familiar to westerns as Firdausi, Hafiz, or Sa'di; but in Persia he is among the foremost classics, and, in his peculiar field, may be placed second to Firdausi. 'Laila and Majnun' was rendered into English couplet verse by Atkinson (1836) and others of his works have been translated. Consult the 'Life and Works' in 'Persian Poets for English Readers' (1883).

NIZAM'S (nī-zāmz') DOMINIONS. See HYDERABAD.

NIZHAN, nyē'zhän, or NYEZHIN, nyē'zhēn, Russia, city in the government of Chernigov; on a branch of the Desna which flows into the Dnieper. It is in a fertile agricultural region in which tobacco is one of the principal products. It has a large trade in grain and tobacco. Pop. 33,000.

NIZHNI-NOVGOROD, nēzh'nī-nōv'gorod. See NIJNI NOVGOROD.

NIZHNI-TAGELSK, ta-gül'sk, Russia, also known as Tagil, town in the government of Perm, 88 miles northwest of Ekaterinburg and 130 miles east of Perm, to which cities it is connected by railroad. The town, beautifully situated in a valley on the eastern slope of the Ural Mountains at the junction of the Tagil, Tura and Salada rivers, is in a region rich in deposits of gold, copper, iron and platinum. It was founded in 1725 by Nikita Demidor, who established an iron foundry here. The town contains many iron and steel mills, and although its chief industry is mining, there is an enterprising trade in various articles of native manufacture, particularly wooden boxes and trays which are sent to the fairs of Irbit and Nizhni Novgorod. The inhabitants are nearly all Great Russians. Pop. 45,000.

NIZHNI TCHIRSK, South Russia, a town in the province of the Don Cossacks, on the right bank of the Don, 210 miles northeast of Novocherkask. The chief productions are wool, grain and cattle. Vineyards are plentiful in the neighboring country. An important annual fair lasts 10 days. Pop. 16,300.

NJORD, nyērd, in mythology, god of the wind and waves. See SCANDINAVIAN MYTHOLOGY.

NO AMMON, or NO, the Hebrew designation for Thebes, the Disopolis Magnus of the Greeks. It is mentioned in Nah. iii, 8 (μέρος Ἀμμών) and in Ezek. xxx, 14-16; Jer. xlv, 25 (Διόσπολις). The shorter form, No, seems to have prevailed generally among the Hebrews, and the Assyrian records call the city Ni, while in Egypt after the 21st dynasty it is written Nt, doubtless pronounced ne-t. Nahum's reference to it as "part of Ammon" makes its identity with Thebes positive. See THEBES.

NO-BODY CRAB, or SEA-SPIDER. See PANTOPODA.

NO MAN'S LAND, a name applied to outlying districts in various countries; at one time to what is now mainly Griqualand East; also to a territory of 80,000 square miles in South Australia; to a small island near Martha's Vineyard, Mass.; to a strip of land bordering on Pennsylvania, Delaware and Maryland, still in dispute between those States because of the displacement of the early boundary stones. Most commonly, however, the name is applied to Oklahoma in the following connection: In 1845 Texas, on being admitted into the Union, ceded to the United States that strip of her land which lay north of lat. 36° 30' N. This piece, 167 miles by 35, was without government until 1890, when it became a part of Oklahoma. At one time there was a great rush of prospectors and settlers to this section. The term "No Man's Land" was also employed during the Great War to designate the ground lying between the front line trenches of the opposing armies.

NO NAME, a novel by Wilkie Collins (q.v.) published in 1862.

NOACHIAN (nō-ā'kī-ān) **PRECEPTS**, seven canons or laws which, according to the Talmud, were given by Jehovah to the sons of Noah, and embodied the duties of Gentiles living under Jewish rule. These Precepts are analogous to what among the Romans was classed as Natural Law or *Jus Gentium*, a code revealed by the consensus of conduct among the Mediterranean nations. The seven Noachian Precepts enjoin: 1. Submission to civil authorities, kings, judges, etc. 2. Avoidance of idolatry and sacrilege. 3. Reverence to the name of God, as in taking an oath. 4. Proper restraint and direction of the human sexual instinct. 5. Reverence for life, even of animals, by refusing to consume the blood of beasts as food. 6. Respect for the rights of property. 7. Refusal to eat the member of a living animal. The expanding and refining genius of the Rabbins added others, and by the 3d century A.D., there were 30, the principal additional four being: 1. The blood of a living animal is not to be drawn for the purpose of drinking it. 2. Animals are not to be mutilated. 3. Magic and sorcery are unlawful. 4. The crossing of animals and grafting of trees are also unlawful. No stranger was allowed to dwell in Hebrew territory unless he conformed to the Noachian Precepts and became a "proselyte of the gate"; in contradistinction to the strangers who conformed by being circumcised, and were styled "proselytes of righteousness."

The Gentile who faithfully obeyed the Precepts "belonged to the pious among the nations and had a portion in the world to come."

NOAH, nō'ā, according to the Hebrew Scriptures, the son of Lamech, and 10th in descent from Adam. He was the first ancestor of the new race of men who should people the earth after the flood, in which points he is the counterpart of the Chaldaic Xithuthros, the Hindu Prithu, and the Greek Deucalion, severally. We read nothing of him from his birth till he is 500 years old, when we are told that he begat three sons, Shem, Ham and Japheth. Having been warned by God of the coming flood, he built an ark or great vessel by the direction of Jehovah, into which he entered with

his family and a number of animals of every kind. After the waters had subsided the ark rested on Mount Ararat, where Noah offered a burnt-offering to God, and was assured that the earth should never again be destroyed by a flood. This is the first passage in the Bible where altar or burnt-sacrifice is mentioned. As a sign of this covenant with Noah, God set the rainbow in the clouds. Noah died at the age of 950 years, 350 years after the flood. Recent scholarship is inclined to believe that in the narrative (Gen. v-ix) material from two different sources has been joined together: Up to ix, 17 Noah appears as the hero of the flood; and from verses 20-27 as the discoverer of the art of making wine, and the first to fall a victim to intoxication. Taken as a whole the narrative marks several important points in the history of civilization. In agriculture, the recognition of such seasons as seed time and harvest; and the discovery of the vine, which is made such a salient point in Greek mythology; the institution of sacrificial worship; the institution of civil government. The Noachian Precepts (q.v.) are founded on Genesis ix, 1-17.

NOAH, Mordecai Manuel, American politician and journalist: b. Philadelphia, 19 July 1785; d. New York, 22 May 1851. In early life a clerk in the government service and afterward a sessional reporter in the Pennsylvania legislature, he was in 1813 appointed United States consul at Tunis, with a special mission to Algiers. He succeeded in ransoming the American prisoners whom the Algerians held in slavery, but was recalled on the pretext that his religion was incompatible with his consular position at Tunis. He was abundantly vindicated later. In those days the United States paid a yearly tribute of \$200,000 to Tunis for the privilege of navigating the Mediterranean. Noah denounced such payment, insisting that the money would be better spent in building war ships. Settling in New York City in 1819 he published a volume of his 'Travels in England, France, Spain and the Barbary States,' and founded the *National Advocate*. In 1822 he was elected high sheriff of the city and county of New York. After the discontinuance of the *National Advocate*, he began the *New York Enquirer* which was merged with the *Courier* and became the *Courier and Enquirer*, in partnership with James Watson Webb, but political differences soon dissolved their connection. Appointed by President Jackson surveyor of the port of New York, he established in 1834 the *Evening Star* and became judge of the Court of Sessions. In 1842 he started a daily, *The Union*, which became a weekly and under the title, *Noah's Sunday Times and Messenger*, was edited by him until his death. A project in which he engaged in 1820 was to re-establish the Jewish nation and form a place of refuge for Jewish emigrants on Grand Island, in the Niagara River, near Buffalo. In 1825 with impressive ceremonies, he laid the cornerstone of the proposed city at White Haven, but the new "Ararat," as it was termed, came to naught. Noah's literary activity was varied; it included a large number of addresses and essays, a translation of the 'Book of Yashar,' and many plays, some of them popular in their time. Consult Wolf, 'Mordecai Manuel Noah: A Biographical Sketch' (1897);

Morais, 'Eminent Israelites of the 19th Century' (1886), and his own 'Gleanings from a Gathered Harvest' (1845).

NOAH, Samuel, American soldier: b. London, England, 19 July 1779; d. Mount Pulaski, Logan County, Ill., 10 March 1871. Of Jewish descent and a cousin of M. M. Noah (q.v.), at 20 he emigrated to America, and was appointed 5 May 1805 cadet in the First regiment of artillery. He was graduated 9 Dec. 1807, was promoted ensign in Second regiment and after desultory service in the Gulf States resigned (13 March 1811) his commission of first lieutenant in the army. He joined Magee's Mexican forces which were besieged at Fort Bahia (14 Nov. 1812) by the Spanish royalists. On Magee's death, Noah in command of the rear-guard routed the enemy and captured San Antonio. War having been declared by the United States against England, Noah left Texas to re-enter the United States army, but on President Madison's refusal to recommission him, volunteered as a private soldier to defend Brooklyn and served to the end of the war. At the time of his death he was the oldest graduate from West Point. Consult Cullom, 'Biographical Sketches of Deceased Graduates of the United States Military Academy.'

NOAH, Book of, a legendary pseudographical book purporting to throw fuller light on the antediluvian and postdiluvian years of Old Testament history. The book has been lost but its contents have been largely incorporated in the Ethiopic book of Enoch and in the book of Jubilees. Its date and authorship are uncertain; a recent commentator places the former as between B.C. 50 and A.D. 80.

NOAILLES, nō-i, French family originating in Limousin, dating from the 11th century. Its more important members are as follows: **ANTOINE DE NOAILLES**, b. 1504; d. Bordeaux, 11 March 1562. He was admiral of France, Ambassador to England 1553-56, the king's agent in the Truce of Vaucelles and governor of Bordeaux. His great-grandson, **ANNE JULES DE NOAILLES**, b. Paris 1650; d. Versailles 1708; was a servile courtier of the French king, who made him marshal of France in 1693. His son, **ADRIEN MAURICE, DUC DE NOAILLES**, b. Paris, 29 Sept. 1678; d. there, 24 June 1766, like his father was marshal of France (1734). Before this he had made his reputation by his financial policy and his opposition to Law. He fought in the war of the Polish Succession, became commander-in-chief of the army in Italy in 1735 and in the war of Austrian Succession was crushingly defeated at Dettingen. His memoirs were edited by Millot (1777) and his correspondence by Rousset (1865). His son, **LOUIS**, b. Versailles, 21 April 1713; d. Paris, 22 Aug. 1793; fought in Flanders and Germany; became marshal of France in 1775. **LOUIS MARIE, VICOMTE DE NOAILLES**, b. Paris, 1756; d. Havana 1804; married a sister of Lafayette's wife and with Lafayette urged French intervention, and fought in America in behalf of the American colonies, in which he took refuge during the darkest days of the Revolution. He returned to France soon afterward, but resigned from the army in 1792, again came to America and fought bravely in the French army in San Domingo, being killed in the brilliant

capture of an English war vessel off Havana. **PAUL**, a great-grandson of Louis, b. Paris, 4 Jan. 1802; d. there, 12 May 1885; upheld the Bourbons and wrote 'Histoire de Mme. de Maintenon' (1848-58) and 'Histoire de la Maison de St. Cyr' (1865), and was a member of the Academy. His great-grandson, in turn, **EMANUEL HENRI, MARQUIS DE NOAILLES**, b. 15 Sept. 1830; d. 16 Feb. 1909; was French Minister to Washington 1872, to the Papal Curia 1873, to Rome 1876-82, to Constantinople 1882-96, and 1896-1902 to Berlin; and wrote on Polish history. His elder brother, **JULES CHARLES VICTURNIEN, DUC DE NOAILLES** (1826-95), was a well-known economist, one of the editors of the *Revue des Deux Mondes* and author of many economic and historical studies. The **COMTESSE NATHIEU DE NOAILLES** (b. 1876), who is of Roumanian descent, was married in 1897 to the grandson of the last-mentioned Duke, and is a novelist and poet of the ultra-emotional school. Her novels include 'La nouvelle espérance' (1903); 'Le visage émerveillé' (1904); 'La domination' (1905); and her poetical works, 'Le cœur in nombrable' (1901, crowned by the French Academy); 'Les éblouissements' (1907); 'Les vivants et les morts' (1913).

NOATAK (nō'ā-tāk') **RIVER**, Alaska, a large river flowing into Kotzebue Sound, with a drainage basin of 8,000 square miles. In 1885-86 it was explored and navigated for 100 miles by McLenegan and Story. As it lies within the Arctic Circle its extensive mineral deposits—coal, copper, silver and gold—are difficult to develop. Fifty miles north of Kotzebue is Noatak, a mission for the Eskimo. Consult 'United States Geological Survey,' Bulletin No. 536.

NOBBE, nō'bē, **Friedrich**, German plant physiologist: b. Bremen, Germany, 20 June 1830. He was educated at Jena and Berlin, and in 1861 was called to a professorship at the Industrial School in Chemnitz. In 1868 he joined the faculty at the Academy of Forestry and Agriculture at Tharandt, where he founded an experiment station for plant physiology, and he originated, in 1869, scientific seed testing. He has published 'Wider den Handel mit Waldgrassamen für die Wiesenkultur (1876); 'Anträge des Ausschusses für Samenprüfungen' (1900); 'Bericht des Ausschusses für Samenprüfungen' (1903-04), etc.

NOBEL, nō'bēl, **Alfred Bernard**: b. Stockholm, Sweden, 21 Oct. 1833; d. San Remo, Italy, 10 Dec. 1896. He was the third son of Emmanuel, and in 1842 his father moved with his family to Saint Petersburg, Russia. In 1850 he sent Alfred to the United States to study under the famous engineer, John Ericsson. On reaching his 21st year the son returned to Saint Petersburg trained as an engineer and moreover able to speak fluently Swedish, Russian, English, German and French. Later he took up the study of chemistry and showed a marked preference for that science in its technical applications. Emmanuel Nobel went to Russia under contract to prepare mines and torpedoes for the Russian government, and erected on the Neva works for their manufacture which eventually were extended to include the manufacture of firearms and agricultural implements.

After Alfred returned from America he was constantly engaged with his father in pursuing some invention. Among other substances nitroglycerin especially occupied their attention, and finally in 1862 they had erected a works at Hølenborg, Sweden, where nitroglycerin was manufactured on a commercial scale for the first time in its history. In 1864 the works were destroyed by an explosion which killed the chemist and Alfred's younger brother Oscar, and the calamity so affected Emmanuel Nobel as to bring on a paralytic stroke which left him permanently crippled. Alfred Nobel, however, immediately erected new works on a barge anchored in Lake Mälaren and in 1865 enlisted capital to erect works on a large scale at Winterviken, Sweden, and Krümmel, Germany. So many accidents occurred with nitroglycerin, and especially the destruction of a vessel transporting it at Aspinwall on the Isthmus of Panama attracted such attention, that its transportation was interdicted by many governments. In the latter part of 1866 Nobel discovered dynamite, which replaced it and which was at once manufactured in his Swedish and German factories and in 1868 at a factory which he started near San Francisco, Cal. In 1871 he erected at Ardeer, Scotland, the works which soon became the largest dynamite works in the world. In fact dynamite proved to be of such utility that works sprang up in all civilized countries. In 1875 Nobel invented explosive gelatine and the gelatine dynamites. In 1888 he invented ballistite. Alfred Nobel was interested in many other arts than that of explosives, having taken out in England alone 129 patents. With his brothers Ludwig and Robert he formed in 1878 the famous firm of Nobel Brothers that operated the petroleum wells at Baku, Russia, and became the most active competitor of the Standard Oil Company. He also purchased the large ordnance works at Bofors, Sweden, that he might the more readily carry out his inventions in ordnance and his investigations in metallurgy. At his death he left an estate worth over nine millions of dollars, and in his will, after leaving small legacies to his already wealthy relatives, directed that the residue should constitute a fund the interest from which should be divided into five equal amounts and awarded as prizes to the person who shall have made, (1) the most important discovery or invention in the domain of physics; (2) in chemistry; (3) in physiology or medicine; (4) who shall have produced in the field of literature the most distinguished work of an idealistic tendency; and (5) who shall have most or best promoted the fraternity of nations, the abolishment or diminution of standing armies and the formation and increase of peace congresses. See NOBEL PRIZES.

CHARLES E. MUNROE.

NOBEL PRIZES, The. A series of five annual prizes provided for by the will of Alfred Bernard Nobel (q.v.), intended for the reward of individuals who work for the benefit of humankind in the domains of (1) physics, (2) chemistry (3) medicine, (4) literature and (5) peace. Prizes (1) and (2) are awarded by the Royal Academy of Science in Stockholm; (3) by the Caroline Medical-Chirurgical Institute in Stockholm; (4) by the Swedish Academy in

Stockholm, and (5) by the Norwegian Storting (Parliament). The statutes approved by King Oscar of Sweden require among other conditions "that every candidate for a prize . . . be proposed as such in writing by some duly qualified person. A direct application for a prize will not be taken into consideration." "Every written work, to qualify for a prize, shall have appeared in print." "No work shall have a prize awarded to it unless it has been proved by the test of experience or by the examination of experts to possess the pre-eminent excellence that is manifestly signified by the terms of the will." The announcements of the awards are made on 10 December when the prize is given together with a diploma and gold medal. It is expected that within six months thereafter the prize-winner will lecture upon the subject for which the prize is awarded at Stockholm, or, in the case of the Peace prize, at Christiania.

The will was contested by heirs but a compromise was effected on condition that a portion of the property be devoted to the founding of institutions for research, known as Nobel Institutes, which has been done. The income from the residue of the estate permits, however, of five prizes, each approximating closely to \$50,000 in value, reduced after 1915 by the amount of the Swedish defense tax, being awarded annually.

From their inception in 1901 to 1920 the awards have been as follows:

Physics.—W. C. Röntgen, German; H. A. Lorentz and P. Zeeman, Hollanders; H. A. Becquerel, P. Curie and Marie S. Curie, all French; Lord Rayleigh, English; Philipp Leonard, German; J. J. Thomson, English; Albert A. Michelson, American; Gabriel Lippman, French; William Marconi, Italian, and Ferdinand Braun, German; Johannes Diederik van der Waals, Hollander; Wilhelm Wien, German; Gustaf Dalen, Swiss; H. Kamerlingh Omnes, German; M. von Laue, German; William Henry Bragg and W. L. Bragg, English; Charles G. Barkla, English; M. Planck and Professor Stark, Germans; C. G. Breteuil, French.

Chemistry.—J. H. von Hoff, Hollander; E. Fischer, German; S. A. Arrhenius, Swede; Sir William Ramsay, English; Adolph von Boeyer, German; Henri Moissan, French; Edouard Buchner, German; Sir William Crookes, English; Ernest Rutherford, English; Wilhelm Ostwald, German; Otto Wallach, German; Marie S. Curie, French; Professor Grignard and Professor Sabatier, French; Professor Werner, Swiss; William Richards, American; Richard Willstätter, F. Haber, Germans, and Professor Asihon, Finnish.

Medicine.—E. A. von Behring, German; R. Ross, English; N. R. Finsen, Dane; Pavloff, Russian; Robert Koch, German; Ramon y Cajal, Spanish; Professor Golgi, French; Dr. Laveran, French; Paul Ehrlich, German, and Elie Metchnikoff, Russian; Theodor Kocher, Swiss; Albrecht Kossel, German; Aliyar Gullstrand, Swedish; Alexis Carrel, French; Charles Richet, French; R. Barany, Austrian; Jules Bordet, Belgian, and A. Krogh, Danish.

Literature.—R. F. A. Sully-Prudhomme, French; Th. Mommsen, German; Björnsterne Björnson, Norwegian; Frederic Mistral,

French, and José Echegaray, Spanish; Henryk Sienkiewicz, Polish; Professor Carducci, Italian; Rudyard Kipling, English; Rudolf Eucken, German; Selma Lagerlöf, Swedish; Paul Heyse, German; Maurice Maeterlinck, Belgian; Gerhard Hauptmann, German; Rabindranath Tagore, Bengalese; Romain Rolland, French; V. Heidenstams, Swedish; K. Gjellerup, Dane; H. Pontoppidan, Dane; C. Spitteler, Swiss; K. Hamsun, Norwegian.

Peace.—Henri Dunant, Swiss, and Fr. Passy, French; E. Ducommun and A. Gobat, both Swiss; W. R. Cremer, English; the Institution of International Law (first award to an institution); Baroness von Suttner, Austrian; Theodore Roosevelt, American; E. T. Moneta, Italian, and Louis Renault, French; K. P. Arnoldson, Swede, and M. F. Bajer, Dane; Baron d'Estournelles de Constant, French, and M. Beernaert, Belgian; International Permanent Peace Bureau, Berne; T. M. C. Asser, Hollander, and Alfred Fried, Austrian; Elihu Root, American; Henri la Fontaine, Belgian; International Red Cross of Geneva; Woodrow Wilson, American.

In 1918 Theodore Roosevelt, with the consent of Congress, distributed his prize among war charities. Consult Mosenthal, 'The Inventor of Dynamite' in the *Nineteenth Century* (1898); 'Les Prix Nobel' published annually at Stockholm.

NOBERT'S TEST-PLATES, finely-ruled glass plates so named from F. Nobert, a German optician, used for testing the power of microscopes. The rulings are executed on the under surface of a piece of exceedingly thin glass by means of a diamond point. Some of these ruled plates have the almost incredible number of 225,187 spaces to the inch. As means of testing the power of the microscope they are superior to any other object.

NOBILITY, in European countries, a certain rank or class of society which possesses hereditary honors and privileges above the rest of the citizens. Such a class is found in the infancy of almost every European nation. Its origin may be attributed to military supremacy, to the honors paid to superior ability, or to the guardians or royal rulers of the nation. Among the Romans the patricians originally formed the nobility; but a new order of nobility arose out of the plebeians, consisting of those who had held curule magistracies and their descendants, and enjoying the right of having images of their distinguished ancestors. Among the ancient German tribes only obscure traces of hereditary nobility are found. The dignities of the counts of the Franks, the aldermen and great *thanes* of England, as also of the *jarls* (in England *eorlas*) of Denmark, were accessible to every one distinguished by merit and favored by fortune. In Venice a civic nobility grew up consisting of a series of families who gradually acquired all political power and kept it to themselves and their descendants. In England hereditary nobility, the nobility belonging to the titles of duke, marquis, earl, viscount and baron, is now entirely personal, though formerly, as a result of the Norman conquest, it was connected with the holding of lands.

In Spain and Italy still the same rank depends in greater measure upon property; and in France and Germany the *de* and *von* of titles point to the same fact. The higher grade of nobility in Spain are called *Grandees*, the lesser *Titulados*. In France and Germany nobility is common to all the members of the noble family, the nobles long formed a class of petty sovereigns within their own domains, and they could not engage in trade without losing their rank. The French Revolution first deprived the nobles of that country of their privileges and exclusive rights, as that of jurisdiction, etc.; and the decree of 19 June 1790 abolished hereditary rank entirely. Under Napoleon I arose a new hereditary nobility, with the titles of princes, dukes, counts, barons and chevaliers, which descended to the eldest son. After the restoration of the Bourbons (1814) the ancient nobility reclaimed their former rights and privileges. Nobility was again abolished in 1848, but was restored by Napoleon III. All marquises and viscounts hold pre-Revolution titles. In Germany there are three distinct grades of nobility: (1) The members of former reigning houses, and descendants of families who belonged at the time of the old empire to the sovereign nobility of the state, and were *reichsunmittelbar*, or directly connected with the empire, or holding their domains directly under the emperor, but whose houses were subsequently mediatised, or deprived of sovereign power in accord with special treaties between the state and the princes. There are at present 50 princely and 51 gräflliche (countly) mediatised families, who in accordance with the act of the diet of 1806 had equality of rank with the reigning houses and enjoyed many of the special privileges which were accorded to the high nobles of the empire. (2) Counts and barons not belonging to the reigning or mediatised houses; and (3) the knights and patrimonial proprietors of Germany. Under the new German constitution titles are recognized only as part of a name and may not be conferred any longer. In Norway the Parliament abolished nobility by the three successive decrees of 1815, 1818 and 1821. In Great Britain titles of nobility can only be conferred by the sovereign, and that by patent in virtue of which they become hereditary. The nobility, as the term is commonly used, consists of those holding the titles already mentioned (or all above the rank of baronet) and their more immediate connections; but if the term were to be used as generally in Europe the gentry would also be included, or all families entitled to bear coat armor. Those of the nobility who are peers of England or of the United Kingdom, hold hereditarily a seat in the House of Lords, while the Scottish peers elect 16 of their number to represent their order, and the Irish peers elect 28 representatives for the same purpose. A few peerages are held by Canadians; creations of recent years have evoked a storm of protest in the Dominion. There is no nobility in the United States, the Federal Constitution declaring that "No title of nobility shall be granted by the United States; and no person holding any office of profit or trust under them shall, without the consent of Congress, accept of any present, emolument, office or title of any kind whatever, from any king, prince or foreign state." Con-

gress sparingly gives its consent for a person in the service of the government to accept a decoration or other mark of honor from another government.

Consult for Great Britain: Burke, 'Rise of Great Families' (2d ed. 1872); Fox-Davies, 'Armorial Families' (Edinburgh 1895); Selden, 'Titles of Honour' (London 1672: includes other nations); Shirley, A. P., 'Noble and Gentle Men' (ib. 1860). *France*: Cousin, Henri, 'Des noms des noblesse et des titres nobiliaires spécialement depuis la Révolution' (Dijon); Guilhaumez, 'Essai sur l'origine de la noblesse en France au moyen âge' (Paris 1902); Langlois, 'Les origines de la noblesse en France' (ib. 1902); de Toqueville, 'L'Amien Régime et la Révolution' (ib. 1856). *Germany and Austria*: Strantz, 'Geschichte des deutschen Adels' (1851); Rose, 'Der Adel Deutschlands und seine Stellung im deutschen Reich' (Berlin 1883). *Italy*: Litta, 'Celebri famiglie italiane' (1819-1907); *Spain*: Bethancourt, 'Historia genealógica' (Madrid 1897-1907).

NOBLE, Alfred, American civil engineer: b. Livonia, Mich., 7 Aug. 1844; d. 19 April 1914. From 1862 to 1865 he served with the Union forces in the Army of the Potomac; after the war entered the University of Michigan, where he was graduated in 1870. In 1870-82 he superintended alterations and improvements in the Saint Mary's Falls Canal and the Saint Mary's River between lakes Huron and Superior. After 1882 he gave his time to bridge and tunnel engineering. He was engineer of the Washington Bridge, New York, the Mississippi bridges at Alton and Cairo, Ill., and was assistant chief engineer of the Missouri River bridges at Leavenworth and West Alton. He was a member of the Nicaragua Canal Board in 1895, of the United States Board of Engineers on deep waterways in 1897-1900 and of the Isthmian Canal Commission in 1899-1903. As member of the International Board of Consulting Engineers on the Panama Canal, Noble was one of the minority of five out of 13 engineers who advocated a lock system instead of a sea-level canal. From 1902 to 1909 he was chief engineer of the Pennsylvania Railroad tunnels under the East River, and of the terminal construction of the same road in New York City. He served also in an advisory capacity in the construction of the New York Subways and the Galveston sea-wall. He was awarded the John Fritz medal in 1910 and the Cresson medal of the Franklin Institute in 1912. He was a member of the American Society of Civil Engineers and of many similar societies, and served terms as president of most of these. He wrote papers which appeared in the 'Proceedings' of these societies.

NOBLE, Sir Andrew, English physicist: b. Scotland, 13 Sept. 1832; d. 1913. He was educated at Edinburgh Academy and the Woolwich Military Academy and was an authority on army ordnance and explosives. He was assistant inspector of artillery in 1859, and after 1860 was a member of the firm of Sir W. G. Armstrong, Whitworth and Company. In 1862 he invented the chronoscope, by which it was possible to measure the velocity of a projectile by various powders. This invention hastened the adoption of rifles. Later he became chairman of the company. In 1900 he served as

member of a Royal Committee to investigate the properties of smokeless powder. He received many honors from domestic and foreign scientific societies and honorary degrees from Oxford and Cambridge. He was made Knight Companion of the Bath in 1893 and was created a baronet in 1902. He published 'Artillery and Explosives' (1906) and many papers, lectures, etc. He became high sheriff of Northumberland in 1896.

NOBLE, Annette Lucile, American author: b. Albion, N. Y., 12 July 1844. She was graduated at Phipps Union Seminary in 1863, and devoted herself to literature and traveled over most of the civilized world writing stories and travel sketches for American periodicals. She wrote 30 books for boys and girls, some of which have been translated into Dutch, German and other languages. Her most popular works are 'Uncle Jack's Executors' (1880); 'After the Failure' (1887); 'The Crazy Angel' (1901).

NOBLE, Eugene Allen, American educator: b. Brooklyn, N. Y., 5 March 1865, was graduated from the Wesleyan University, (Connecticut) in 1891 and studied theology also at Garrett Biblical Institute in Illinois. He was ordained to the Methodist Episcopal ministry and became pastor of Methodist Episcopal churches in Bridgeport, Conn. (1891-95) and Brooklyn (1895-97). From 1897 to 1902 he was superintendent of the Seney Hospital, Brooklyn, and from 1902 to 1908 head master of the Centenary Collegiate Institute at Hackettstown, N. J. In 1908 he became president of Goucher College, Baltimore, serving until 1911 when he became president of Dickinson College (Pennsylvania), which post he held until 1914. He subsequently resided in Schenectady, N. Y., and is a contributor to magazines on educational and literary topics. He has received the degree of LL.D. from Hamilton College and the University of Pittsburgh; S.T.D. from Wesleyan University; L.H.D. from Dickinson College; and D.D. from Saint John's College, Maryland.

NOBLE, Frederick Alphonso, American Congregational clergyman: b. Baldwin, Maine, 17 March 1832; d. 31 Dec. 1917. He was graduated from Yale in 1858, and from the theological seminaries of Andover (1858-60) and Lane (1861). He was minister of Union Park Church, Chicago, 1879-1901, when he resigned and was president of the American Missionary Association 1898-1900. He has been prominently connected with the leading missionary conferences of his church, and has written 'Divine Life in Man' (1896); 'Typical New Testament Conversions' (1901); 'The Pilgrims' (1903), etc.

NOBLE, John Willock, American lawyer: b. Lancaster, Ohio, 26 Oct. 1831; d. 1912. He was graduated from Yale University in 1851 and engaged in law practice. He was city attorney of Keokuk, Iowa, at the outbreak of the Civil War, when he enlisted and served through the war, rising to the rank of brevet brigadier-general. After the war he settled in Saint Louis; in 1867-70 he was United States attorney for Missouri at Saint Louis, and in 1889-93 Secretary of the Interior in President Harrison's Cabinet. He resumed his law practice in Saint

Louis. His term as Secretary was rendered difficult by the questions attendant on organizing the Territory of Oklahoma and opening Indian lands to settlement by the whites.

NOBLE, in *numismatics*, an ancient English gold coin, six shillings and eightpence, or \$1.66, first struck in the reign of Edward III, 1344. Half-nobles and quarter-nobles were also in circulation at the same period.

NOBLESVILLE, no'b'lz-vil, Ind., city, county-seat of Hamilton County, on the White River, and on the Lake Erie and Western and Chicago and Southeastern railways, 24 miles north by east of Indianapolis, and interurban roads to all parts of Indiana. It is in a fine agricultural region and in a natural gas belt. It was settled in 1824, and in 1839 was incorporated. Hamilton County is the greatest horse-raising county in Indiana. Its manufacturing industries comprise carriage, furniture and box factories, planing mills, flouring mill, foundry, straw board, enameling, carbon, serum, and dairy products, and a canning factory. It has grain elevators, water, electric and gas plants, splendid schools, churches, library, up-to-date public buildings, paved streets, concrete walks, modern homes with beautiful lawns and shade trees. Living conditions and other advantages are most favorable for all kinds of manufacturing. It has a large trade in its manufactured articles and farm products at home and abroad. It maintains a very progressive Chamber of Commerce. The charter of 1890 provides for a mayor, who holds office four years, and a council. Pop. (1920) 4,758.

NOBUNAGA, nō-boo-nā'gā, Japanese general and statesman: b. Owari, 1533; d. Kioto, 1582. He was son of a soldier and small landholder, and to the little property left him in 1549 by his father rapidly added more, so that in 1559 he had control of the entire province of Owari. Thence, with the assistance of his lieutenant, Hideyoshi, he made bold forays into neighboring provinces. In 1567 he made an alliance with Yoshiaki, younger brother of the lately assassinated shogun, and, having put him upon the throne in 1568, was appointed vice-shogun, in which office he put down all opposition, crushed the political power of Buddhism, and encouraged the Jesuit missions, no doubt merely to counteract the influence of the Buddhists. Yoshiaki, attempting an alliance against Nobunaga, was deposed in 1573, and Nobunaga took the powers but not the titles of the shogunate, thus forwarding the work of political reform. In 1582 one of his lieutenants, angered, according to legend, by a practical joke of Nobunaga, turned against him, hemmed him in in a temple in Kioto, and set fire to the building. Nobunaga committed hari-kari. Consult Denning, 'Life of Hideyoshi'. (1890); Brinkley, 'Japan' (1901).

NOCERA INFERIORE, nō-chā'ra ěn'fā-rē-ō'rā (formerly **NOCERA DE' PAGANI**), Italy, town in the province of Salerno, 23 miles southeast of Naples by rail. It is situated at the foot of Monte Albino, 135 feet above the sea-level. A branch railway of the line from Naples to Avellino connects Nocera with Codola (three miles). The town was the ancient Nuceria Alfaterna, destroyed by Hannibal in 216 B.C. and rebuilt by Augustus. The old

cathedral proves that Nocera became a see at an early date. In the 12th century Nocera took the part of Innocent II against Roger of Sicily and paid heavily for its choice. A colony of Saracens was brought here by Frederick II, and from their presence the town is supposed to have received the name "of the pagans," a name also given to the town of Pagani about a mile away. In 1385 Pope Urban VI was besieged in the castle of Charles of Durazzo. Here he had imprisoned the cardinals who favored the anti-pope Clement VII. In this old castle, now in ruins, Helena, widow of Manfred died after the battle of Benevento (1266). Two miles toward the village of Nocera Superiore is the circular church of Santa Maria Maggiore dating from the 4th century with its curious dome covered with a false roof. This is supported by 40 ancient columns and its walls are covered with frescoes of the 14th century. Nocera was the birthplace of Francesco Solimena, the painter, and of Hugo de' Pagani, founder of the Templars. Nocera is the episcopal see of Campania. It has several large factories for linen and woolen goods. Pop. (1911) 23,368.

NOCTES AMBROSIANÆ, The. It was in October 1817, that the brilliant young Scotchmen, John Wilson and John Gibson Lockhart, took the new *Blackwood's Magazine* out of the hands of two incompetents who for six months had been feebly trying to bring it to birth, and made it at once the most brilliant and daring of English periodicals. Five years later, in 1822, there appeared in its pages the first number of that famous series of papers in dialogue, the 'Noctes Ambrosianæ.' It is not certainly known with whom the plan of the Noctes originated. For the first year or more, both Wilson and Lockhart seem to have contributed to them, perhaps with some assistance from that swash-buckling Irishman, William Maginn, who figures as O'Doherty in the early numbers. But in 1825 Lockhart resigned his position on the *Blackwood* to take charge of the new *Quarterly Review* in London, and after that time most of the papers were certainly written by Wilson himself. He abandoned the attempt to impersonate many different characters, and reduced the number of speakers to three: Christopher North, the Ettrick Shepherd (James Hogg), and a Mr. Tickler, said to represent an uncle of Wilson. But the three persons only represent different sides of Wilson's genius or different moods of his temper. Christopher North is Wilson as critic or philosopher, though not given to very staid reflection in either capacity; the Shepherd represents Wilson's exuberant humor and extravagant sentiment—Wilson letting himself go; Tickler, the most prosaic person of the three, is Wilson the man of affairs. The Noctes are the record of those jovial nights when these three foregathered in "the blue room" or at the well-laden table of the Edinburgh inn of Mr. Ambrose.

No form of composition could have been better suited to give full expression to Wilson's genius. For Wilson was never a careful or consecutive thinker; his prejudices and his emotions were always getting the better of his argument. His statements were seldom precise, his opinions seldom temperate. But from the

jovial speakers at the table of Mr. Ambrose we do not expect methodical discussion in judicial phrase. It is talk we hear there; the talk of red-blooded men of full minds and healthy digestions, eager, witty, exhaustless and never dull. It ranges freely over all subjects, literary, social, political: in one evening you shall get a broad and vivid picture of the life of that day as a high-spirited Tory gentleman sees it. Of course the reader of our time must find much of this rapid after-dinner talk concerned with matters merely local and temporary, with men and measures now forgotten; he will sometimes also be a little impatient at the amount of interest in meats and drinks and the effects thereof. Yet in these papers from month to month there is a great volume of literary criticism, often prejudiced, usually brief and unsystematic, but often wise and never merely idle; there is also a great body of political and social criticism, often narrowly Tory in character, but always positive and vigorous. And the talk is constantly running away from these more serious themes, to some of the homely joys of active life. You shall find an account of a dog-fight or a swimming match standing cheek by jowl with a slashing criticism of the cockney poets or an estimate of the Kantian philosophy. For North was always an out-of-door man who loved horses and dogs; perhaps he is at his very best in some of those rhapsodies of the Shepherd which are at once the most faithful and the most imaginative descriptions of Scottish scenery ever written.

But whoever the speaker and whatever the theme, the voice is always that of John Wilson — big, arrogant, sentimental, soft-hearted giant, who duffed the years aside and declared that the one thing he proposed never to learn was how to grow old. The voice is doubtless rather loud and the temper over-excited. There was little subtlety in Wilson's mental processes, little fineness or delicacy in his sympathies. But, perhaps for this reason, no man could ever put himself more completely into his writing. To be in his company is, at all events, to get a new sense of many of the healthy joys of living. Even if it is claimed that the Noctes do not teach or inspire, they have at least lasting power to exhilarate; and that, in such a dull-colored world as this sometimes seems to be, is no small service. Consult Oliphant, Mrs., 'William Blackwood and His Sons' (Vol. I, ch. 6); Saintsbury, 'Essays in English Literature' (1780-1860, ch. 9); Winchester, C. T., 'A Group of English Essayists.'

CALEB T. WINCHESTER,

Late Professor in Wesleyan University.

NOCTILUCA, a luminous flagellate protozoan (*Noctiluca miliaris*), extremely abundant throughout all seas, and one of the chief causes of the "phosphorescence" of the waves. It is a spherical animal — large for an infusorian (.02 inch in diameter) — and moves by means of a long stout lash or flagellum, beside which there is a second, very much smaller, lying in the "mouth" region. Its substance is remarkably spongy, and the phosphorescence is said by Allman to have its seat just underneath the tough rind which is its most peculiar characteristic. The young are derived from segmentation of the protoplasm of the body, which forms small oval bodies with a whip-like lash, quite unlike the adult, but in general resembling other flagel-

late protozoa. It represents, with a similar form (*Leptodiscus*), the order *Cystoflagellata*. See FLAGELLATA.

NOCTUIDÆ. See MOTHS.

NOCTURNE, (1) in art, a painting exhibiting some of the characteristic effects of night light. Whistler has produced various nocturnes which have given rise to considerable controversy. (2) In music, the term denotes a composition in which the emotions, particularly those of love and dreamy, melting tenderness, are developed. The nocturne was invented by John Field, and has become a favorite style of composition with modern pianoforte composers. Chopin is the most famous of nocturne composers. See CHOPIN.

NOD, LAND OF, The, the "land east of Eden," to which Cain fled after he had killed his brother Abel (Genesis iv, 16). Some authorities consider the word as coming from the Hebrew *nûd*, to flee, and think the Land of Nod means simply the land of flight, or exile, or "the land of wandering." Other authorities go so far as to identify Nod with some country in India, or take it to mean the land of nomadic tribes in Asia, perhaps extending even to China. Sayce (*Expository Times* 1911) thinks it was the "land of Yalu," east of Babylonia. Others again suppose that Cain represents the Kenites, a tribe inhabiting the Negeb, and that the Land of Nod may have been a district there. Cain, or Kayin, might easily have represented the nomads of Central Asia. "That the figure of Cain represents some phase of nomadic life may be regarded as certain," writes a commentator. The name Cain has a collective sense; and every descriptive touch in the closing verses is characteristic of desert life. His expulsion expresses the fundamental fact that his descendants are doomed to wander in the uncultivated regions beyond the pale of civilization. We are, therefore, led to think of Cain as the impersonation of an inferior race of nomads, maintaining a miserable existence by the chase and practising a peculiarly ferocious form of blood-feud. The view thus suggested of the fate of Cain finds a partial illustration in a group of low-caste tribes called Solubba, or Sleyb. These people live partly by hunting, partly by coarse smithwork and other gipsy labor in the Arab encampments. They are forbidden by their patriarch to be cattle-keepers, and have no property but a few asses; they are excluded from fellowship and intermarriage with the regular Bedouin, though on friendly terms with them; and they are the only tribes that are free of the Arabian deserts to travel where they will, ranging practically over the whole peninsula from Syria to Yemen. To go to the Land of Nod is an old English form meaning to go to bed.

NODAL LINES AND POINTS. See NODE; HARMONICS.

NODDY, a sooty brown tern (*Anous stolidus*), widely diffused through the northern and southern hemispheres, and well known to sailors for its fearlessness, regarded as stupidity, allowing itself even to be taken by the hand; but this is true only of birds rarely or never disturbed by men. The noddy is a rare visitant to northern shores, but is very abundant in warmer climates, as in the West Indies and South Seas,

where its eggs are gathered from certain lonely islets in immense quantities and used as food.

NODE, (1) *in astronomy*, the two points in which the orbit of a planet intersects the plane of the ecliptic; the one through which the planet passes from the south to the north side of the ecliptic being called the ascending node, and the other the descending node. As all the bodies of the solar system, whether planets or comets, move in orbits variously inclined to the ecliptic, the orbit of each possesses two nodes, and a straight line drawn joining these two points is called the line of nodes of each body. It is scarcely necessary to add that as the earth moves in the plane of the ecliptic she has no nodes. The places of the nodes are not fixed points on the plane of the ecliptic, but are in a constant state of fluctuation, sometimes advancing (eastward), and at other times receding (moving westward). This motion is produced by the mutual attractions of the planets, which tend to draw each of them out of the plane of its orbit; and it depends upon the relative positions of the planets with respect to another planet whether that planet's nodes shall advance or recede. (2) *In physics*, a point in a vibrating body, or system of vibrating particles, where there is no movement. When a body is vibrating, the vibratory motion is conveyed from one place to another by the action of the molecular forces of the particles on one another. If a plate of glass or metal be held in the hand, and a bow be drawn across the edge, particles of fine sand, previously placed on the plate, will arrange themselves in lines, along which it is evident no vibration has taken place. These lines, called nodal lines, generally form geometrical figures. (3) *In botany*, the joint of a stem, or the part where a leaf or several leaves are inserted.

NODIAK, a Papuan animal. See ECHIDNA.

NODIER, Charles, shärl nō-dē-ä, French author: b. Besançon, France, 29 April 1780; d. Paris, 27 Jan. 1844. At an early age he proceeded to Strassburg, where he studied under Eulogius Schneider, and, returning to his native district, gave much of his attention to natural history. In 1798 he became assistant librarian at Besançon. Soon drawn into connection with Royalist clubs, he wrote with great acrimony against Bonaparte. These philippics subjected him to prosecutions, and even to imprisonment. For several years he lived concealed in the Jura, and then fled to Switzerland, where he supported himself as a corrector of the press until, after many adventures, he returned to France. In 1814 he went to Paris, where Louis XVIII rewarded him with a title of nobility and the cross of the Legion of Honor. In 1824 he was appointed librarian to the arsenal, and while in that post he actively assisted the growth of Romanticism, and in 1833 was admitted a member of the Academy. As a critic he is known by a series of excellent editions of the French classics with notes. As a grammarian and lexicographer he published 'Dictionnaire universel de la langue française' and 'Elements de linguistique.' Among his many other works, many of them fictions of the romantic school, are 'Stella ou les proscriptions' (1802); 'Trilby' (1822); the first direct imitation in France of Scott's romances; 'La Fée aux miettes' (1832);

'Légende de Sœur Béatrix' (1838). Consult Menessier-Nodier, 'Charles Nodier' (1867).

NODULAR DISEASE. See SHEEP.

NOË, Amédée de, ä-mä-dä dē nō-ä. See CHAM.

NOEGGERATH, nêg'-rät, Emil Jacob, German gynecologist: b. Bonn in 1827; d. Wiesbaden in 1895. He was educated in Bonn, receiving his medical degree in 1855, and came to the United States in 1856. Settling in New York, he became professor of obstetrics and gynecology at the Bellevue Hospital Medical College. In 1885 he went back to Germany and settled in Wiesbaden. He originated a new method in ovariectomy and was one of the first to emphasize the importance of latent gonorrhea in women. With Dr. Jacobi he founded in New York the *American Journal of Obstetrics*, of which he was coeditor from 1868 to 1871. With Abraham Jacobi he also wrote 'Contributions to Midwifery' (1859). He was sole author of 'Beiträge zur Struktur und Entwicklung des Carcinoms' (1892).

NOEL, nō'ë, Baptist Wriothsley, English clergyman: b. Leightmont, Scotland, 10 July 1799; d. Stanmore, Middlesex, 20 Jan. 1873. A brother of the 1st earl of Gainsborough, he was graduated from Cambridge University in 1821, entered the Anglican priesthood and became in 1827 incumbent of Saint John's, Bedford Row, London, where he achieved distinction as an evangelical preacher and helped (1846) to found the Evangelical Alliance. In 1848 he quitted the Establishment for the Baptist fold, was minister of John Street Chapel, London, 1849-68, was twice president of the Baptist Union, and was prominent in philanthropic labors in the metropolis. He supported strenuously the cause of the North in the American Civil War. He published 'Essay on Christian Baptism' (1849); 'The Union of Church and State' (1848); 'Freedom and Slavery in the United States of America' (1863); 'Hymns About Jesus' (1869), etc.

NOEL, Nicholas, French physician: b. Rheims, 27 March 1746; d. Rheims, 11 May 1832. He was the son of a poor laborer and was apprenticed to a blacksmith, but his love for science attracted the curé of the parish, who obtained a fellowship for him in the Paris University. He left his studies there to give his assistance to the United States in the struggle for independence. Arriving in 1776 he offered his services to Congress and was appointed surgeon to a regiment in Gen. Nathaniel Green's division. He was also surgeon on the frigate *Boston*; organized the military hospitals in Philadelphia; and was present at the surrender of Yorktown in 1781. Returning to France in 1784, he became house surgeon of the hospital in Rheims. In 1792 he was again in the army. In 1793 he was appointed inspector of military hospitals in Belgium, but he resigned in 1795. He then settled in Rheims, where he founded an academy of medicine and a botanic garden. His writings include 'Journal d'un chirurgien pendant la Guerre pour l'indépendance des colonies Anglaises de l'Amérique du Nord' (Rheims 1787); 'Traité historique et pratique de l'inoculation' (1789), and 'Dissertation sur la nécessité de réunir les connaissances chirurgicales et médicales' (Paris 1804).

NOEL, Roden Berkeley Wriothesley, English poet: b. England, 27 Aug. 1834; d. Mainz, Germany, 26 May 1894. He was a son of the Earl of Gainsborough. He was educated at Cambridge, and though never a popular poet his work appeals to highly educated readers and is much of it rich in melody, though too voluminous to keep entirely to his best standard. His published volumes include 'Behind the Veil and Other Poems' (1863); 'A Little Child's Monument' (1881); 'A Modern Faust and Other Poems' (1888), etc.

NOEL, Thomas, English poet: b. Kirkby-Mallory, England, 11 May 1799; d. Brighton, 16 May 1861. He was graduated from Merton College, Oxford, in 1824, and was the author of 'The Cottage Muse' (1833); 'Rhymes and Roundelays' (1841), which includes the famous poem 'The Pauper's Drive,' often credited to Hood; 'Beatrice and Other Poems' (1868). He also wrote the words of the well-known song 'Rocked in the Cradle of the Deep.'

NOEMI, a romance by Sabine Baring-Gould, published in 1895. It is a tale of Aquitaine, during the English occupation, in the early 15th century.

NOETIANS, nō-ē'shī-anz. See SABELLIUS.

NOETIC CONSCIOUSNESS. See METAPHYSICS.

NOGALES, Ariz., town and county-seat of Santa Cruz County on Mexican border and on the Southern Pacific Railroad, 68 miles south of Tucson. A street is the dividing line from the Mexican town of the same name. The ruin of the Tumacacori Mission near Nogales, built by Father Kino in 1687, is an interesting historical feature. The town is an inland gateway to the west coast of Mexico and is a centre of mining and cattle industries. Mining machinery is manufactured. The headquarters of the United States customs district for the State are located here. The waterworks and sewage plant are municipal property. Pop. (1920) 5,199.

NOGALES, nō-gā'lēs, (1) Mexico, town in the state of Sonora, on the Santa Cruz River, on the boundary between Mexico and Arizona, and on the Sonora Railroad. A United States consul is stationed here. Pop. 3,640. (2) The Mexican town is separated only by a thoroughfare from an American town of the same name, and greater population, the capital of Santa Cruz County, Arizona.

NOGARET, nō-gā'rā', **Guillaume de**, French statesman: b. Toulouse in 1260; d. Paris, April 1313. His father was a citizen of Toulouse, said to have been condemned as a heretic during the Crusade of the Albigenses. The name came from a small ancestral property at Nogaret, near Saint Felix de Caramon. Guillaume de Nogaret studied law and was professor of jurisprudence in the University of Montpellier. In 1293 he entered the service of the French king, Philip IV, and spent the rest of his life in extending the power of that monarch. In 1295 he became a member of the royal council. His name is mainly conspicuous because connected with the quarrel of Philip IV with Pope Boniface VIII. In 1300 he was sent with an embassy to Pope Boniface VIII of

which he left a very highly colored and picturesque account; and in 1303 when Philip IV was about to yield to the power of Boniface, who was extending his authority over the sovereigns of Europe, Nogaret came forward with a bold plan that he should go to Italy, seize Boniface and bring him to a church council in France convened to depose him for heresy, simony and other crimes. The king consented to the plan, and on 7 March a solemn royal assembly was held in the Louvre, where Guillaume de Nogaret read a long series of accusations against Boniface and demanded the calling of a council to try him. Soon afterward Nogaret went to Italy, and by the aid of a Florentine spy he gathered in the Apennines a band of enemies of the Gaetani (Boniface's family). Among these was Sciarra Calanna, who accompanied Nogaret to Anagni, the birthplace of Boniface, who was there. On 7 Sept. 1303, Nogaret and Colonna at the head of a company of 1,600 men surprised the little town and took Boniface prisoner. Within two days, however, the people rose and compelled the invaders to flee. The aged Pope was freed, but he died a month later (11 October). His successor, Benedict XI, was too timid to excommunicate the offenders. Early in 1204 Nogaret went to Languedoc to report to Philip IV, who rewarded him with gifts of money and land, including the town of Marsillargues on the right bank of the Vidourle (in the eastern part of the Department of Hérault), with its castle. Nogaret was sent back with an embassy to Benedict XI to demand absolution for all concerned in the plot against Boniface. Benedict refused to receive Nogaret and excepted him from the general absolution he granted on 13 May 1304. On 7 June the Pope issued against Nogaret and those associated with him in the attack of Anagni the *Flagitiosum scelus*. When Benedict died, 7 July 1304, French influence had a Frenchman, Bertrand de Got, elected as Benedict's successor, under the name of Clement V. In 1312 Clement V acceded to Philip's plan to destroy and despoil the Templars. The whole proceeding bears traces of the unscrupulous Nogaret, who was successful in getting the renegade members of this order together to give evidence against their fellows. In 1307 Nogaret became keeper of the seal, and in consequence, was the king's chief Minister. He was employed in the trial of Guiscard, bishop of Troyes, charged with various crimes including witchcraft, which had begun in 1308 and lasted until 1313. This legal procedure may have been a gentle hint to Clement V. for the latter granted absolution to Guillaume de Nogaret on 2 April 1313. As a penance Nogaret was to go on the next crusade and also to visit certain pilgrimage places in France and Spain. He never did so. He remained keeper of the seals until his death and was busy with the king's affairs concerning Flanders a month before his death. Consult Dupuy, 'Histoire du différend d'entre le pape Boniface VIII et Philippe le Bel, roy de France' (Paris 1655); Renan in 'Histoire littéraire de la France, XXVII'; Holzmann, 'Wilhelm von Nogaret' (Freiburg 1898); Finke, Heinrich, 'Aus den Tagen Bonifaz VIII' (Münster 1902); Molinier, Auguste, 'Les Sources de l'histoire de France III' (Paris 1903), and Thomas, Louis,

'La vie privée de Guillaume de Nogaret,' *Annales du Midi* (Toulouse 1904).

NOGARET, Stanislas Henri Lucien de, French colonist in America; b. Marseilles, 1682; d. Paris, 1759. He studied law; ran away from college; served in the army in Canada until 1716, and then was sent to Louisiana, where he became Bienville's lieutenant in the bloody wars with the Natchez Indians described by Nogart in his 'Précis des établissements fondés dans la vallée du Mississippi par le Chevalier Le Moyne de Bienville' (1738). From 1735 until his death Nogaret resided in France and acted as director of the Louisiana Company.

NOGENT-SUR-MARNE, France, a town in the Department of Seine, six miles east of Paris by rail. It is built on a hill on the right bank of the Marne. The Eastern Railway crosses the Marne here over a viaduct 875 yards long. Nogent stands on the line of the Paris fortifications on the outskirts of the Bois de Vincennes. Its beautiful situation gained for the town the name of Beauté and Charles V built a castle here which Charles VII presented to Agnes Sorel who was called in consequence "Dame de Beauté." This château was demolished in the 18th century. An island in the Marne south of the town is called Ile de Beauté. An old Gothic church with a Romanesque tower is Nogent's chief building. In front of it stands a monument to the painter, Watteau, who died here in 1721. Nogent has extensive stone quarries and manufactures pottery and chemicals. Pop. (1911) 14,051.

NOGI, nōgē, Kiten Marosuke, Japanese soldier; b. Chosu, near Tokio in 1849; d. Tokio, 13 Sept. 1912. He came from one of the families of the Samurai, the old nobility of Japan, and was brought up with ideals of rigid etiquette and Spartan heroism. Trained for a soldier's career, he became a major in 1871 and was made a captain in 1877, participating in the civil war of that year in Japan. During the Chino-Japanese war he commanded a brigade and fought in the battles of Kinchow and Port Arthur, placing his troops with such skill at the latter place that the city quickly fell into the hands of the Japanese. He was immediately promoted to be lieutenant-general with command of the second division and rewarded with a peerage. In 1896 he was made governor-general of Formosa, but his rule proved too strict and he returned to Japan as commander of the 11th Division. This post he resigned in 1900 and retired to quiet life, devoting himself to farming and the study of warbooks, war maps and methods, preparing for the struggle that he predicted would come with Russia. When the Russo-Japanese war broke out in 1904, Nogi was promoted to general, and ordered to attack Port Arthur. He landed his corps on the Liaotung Peninsula on 1 June 1904 and commanded the first and 11th Divisions. Gradually he detached himself from Oku's army corps and fell into a position to march to Port Arthur. The city of Dalny fell (26 May). On 6 June Nogi took command of the Third Army, protected in the rear from the army of Oku. The Japanese had now to drive the Russians from the passes and roads and to prepare a base of supplies. Much heavy fighting occurred, but Nogi marched against

the Russian outposts on 26 June and drove the enemy from strong positions. He was, however, attacked furiously by Stoessel, the Russian commander, whom he ultimately overcame. By the end of July Nogi was in the immediate neighborhood of Port Arthur; and, although he had lost about 8,000 men, he attacked the Russians on 20 July with an equal force. His supplies were inadequate and he had not been correctly informed as to the strength of the fortress. The siege continued for six months, marked by terrific fighting and terrific losses on both sides. The Japanese lost in three weeks 16,000 men. In September the fighting concentrated at 203 Meter Hill, which the Japanese took on 5 December. Nogi's two sons were among those killed in the attempt to capture this point. The Japanese lost some 10,000 men and the Russians about 3,000 at Port Arthur which General Stoessel surrendered to Nogi on 2 January 1905. In the course of the fighting here hand grenades made their appearance. Nogi now led this army toward Mukden where General Kuropatkin had made a stand. In February Nogi swung around the Russian left wing and from 9 March to 16 March a desperate battle raged around the capital of Manchuria. The battle of Mukden was up to that date the greatest battle that the world had seen. At Mukden 700,000 troops were fighting on a line which was at one time 80 miles long. Nogi had the honor of bringing about Kuropatkin's retreat and surrender. He was created baron in 1895 and raised to count in 1906. At the command of the emperor he became honorary president of a school for young peeresses.

The unusual circumstances of his death attracted worldwide interest and comment. Japan's most famous general, with his wife, committed suicide on the occasion of the funeral of the emperor, Mutsuhito. This was done "in accordance with Samurai tradition, in order to inspire his countrymen with reverence for the past and to save them from the corrupting tendencies of modern life." As the gun gave the signal for the funeral procession to start, the Count and Countess Nogi, carefully attired for the ceremony, stabbed themselves with swords according to the etiquette of hara-kiri, the honorable Japanese suicide. The dramatic event impressed the whole world and provoked much comment. "The fact was," writes a commentator, "that General Nogi was a great Samurai bred in the practice of ancient Japanese knighthood and nobly illustrating its virtues. He had served his country with unselfish devotion. From his youth he had borne hardships and great sorrows with the stoicism of his ancestors; the winner of some of the greatest and most fiercely fought battles of modern times, he had ascribed all his victories to the influence of the spirit of his Imperial master; and when that master died, in accordance with the ancient habit of the Samurai, he committed suicide in order that the emperor might not go alone on his journey. General Nogi's death brought out very strikingly the sincerity of his loyalty to the old ideas of Bushido—the Samurai code of honor, courage, loyalty, courtesy. It also presents in a very dramatic way the contrast between non-Christian and Christian ideals."

The Japanese view of the suicide is seen in Count Okuma's words concerning the event: "There was a threefold motive: first, the deed was marked by loyalism of the very highest kind; second, the act was a warning to the modern tendencies toward corruption, or falling away from the old ideals of life among the upper classes of our people; third, it was a rebuke to those in high places in the army and in official life who are becoming more and more absorbed in money-making, in politics and in the furthering of their aspirations at Court."

Count Nogi was famous for his character as a man as well as for his soldierly qualities. He was also a famous poet, highly skilled in the technique of the art. "Poet, dreamer, seer," wrote Richard Barry, "he kept himself detached—a body apart who retained all his faculties for supreme concentration on the vital military problems when they were presented. In executive skill, in organizing talent, he seemed to be deficient. In the military genius that comprises tactics and strategy and the inspiration of effective leadership he was supreme. He died—calm, masterful, serene—with the poise of an informed spirit, to whom this life is but a lesser step in the greater journey." See *Russo-Japanese War*; Mukden; Port Arthur, etc. Consult Washburn, Stanley, 'Nogi: a man against the background of a Great War' (New York 1913); Barry, Richard, 'Nogi—Seer, Statesman and Soldier' in *Harper's Weekly* (28 Sept. 1912); Farant, Léon, 'Le général Nogi poète and also Valjoie; Jean de, 'La mentalité japonaise à propos du hara-kiri' in *Société Franco-Japonaise de Paris* (Paris 1912); Barry, Richard, 'Port Arthur: a Monster Heroism' (New York 1905), portrait of General Baron Nogi studying the defenses of Port Arthur in his garden in the Willow Tree Village, Manchuria, p. 62; also portrait of Nogi *Harper's Weekly* (21 Sept. 1912).

NOGUCHI, nō'goo-chē, Hideyo, Japanese physician: b. Inawashiro, Yama, Fukushima, Japan, 24 Nov. 1876. He was educated in public schools and under private tutors in French, English, German and Chinese literature, and was graduated in medicine at the Tokio Medical College in 1897. He was assistant in the General Hospital in Tokio in 1897-98; assistant in the Government Institute for Infectious Diseases in 1898-1900; quarantine officer in the Yokohama Harbor Station in 1899; and physician in charge of the Central Hospital at Newchwang, China, in 1899-1900. He was also lecturer on pathological anatomy, Tokio Dental College in 1898-99. In 1901 he came to the United States and studied at the University of Pennsylvania, where he became assistant in pathology in 1901-03. In 1903-04 he was in Copenhagen, connected with the Staten Serums Institute. Returning to the United States, he worked in the Carnegie Institute in Washington in 1903-04. In 1904 he joined the staff of the Rockefeller Institute for Medical Research, New York, of which he became a member in 1914. His contributions to medical science are the following: special attention to serpent venoms; a method for obtaining a pure vaccine for smallpox; pure cultivation of syphilitic organisms; microscopy of infantile paralysis; the presence of *treponema pallidum* in the

brain of general paresis and in the spinal cord of locomotor ataxia; and introduction of a skin test for syphilis. He is the author of the so-called Noguchi luetin reaction. He is a Fellow of the New York Academy of Sciences; and a member of the Association of American Pathologists and Bacteriologists; Association of American Physicians; and many others. He was knighted by King Alfonso of Spain in 1913, by King Christian of Denmark in 1913 and by the king of Sweden in 1914. The Emperor of Japan gave him the Order of Merit in 1915. He has published 'Snake Venoms' (New York 1909); 'Sérum Diagnosis of Syphilis and Luetin Reaction' (1910; 3d ed. 1912). Consult Paget, S., 'Noguchi's Researches in Infective Diseases, *Science* (N. S., Nov. 21, 1913); Portrait in *World's Work* (January 1914).

NOGUCHI, Yone, Japanese poet: b. Tsumishima in 1875. He was educated at the Otani School, Nagoya, under the support of the main Buddhist temple of the Otani sect, at the Nagoya High School and at the Tokio University. In 1893 he came to the United States, arriving in San Francisco, where he suffered extreme poverty. He made some friends among American writers and stayed for a time with Joaquin Miller. In 1897 he published 'Seen and Unseen: or Monologues of a Homeless Snail,' and in the next year 'The Voice of the Valley,' a little book inspired by a stay in the Yosemite. In 1902 he went to England and lived with Yoshio Markino, a Japanese artist, in poor lodgings in the Brixton Road, London, producing here a little book 'From the Eastern Sea,' the cover of which was designed by Yoshio Markino. During his stay in England he lectured at Oxford on Japanese poetry. In 1903 he went to New York and returned to Japan. He crossed to China and traveled for about a year and in 1906 he published in Tokio 'The Summer Cloud.' He writes frequently under the *nom de plume* of 'Miss Morning Glory.'

Besides the books mentioned Yone Noguchi has published 'The American Diary of a Japanese Girl' (1902, 1913); 'The Pilgrimage' (1909-12); 'Lafcadio Hearn in Japan' (1911); 'Through the Torii' (1914); 'The Spirit of Japanese Poetry' (1914); 'The Spirit of Japanese Art' (1914). Consult 'The Story of Yone Noguchi told by himself,' illustrated by Yoshio Markino (London 1914); and Ransome, Arthur, 'Portraits and Speculations' p. 189 (London 1913).

NOILS (also Noyls), the short and broken fibres and knots of wool that are combed out of the long staple. Noils are afterward carded and spun into coarse woolen yarn. They are also used for felting. Noils are, therefore, the short refuse wool which remains entangled among the teeth. There are many grades of noils. The word seems to come from the Latin *nodus*, a knot, and through the Old French *noill*, *nuil* or *newel*, a button or stone of a fruit, and the modern French *noyau*, a kernel.

NOIRÉ, nwā-rā, Ludwig, German philosophical writer: b. Alzey, Hesse, Germany, 26 March 1829; d. Mayence, Germany, 26 March 1889. He was educated in Giessen and taught for many years in the gymnasium at

Mayence, giving himself meantime to philosophical study. He wrote 'Die Welt als Entwicklung des Geistes' (1874); 'Einleitung und Begründung einer monistischen Erkenntnisstheorie' (1877); 'Logos' (1885).

NOISELESS POWDER. See EXPLOSIVES.

NOISSEVILLE, nwäs-vêl, France, a village five miles east of Metz, celebrated as the scene of Bazaine's attempt to break through the line of German besiegers, 31 Aug.—1 Sept. 1870. With 120,000 men and 600 guns, he attacked Manteuffel with 41,000 men and 138 guns, drove him back and took the villages of Montoy, Servigny and Courcy, but German reinforcements arriving on the second day, Bazaine was compelled to fall back upon Metz.

NOLA, nō'lā, Italy, city and episcopal see in the province of Caserta, 16 miles east by north of Naples. It is said to have been founded by the Etrurians before Rome was built, and 313 B.C. it became a part of the Roman territory. It successfully resisted an attack of Hannibal in the Second Punic War. Nola claims to have made, in the 5th century, the first bells used in Christian churches and the festival of Saint Paulinus, their inventor, is faithfully observed. Giordano Bruno (q.v.) was born in Nola and Augustus died here in 14 A. D. Nola is celebrated for its antiquities, which include a portion of a church of the 4th century. Pop. 14,900.

NOLDEKE, nêl'dê-kê, Theodor, German orientalist: b. Harburg, Germany, 2 March 1836. He was educated at the gymnasium of Lingen, Hanover, and at the University of Göttingen. In 1859 he won the prize offered by the French Académie des Inscriptions with his history of the Koran, which he wrote in French and translated into German in the following year. He was privat-docent at Göttingen in 1861-64, and then was appointed assistant professor there. In 1868-72 he occupied the chair of theology at Kiel and was then called to the professorship of Oriental languages at Strassburg from which he retired in 1906. A scholar of wide attainments, he has made a speciality of the Semitic languages and of Oriental philology and history, in which departments he is a leading authority. He is a voluminous writer, nearly 600 titles being set against his name. Much of his work is intended for specialists only, yet much of his writing is intended for the general public. He has published 'Das Leben Muhammeds' (1863); 'Die alttestamentliche Litteratur' (1868); 'Grammatik der Neusyrischen Sprache' (1868); 'Untersuchungen zur Kritik des Alten Testaments' (1869); 'Mandäische Grammatik' (1874); 'Aufsätze zur persischen Geschichte' (1887); 'Orientalische Skizzen' (1892), translated into English in that year and revised by him; 'Beiträge zur semitischen Sprachwissenschaft' (1904); 'Burzoes Einleitung zu dem Buche Kalila wa Dimna' (1912); 'Untersuchungen zur Achikar-Roman' (1913).

NOLHAC, nōl-äk, Pierre de, French historian and critic: b. Ambert, 15 Dec. 1859. He studied at the French school in Rome, worked for a year in the Bibliothèque Nationale, in 1886 became professor of history and classical philology in the École des Hautes Etudes, and in 1892 was appointed conservator of the Ver-

sailles Museum. Among his literary and historical studies are 'Lettres de Joachim du Bellay' (1884); 'La Bibliothèque de Fulvio Orsini' (1887); 'Erasmus en Italie' (1888); 'Marie Antoinette' (1890); 'Petrarque et humanisme' (1892); 'Histoire du château de Versailles' (1899-1900); 'Louis XV et Marie Leczinska' (1900); 'La création de Versailles' (1901); 'Louis XV and Mme. de Pompadour' (1902); 'Les jardins de Versailles' (1905); 'Nattier, peintre de la Cour' (1905); 'Poèmes de France et d'Italie' (1905); 'Versailles et Trianon' (1909); 'Le Trianon de Marie Antoinette' (1914), and works on Fragonard, Francis Boucher, Mme. Le Brun and Hubert Robert.

NOLI ME TANGERE ("Touch me not"), the words spoken by the risen Christ to Mary Magdalen (John xxviii, 7). The subject was a favorite in Italian art. It frequently appears in cycles representing the life of Christ as in Giotto's frescoes in the Arena Chapl, Padua, and in Duccio's frescoes in Siena. Fra Angelico, Martin Schöngauer (15th century) and Lorenzo di Credi (Uffizi) also painted this subject beautifully. The most famous of all paintings on this theme is the one by Titian, representing Christ and the Magdalen in the foreground of a beautiful landscape, the Magdalen on her knees raising her hand to touch Christ, who draws back his robe uttering the words "Touch me not." It was painted about 1518, and bought by Rogers, the poet, who bequeathed it to the National Gallery, London, in 1855. The canvas measures about four feet by three. A smaller picture by Titian, a fragment only of the original, representing the figure of Christ in a white tunic and blue mantle is in the Madrid Museum. It was taken to Spain by Mary of Burgundy in 1556. The Escorial has a copy. The Madrid Museum has a 'Noli me Tangere' by Correggio, representing Christ and Mary Magdalen. It was owned by Philip IV, and was originally in the Escorial. This is about four by three feet. Albertinelli's 'Noli me Tangere' is in the Louvre. This is a small work: Christ is leaving the sepulchre and Mary Magdalen is kneeling before him. It was painted between 1490 and 1500 and shows the influence of Fra Bartolommeo. This picture belonged to Louis XIV. Consult Jameson, Mrs., 'History of Our Lord in Art' (Vol. II, pp. 278-285, London 1865).

NOLL, nōl, a name by which Oliver Cromwell (q.v.) was popularly known.

NOLLE PROSEQUI (no prosecution). A technical term in English law, signifying that the proceedings against the defendant shall be discontinued. This originated in England in the reign of Charles II. In the United States the *nolle prosequi* is confined almost exclusively to criminal cases. The codes regarding the methods of procedure differ slightly in the different states. In some states the prosecuting officer may enter a *nolle prosequi* at his discretion; in others the permission of the court must be obtained. The term is sometimes shortened to *nol. pros.* See NONSUIT; PLEADING; PRACTICE.

NOLLEKENS, nōl'ê-kênz, Joseph, English sculptor: b. London, 11 Aug. 1737; d. there, 23 April 1823. He was the son of a painter of Antwerp who had settled in England, and after studying sculpture at Rome became very suc-

cessful in the execution of portrait busts, and was elected to the Royal Academy in 1772. He modeled busts of George III, Pitt, Canning and Castlereagh. His finest ideal statue is 'Venus with the Sandal.' He was exceedingly penurious in his habits and left a fortune of \$1,000,000. Consult 'Nollekens and his Times,' by J. T. Smith (Gosse's edition, 1895).

NOMA. See CANCRUM ORIS.

NOMADS, a general name given roaming or wandering people or tribes without fixed habitations, and generally pastoral. Nomadic tribes are seldom found to quit their wandering life until they are compelled to do so by being surrounded by tribes in settled habitations, or unless they can make themselves masters of the settlements of a civilized nation. But this change commonly takes place by degrees. Some of the greatest revolutions in history have been effected by these wandering tribes. North Africa, the interior of South Africa, and the northern and middle parts of Asia, are still inhabited by nomadic tribes. Different tribes, however, possess different degrees of civilization. Some are little better than bands of robbers.

NOMARCHY, or **NOME**. (1) The largest political division of Greece, which is divided again into demarchies. There are 30 nomarchies in Greece. The nomarchy corresponds to the French prefecture. The nomarch, or governor of a nomarchy, is appointed by the king on the nomination of the Minister of the Interior; but the demarchs, who assist them in the work of administration, are popularly elected. Prior to 1899, the eparchy formed the divisional unit below the nomarchy, but at that date it was abolished. (2) The name given by the Greeks to the provinces into which Egypt was divided, from the earliest historical period to the end of the Roman rule.

NOMBRE DE DIOS, nôm'brâ dâ dê'os, Mexico, city in the state of Durango, about 150 miles from the Gulf of California, and 30 miles southeast of Durango, the nearest railroad station. It was the earliest Spanish settlement in Mexico, and is situated in a region noted for its extensive deposit of silver ore. Pop. 11,000.

NOME, nôm, Alaska, city in the north-western part; on the north shore of Norton Sound (q.v.) at the mouth of Snake River, 14 miles west of Cape Nome. It is the commercial centre of an extensive gold mining district, including a large part if not all of Seward Peninsula district which contributes to the wealth of Nome. The placer gold fields, so dependent upon water for their development, are not continuous; rich deposits may have long intervening stretches where as yet no gold has been found. Nome came into existence as a mining camp in 1898-99 when gold was discovered in the creeks and streams of the vicinity, and the value of the beach deposits was recognized. Angelo Heilprin, president of the Philadelphia Geographical Society, is authority for the statement that out of the Nome sands "in barely more than two months" has been taken over \$1,000,000 by the crude method of "rocking." Nome is the shipping point for Council City, second in size to Nome. The tin found in the

vicinity of Cape Prince of Wales, and at Cape York, 90 miles northwest of Nome, is of industrial interest to Nome. Short narrow gauge railroads connect several of the mining camps with the city. The gold output for 1913 was about \$2,500,000. The harbor is closed by ice the greater part of the year, so that the city is active only from June to October. The city government is well organized, with all the departments essential for proper maintenance and operation. The streets are lighted by electricity; it has a good water system, free mail delivery, and many of the modern conveniences found in cities in older settlements of the United States. There are steamer connections with Seattle and the Yukon. Pop. about 5,000. See ALASKA.

NOME, (1) in music (especially in ancient Greek) any melody which was made up from or depended on natural or inviolable rules. (2) A province or other political division of a country, especially ancient Egypt and modern Greece. See MONARCHY.

NOME, Cap. See CAPE NOME.

NOMINALISM, a name of one of two rival schools of mediæval philosophy. The discussion arose respecting the nature of our general or abstract ideas, or of "universals." It was contended by some that abstractions—as a circle in the abstract, beauty, right—had a real existence apart from round things, beautiful objects, right actions. This was called realism and was the view which had been maintained by Plato. Those who held the opposite view were called Nominalists, because they maintained that there is nothing general but names; the name "circle" is applied to everything that is round, and is a general name: but no independent fact or property exists corresponding to the name. Specifically the controversy was as to the existence of "universals" or of genera and species, and arose out of a passage in the Latin translation of Porphyry's 'Isagoge.' Roscellinus, canon of Compiègne, in the latter part of the 11th century, was the first advocate of nominalism, and maintained, in opposition to the advocates of realism, that general ideas have no separate entity. He was charged with holding heretical opinions concerning the Trinity, for which he was cited before the Council of Soissons and condemned 1092 A.D. His first great opponent was Anselm, archbishop of Canterbury, and later Abelard, who had been a pupil of Roscellinus, modified his master's views into what is known as conceptualism.

NOMINATION. See CAUCUS.

NOMINATIONS, Political. See CONVENTIONS, POLITICAL.

NOMOCANON, in the Greek Church, a systematic collection of ecclesiastical laws, including certain secular enactments, especially imperial decrees, which have an ecclesiastical bearing. The most important is the Nomocanon of Photius (883) which was republished at Rome 1842 in the 'Spicilegium Romanum,' and the 'Syntagma' of Matthew of Blastares (1335).

NON-ACTIVITY. See NEUTRALITY.

NON-COMBATANTS, a term used in warfare for officers and privates charged with

administrative duties and who do not fight unless in self-defense; also for residents of a belligerent state who take no part in war.

NON-COMMISSIONED OFFICERS, in the army are officers intermediate in rank between the commissioned officers and privates or marines. They hold rank, not by commission from the executive authority, but by appointment of a superior officer. They are selected from the rank and file, and are generally the most meritorious of these. They vary in rank and comprise sergeants-major, sergeants, drum-majors, corporals. Their duties are various, but in general it may be stated that they overlook the men when off parade and while in barracks. They can only be reduced to the ranks by the colonel-commandant or by court-martial. A grade of officers above non-commissioned officers are the warrant officers. See UNITED STATES — ARMY.

NON COMPOS MENTIS, *nōn kōm'pōs mēn'tis* ("not of sound mind"), an expression used of a person who is not of sound understanding. See INSANITY.

NON-EUCLIDEAN GEOMETRY. See GEOMETRY, NON-EUCLIDEAN.

NON-FEASANCE (not doing), a legal term signifying the omission of some act which one is under a legal obligation to perform. The rule of law is that no action lies for non-feasance, i.e., for failure or refusal to perform the obligation, but that an action does lie for mal-feasance (or mis-feasance), i.e., for negligently or improperly performing the obligation. Polson in 'English Law' writes: "Misconduct of officers of justice, being what the law terms malfeasance, that is, wrong doing, or culpable non-feasance." Some writers are of the opinion that non-feasance never amounts to a tort; but this is erroneous. For example, if the owner of a factory fails to comply with a law requiring him to equip his factory with fire-escapes, in case of fire he is liable in damages to the persons injured. His omission in non-feasance and his non-feasance is a tort. The word comes from the Latin *non* and *facere*, to make, through the French *faisant* of the verb *faire*. Consult Jagard, E. A., 'Handbook of the Law of Torts' (Saint Paul 1895).

NON-INTRUSIONISTS, those members of the Scotch Established Church who contend for the principle that no minister should be intruded on a parish contrary to the will of the congregation. The name originated in a resolution, bearing this import, proposed by Dr. Chalmers and seconded by Lord Moncreiff in the General Assembly in 1833. It was to meet these views that the General Assembly, in 1834, passed the Veto Act, which brought the Church into conflict with the law courts and the disruption from which the Free Church of Scotland came into being in 1843.

NON-PARTISAN PRIMARY. See PRIMARY, DIRECT; ELECTIONS.

NON POSSUMUS, "We cannot," an expression used by Pope Clement VII in reply to Henry VIII's demand for the dissolution of his marriage with Catharine of Aragon; used in general expression for the refusal of the Roman Catholic Church to yield to the demands of the temporal power.

NON-RESISTANCE, Doctrine of, is that it is unlawful, on religious grounds, to resist the commands of a ruler or magistrate. This view is held by the Friends and is to be found in the works of Tolstoy. The New Testament writers urge the necessity of obedience to those in authority, although, as usually understood, this teaching refers only to lawful commands. It has, however, been maintained that obedience is to be rendered to all the commands of a ruler without exception.

NONANE, or **ENNEANE**, the ninth member of the series of the saturated fatty hydrocarbons or paraffins. It has the chemical formula C_9H_{20} and is theoretically capable of existing in no less than 35 different isomeric forms, a number of which have been actually identified. Two of these, having a common specific gravity of about 0.742, and boiling at 266° F. and 277° F., respectively, are known to exist in ordinary petroleum.

NONCONFORMIST, the name applied in the early part of the 17th century to those persons who, while adhering to the doctrine of the Church of England, refused to conform to its discipline and practice, chiefly in the matter of certain ceremonies, for example: the wearing of the surplice, kneeling at the reception of the Sacrament, signing of the cross after christening and the use of the ring in marriage. After the passage of the Fourth Act of Uniformity in 1662 and the ejection from their livings of those clergymen who refused to conform to that act, the term Nonconformists was applied to all those who by their opposition ceased to be members of the Established Church and who gradually formed themselves into sects. The history of this break in English Protestantism dates from the reign of Mary Tudor; but it does not become of real importance until the days of Elizabeth, when repugnance excited by the horrors of Mary's reign, hatred of Spain and the example of the reforms taking place in other centres of Europe strengthened the forces hostile to the Established Church. With the accession of Elizabeth, the Calvinist section, soon nicknamed "Puritans," returned from their voluntary exile. "In Geneva and Heidelberg," writes an authority, "they had learned to love the bare services and the elaborate preachments of the prevailing fashion." Europe, or a large part of it, owned in Calvin an intellectual and spiritual master and his authority was more absolute than that of most of the Popes. Swayed by these notions such men came back hoping for a "root-and-branch" revolution and anxious to reform the Church on the Calvinistic Presbyterian model. Thus, when it appeared that the new order would not only continue episcopacy, but would enjoin set prayers, sacerdotal vestments and outward sacramental signs there was a great outcry. The first few years of Elizabeth's reign were filled with the 'Vestiarian Controversy.' Elizabeth, however, who had very little personal religion, preferred an episcopal to a presbyterian system and retained ritual and such prelates as Matthew Parker (1504-75), to strike a balance between conservatism and innovation; to maintain the Prayer Book in spite of the Genevan party, and to adjust delicately, and yet firmly, the difficult questions of the day. Those who held Puritan views Elizabeth

cordially detested, as her forcible expressions plainly show; but, on the other hand, she was willing to conciliate them for the sake of their political support. Elizabeth's Act of Uniformity (the third), passed in 1559, ordered the use of the Second Prayer Book from 24 June 1559. Wishing to please the Puritans, Archbishop Parker, on an understanding with Queen Elizabeth, published certain "advertisements" addressed to the clergy, requiring them, at least, to conform to the wearing of a surplice, kneeling at communion, using the font for baptism, etc.; but the effect was small, for the Puritans became bolder and bolder until they demanded the substitution of an entirely Presbyterian régime, demanded by Thomas Cartwright in his First and Second Admonitions (1572) and followed by his 'Book of Discipline' (1580). In 1588 the 'Mar-Prelate Tracts' appeared and were hawked about the London streets. The violence of their attacks upon the queen and the bishops caused Elizabeth to take drastic measures. Perry and Udel, authors of the tracts, were tried and executed and Cartwright was imprisoned. The Marprelate Tracts, however, opened a rift in the Puritan party itself. They were the climax in the first Puritan assault upon the Established Church in favor of the 'Book of Discipline,' but the act passed in 1593 inflicting punishment to be followed by exile of a second offense on all who refused to attend the Established Church, or who held separate meetings, caused a division in the Puritan party. Some, retaining their beliefs outwardly, pretended to conform, while the extremists, for a time called Brownists (after their leader), fled to Holland; and a quarter of a century later sailed from Leyden and then from Plymouth in the *Mayflower*, 6 Dec. 1620, and settled in New England. With the death of Queen Elizabeth the hopes of the Nonconformists revived. Their system of doctrine and government was dominant in Scotland and they hoped for much from the Scottish James. They met him on his way to London and presented their 'Millenary Petition,' which requested that the ritual to which they objected should be abolished in the State Church. James promised them a conference, which met the next year (1604) at Hampton Court Palace. The king proved wholly on the side of the Established Church and the Nonconformists were disappointed. The same year Archbishop Bancroft, with the king's sanction, enforced the canons of 1604 restoring the rites in such parishes where the Puritans had succeeded in suppressing them. This controversy culminated in the long fight of Archbishop Laud (1573-1645) in his desire to rescue the Church of England from Calvinistic influence and who died a martyr. On the day that he was beheaded by the Nonconformists party the Book of Common Prayer was disestablished and the Directory was substituted for it by the Lords and Commons. "Thus," wrote a member of the Lower House, "the Archbishop and the Prayer Book died together." The supremacy was now transformed from the Crown to Parliament; the Solemn League and Covenant was accepted for the whole nation; and the Westminster Assembly of Divines met in Westminster Abbey as a permanent committee to reform the Church (1643). On the restoration of the king (Charles II) the Convocation

of 1662 revised the Prayer Book and forced its use. Those who refused to conform—and there were nearly 2,000 clergymen who did so—organized themselves outside of the Established Church and called themselves by the name of Nonconformists. Many repressive acts were passed against them, including the Five Mile Act, making liable to imprisonment any Nonconformist minister who came within five miles of the town from which he had been ejected. The next epoch in the history is the Toleration Act of 1689 regarded in its day as a charter of religious liberty. Many legal rights were allowed to the Nonconformists. With their conditions ameliorated, the Nonconformists were lapsing into quietude when the great Methodist, or Wesleyan, movement fired the dissenting sects to new activity. Under John (1703-91) and Charles Wesley (1707-88) and George Whitefield (1714-70) Methodism became a power in England at large and crossed the Atlantic to the United States.

In the 19th century the word Nonconformist was applied in England generally to all Protestant dissenters, i.e., to those who dissent from the Church of England. The great object of these sects, often referred to as a "Nonconformist party," has been to disestablish the Church of England. They form a body of no small political power. Though not succeeding in their aims, they have had several privileges accorded to them. Since 1836 dissenters have been allowed to be married by their own ministers and according to their own rites; the registration of births, marriages and deaths has been transferred from the Church to the State; a charter was given to the free University of London; the great universities of England have admitted Nonconformist students since 1871 and since 1880 the Burials Act allows the Nonconformist ministers access to the churchyards for funerals.

A sentence in a letter to the London *Times*, 28 Nov. 1890, reads: "The minimum demand of the great Nonconformist party is the abdication of Mr. Parnell. Nothing less will satisfy the Nonconformist conscience now." The phrase "Nonconformist conscience" appears as early as 1672, when Mervel wrote: "I suppose the Nonconformists value themselves though upon their Conscience and not their numbers." Statistics of 1918 with regard to the Nonconformists of Great Britain are as follows: Presbyterians: (Church of Scotland), 1,887 ministers; 721,158 communicants; 1,693 churches; income £491,982; (United Free Church of Scotland, consisting of the Free Church and United Presbyterian), 1,596 ministers; 518,747 communicants; 1,516 congregations; income £1,001,752. Free Church of Scotland, 88 ministers; 178 congregations. United Original Secession Church, popularly known as "Auld Lights" (seceders of 1733), 22 ministers; 3,247 communicants; £5,545 income. Presbyterian Church of England, 370 ministers; 355 congregations and 8 preaching stations. Presbyterian Church of Wales, 1,346 ministers; 184,694 communicants; 1,452 churches. Presbyterian Church in Ireland, 640 ministers; 103,760 communicants; 562 churches; £308,517 income. Methodists in Great Britain, 8,504 churches; 2,603 ministers; 494,993 communicants; 19,211 lay preachers. United Methodists, 2,727 churches; 649 ministers; 157,057 members. Primitive Methodists,

4,841 churches; 1,157 ministers; 205,217 members. Wesleyan Reform, 197 churches; 22 ministers; 8,317 communicants. Independent Methodists, 145 churches; 404 ministers; 8,770 communicants. Congregationalists (original Separatist, or Independents) British Isles, 4,989 churches; 3,062 ministers; 489,618 communicants. Baptists (possibly originally derived from the Lollards), British Isles, 3,158 churches; 2,070 ministers; 408,029 communicants. The total amounting to more than 30,326 churches and 3,139,602 church members. In addition to these sects, there are the Salvation Army, the Brotherhood Movement, Christian Endeavor Union, Moravian Church, Churches of Christ, The Countess of Huntingdon's Connexion, Disciples of Christ, Free Church of England, Society of Friends and the British and Foreign Unitarian Association. (See LOLLARDS; WYCLIFF; REFORMATION; HUGUENOTS; PRESBYTERIANISM; BROWNISTS; CONGREGATIONALISM; BAPTISTS; METHODIST CHURCHES; FRIENDS; CALVIN; LAUD; WESLEY; WHITEFIELD; FOX). Consult Neal, 'History of Puritans or Protestant Nonconformists, 1517-1688' (2d ed., London 1822); Price, 'History of Protestant Nonconformity in England from the Reformation under Henry VIII' (2 vols., London 1836); Bogue and Bennett, 'History of Dissenters, 1688-1808' (4 vols., London 1808); Bennett, 'History of Dissenters, 1808-38' (London 1839); Wilson, 'History and Antiquities of the Dissenting Churches' (4 vols., London 1808); Abbey and Overton, 'The English Church in the Eighteenth Century' (London 1878); Hetherington, 'History of the Westminster Assembly of Divines' (Edinburgh 1878); Clark, H. W., 'History of English Nonconformity' (2 vols., London 1911-13); Selbie, W. B., 'Nonconformity' (London 1913); 'The Literature of Dissent' in Cambridge History of English Literature, Vol. X (London and New York 1913).

NONES, nōnz, (1) in the Roman calendar the fifth day of the months January, February, April, June, August, September, November and December, and the seventh day of March, May, July and October. The *nones* were so called as falling on the *ninth* day before the *ides*, both days included. See CALENDAR. (2) The office of the Church recited at the ninth hour of the day (about 3 P.M.), but in practice earlier, from the common meaning of noon.

NONIUS, nō'nī-ūs, **Marcellus**, Latin grammarian: b. probably Thubursicum in Numidia at the opening of the 4th century A.D. His 'De Compendiosa Doctrina,' originally consisting of 20 books, is greatly esteemed on account of its many quotations from earlier writers whose works are lost. The 16th book is no longer extant. Consult editions by Quicherat (1871) and L. Müller (1888); also Nettleship, 'Essays in Latin Literature' (1885); and W. M. Lindsay (1903).

NONJURORS, in British history, those who refused to take the oath of allegiance to the government and Crown of England at the Revolution of 1688, when James II abandoned the throne. The nonjurors maintained the doctrine of passive obedience and non-resistance, and regarded the accession of William and Mary as a usurpation. They numbered

among them upward of 400 clergy and eight bishops of the Church of England and one archbishop, many of them men of learning and of blameless reputation, of whom the saintly Bishop Ken was one. They were of High proclivities, asserted the liberties of the Church in spiritual things and maintained an episcopal succession of their own. Although their sympathies and prayers were with the exiled house of Stuart, they were seldom actively disloyal to the *de facto* sovereigns. When in 1689 the Church Establishment in Scotland ceased to be episcopal, 300 nonjuring clergymen were deprived of their livings, to which Presbyterians were appointed; but they and their successors were more actively disloyal than their English brethren, participated largely in the Jacobite risings in 1715 and 1745 and were in consequence vindictively proscribed. On the death of the young Pretender in 1788, the Scottish Episcopal bishops made submission to the reigning house of Hanover. The last nonjuring English bishop died in 1805. Consult Lathbury, T., 'History of the Nonjurors' (London 1845); Ollard and Crosse, 'Dictionary of English Church History' (ib. 1912); Overton, J. H., 'The Nonjurors' (ib. 1902).

NONNUS, nōn'ūs, Greek poet of the 5th century of our era. He wrote the 'Dionysiaca,' an epic poem in 48 books relating the journeys and expeditions of Dionysius in lively and poetic style, full of taste and learning. He was a Christian and produced a poetic paraphrase of Saint John's Gospel. Consult Ludwich, 'Beiträge zur Kritik des Nonnos' (1873).

NONPAREIL, (1) a small and beautiful finch (*Cyanospiza ciris*) of the South Atlantic and Gulf States; sometimes called the painted bunting. It is nearly related to the indigo-bird (q.v.), and is frequently kept as a cage-bird, especially by the French people of southern Louisiana, who call it *le pape* (the pope). It is about the size of a canary, and, in the male, ultramarine blue over the whole head and neck, excepting a narrow stripe from the chin to the breast, which, with the under parts generally and the rump, is vermilion red; there are touches of green about the shoulders. The female is clear dark green above and yellowish on the lower surfaces. Its song is a series of melodious warblings, and its nest is placed in bushes and low trees, and contains pearly white eggs marked with purplish and reddish brown. (2) In typography, 6-point type, or 12 lines to the inch: in America the size of type between minion and agate, and in England between emerald and ruby.

NONSENSE, **Fort**, in American history, the name of a former fort near Morristown, N. J., projected by Washington to keep his discouraged and famished army from revolting during the winter of 1779-80. The Washington Association of New Jersey erected a memorial stone on the site of the earthworks in 1888.

NONSUIT, *in law*. See NOLLE PROSEQUI.

NONYL, or **ENNYL**, *in chemistry*, a group of organic radicals whose common empirical formula is C_8H_9 , and whose hydrides are the nonanes (q.v.). The nonyls are analogous to ethyl and nethyl in their chemical behavior, and, like these, cannot exist in the free state. The derivatives of the nonyls have

been very little studied as yet, because they are of no commercial importance, and their relations are exceedingly complicated, owing to the large number of possible isomeric forms that each of them can have. Several of their alcohols, amines and chlorides have been prepared, however.

NONYLENE, or **ENNYLENE**, the ninth member of the olefine series of fatty hydrocarbons. It has the chemical formula $C_{10}H_{18}$, and is capable of existing in many isomeric modifications. All of these modifications that are known are liquid. The specific gravity lies between 0.7 and 0.9, and the boiling-point between 230° F. and about 300° F.

NOOTKA (noot'ka) **INDIANS**, a name given to several North American Indian tribes of the Wakashan family, residing chiefly on Vancouver Island, but extending from Cape Cook on the north to beyond Port San Juan and including the Wakah of Cape Flattery, Washington.

NOOTKA SOUND, Canada, an indentation on the west coast of Vancouver's Island. See VANCOUVER ISLAND.

NORBERT, Saint. See PREMONSTRATENSIANS.

NORCHIA, nôr'chê-ä, **The Biga of**, in archæology, a name given to the remains of a biga, or two-horse chariot, discovered in 1901 in the course of some excavations undertaken by a country builder at Norchia, a small town almost 30 miles north of Rome, in what was once a populous part of Etruria. With it were found a number of bronze vessels and some pieces of pottery, of a character familiar among Etruscan remains. These remains were purchased by the Metropolitan Museum of Art in New York, and placed on exhibition.

NORD, nôr, France, a northeastern frontier department bordering on Belgium and the North Sea; area, 2,229 square miles. Capital, Lille. The coast, marked by a long chain of sandy hillocks, furnishes the two harbors of Dunkirk and Gravelines. The interior is a monotonous but fertile alluvial flat, intersected by sluggish streams and canals. A great part is in the basin of the Sambre. The department, while essentially agricultural, upward of four-fifths of the area being under cultivation, is also first of the departments in industry, there being great textile industries, important iron and steel works, porcelain and glass manufactures and productive coal-mines. Part of it was in German occupation during the Great War. Next to the Seine, it is the most populous of French departments. Pop. 1,961,780.

NORDAU, Max Simon, German physician and author: b. Budapest, Hungary, 29 July 1849; d. 22 Jan. 1923. He studied at the University of Budapest, receiving his degree in 1872; he then traveled for six years, visiting the principal countries of Europe, and in 1878 began the practice of medicine in Budapest. In 1880 he went to Paris, and after two years of study resumed the practice of his profession there. He began his literary career at Budapest before entering the university as contributor and dramatic critic for *Der Zwischenact*; he subsequently was an editorial writer and correspondent for several other newspapers. His news-

paper writings were collected and furnished the material for his earlier books, including 'Pariser Studien und Bilder' (1878); 'Seifenblasen' (1879); 'Vom Kreml zur Alhambra' (1880); 'Paris unter der dritten Republik' (1881), which are mostly criticisms of political and social conditions. In 1883 he published 'Die konventionelle Lügen der Kulturmenschheit' (English translation, 'Conventional Lies of Society'), in which he showed what he believed to be the essential falsity of some of the social, ethical and religious standards of modern civilization; and in 1892 published 'Entartung,' translated into English under the title 'Degeneration.' This is his best-known work and provoked much criticism; in it he maintained that the civilization of the present, the new inventions and the growth of great cities have resulted in the degeneration of man, especially of the higher classes; that this degeneration is seen particularly in the lowered, and often depraved, standard of literature, art and music; and that the authors and artists of the day whose work is in accordance with these standards are themselves mental and moral degenerates. He was a disciple of Lombroso. His other works include 'Paradoxe' (1885; in English, 'Paradoxes'); 'Die Krankheit des Jahrhunderts' (1887; in English, 'The Malady of the Century'); 'Seelen Analysen' (1892); 'Die Drohnenschlacht' (1897); the novel, 'Gefühlskomödie' (1891; in English, 'A Comedy of Sentiment'); and the dramas, 'Der Krieg der Millienen' (1882); 'Das Recht zu lieben' (1893); 'Die Kugel' (1894); and 'Dr. Kuhn' (1898); 'The Drones Must Die' (1899); 'Zeitgenössische Franzosen' (1901); 'Morganatic' (1904); 'On Art and Artists' (1907); 'Die Sinn der Geschichte' (1909); 'Zionistische Schriften' (1909); 'Mörchen' (1910); 'Der Lebenssport' (1912). After the outbreak of the Great War he was, being a native of Hungary, accused of German sympathies; but he repudiated the charge, and afterward went to reside in Madrid. Dr. Nordau was a Jew and was one of the prominent leaders of the Zionist movement. An attempt to assassinate him was made in the latter part of 1903.

NORDENBERG, nôr'dên-bärj, **Bengt**, Swedish artist: b. Kompikalla, Sweden, 22 April 1822; d. Düsseldorf, 14 Dec. 1902. In his early years he was a house-painter. In 1843 he went to Stockholm and studied in the Academy while still following his trade. In 1851 he went to Düsseldorf and studied under Theodor Hilderbrandt. In 1857-58 he studied in Paris under Couture, after which he visited Italy. He finally settled in Düsseldorf. Nordenberg was much influenced by Tidemand. His subjects were drawn chiefly from Swedish peasant life. They include 'Communion in a Village Church' (National Gallery, Christiania); 'The Organist' (Leipzig Museum); 'Laying the Tithe in Skåne' and 'Wedding Procession in Varend' (both in the Stockholm Museum); 'A Golden Wedding' and 'A Forest Fire.' Nordenberg was given a medal at Lyons in 1866, at Stockholm in 1845, 1847 and 1848 and London in 1879. He had honorable mention at the Paris Salon of 1864 and at the Vienna Exhibition in 1873.

NORDENFELT, nôr'dên-fêlt, **Torsten Vilhelm**, Swedish inventor: b. 1842. After a thorough technical training, from 1862 to 1866

he was engaged in promoting the sale of Swedish iron in London; and early in the eighties established in Sweden, England and France factories for the production of ammunition, machine guns, torpedoes and submarine torpedo boats. Soon afterward with Hiram S. Maxim (q.v.) he formed the Maxim-Nordenfelt Company. Oscar II of Sweden named him royal chamberlain in 1885. Nordenfelt's best-known invention is a machine gun, intended as a defense against torpedo boats, made with from 2 to 12 barrels, from any one of which the supply of ammunition can be shut off without interfering with the other barrels. See MACHINE GUN.

NORDENSKIÖLD, nôr'dën-shêld, **Adolf Erik**, BARON, Swedish Arctic explorer: b. Helsingfors, 18 Nov. 1832; d. Dalby, Sweden, 12 Aug. 1901. He was educated in Finland at the University of Helsingfors by his father, Nils Gustav Nordenskiöld (1792-1865), a mineralogist, with whom he explored parts of the Urals. He was graduated in 1857, and in 1858 became superintendent of the mineralogical department of the Swedish Royal Museum in Stockholm, having been forced to leave Finland by the Russian authorities, who took umbrage at his political views. In all subsequent Arctic expeditions sent out by the Swedish government he took part, accompanying Torrell to Spitzbergen in 1858 and 1861, and being leader himself in 1864 and in 1868, when he attained 81° 42' the farthest north at that time reached on board ship. Oscar Dickson, a wealthy gentleman of Gothenburg, who had contributed to previous exploration funds, made it possible for Nordenskiöld to explore Greenland in 1870, a preliminary expedition, which, however, made important discoveries of algæ and meteorites and penetrated the island farther than had ever been done before. In 1872, after serving two years in the Swedish lower house of Parliament, where he allied himself with the Liberal party, Nordenskiöld set out on the fifth Swedish expedition, which wintered in Mossel Bay, whence with a few comrades he pushed north in the spring of 1873 on sledges. In 1875 and 1876 he led the expeditions sent out by Dickson across the Kara Sea and up the Yenesei River. These were mere preparations for his great exploit in 1878-80 when he accomplished the Northeast Passage, the dream of explorers for over three centuries. He left Karlskrona 22 June 1878; wintered in the ice near Bering Strait, and reached Yokohama 2 Sept. 1879, and returned to Europe by the Suez Canal. He was created a baron in 1880. In 1883 he again explored Greenland from the west coast, beating his previous record of the farthest inland. The remaining years of his life were spent in the study of early cartography, his publications in this field being 'Periplus, an Essay on the Early History of Charts and Sailing Directions' (1897); an edition of Marco Polo, in French with facsimile (1882); 'Bidrag til Nordens äldsta historia' (1892), in honor of the American Columbian celebration, and accompanied by the earliest maps of North America. Most of his important explorations were also described by his pen. Consult Leslie, 'Arctic Voyages of Nordenskiöld' (1880); and the 'Life' in Swedish, by Andersson (1901).

NORDENSKIÖLD, Gustav, Swedish explorer, son of A. E. Nordenskiöld (q.v.): b. Stockholm, 1868; d. Mörsill, 6 June 1895. He explored Spitzbergen in 1890 and the Colorado cañons in 1891, and described the latter in a work translated by Morgan under the title 'The Cliff Dwellers of the Mesa Verde' (1893).

NORDENSKIÖLD, Nils Erland Herbert, BARON, Swedish ethnologist: b. Stockholm, 19 July 1877. He is the son of A. E. Nordenskiöld (q.v.); after an education at Upsala, in 1906-08 he became connected with the Museum of Natural History, Stockholm. In 1913 he was made director of the ethnographic division of the Göteborg Museum. Between those years he traveled and made collections for the museums in Stockholm. He visited Patagonia in 1899; Argentina and Bolivia in 1901-02; Peru and Bolivia in 1904-05; Bolivia in 1908-09; and in the interior of South America in 1913. In 1912 he received the Loubat prize and the Wahlberg gold medal. In addition to numerous articles in scientific periodicals, he has published 'Från högfjäll och urskogar' (1902); 'Indianlif i el gran chaco' (1910); 'Indianer och hoita' (1911); and 'Sydamerikas indianer' (1912).

NORDENSKIÖLD, Nils Otto, Swedish explorer and geologist, nephew of A. E. Nordenskiöld (q.v.): b. Smaland, 6 Dec. 1869. He was educated at Upsala, where he was graduated with a doctor's degree in 1894. In 1895-97 he accompanied the scientific expedition to Patagonia under Ohlin; in 1898 traveled through the Klondike and Alaska; in 1900 was a member of the Danish expedition under Amdrup to the eastern coast of Greenland; and in October 1901 left Gottenburg on the Antarctic to explore the south polar regions. His ship was sunk in Erebus and Terror Gulf in the early part of 1902, and he and his men encamped on Paulet Island, whence they were rescued by the *Uruguay*, a gunboat sent out by the government of Argentina. In 1909 he explored the southwest of Greenland. He was appointed professor of geography at Gottenburg in 1905. He is the author of 'Antarctica' (1901-04), and 'Geology and Physical Geography of East Greenland' (1909).

NORDERNEY, nôr'dër-nî, Germany, one of the East Friesian Islands, three miles from the coast of Germany and belonging to the province of Hanover. It is about eight miles long and a little over one mile wide, and is accessible from the mainland at low tide. It is treeless, covered with dunes which are from 50 to 75 feet in height. At the southwest extremity is a village which is protected from the sea by a wall, and the lighthouse in the centre of the island may be seen many miles. The island is the most important of the group on account of being a favorite sea-bathing place. Pop. about 4,300.

NORDHAUSEN, nôrd'hôw-zën, Germany, city in the province of Saxony, on the Zorge, 40 miles north-northwest, of Erfurt. It is at the base of the Hartz Mountains and the west end of the fertile "Goldene Aue" that is, "golden plain." It has 70 large distilleries of corn brandy ("Nordhäuser schnaps"), breweries, tanneries, chemical works and tobacco factories and a great export trade in ham and other hog

products. A quaint town-hall, a Gothic cathedral and the church of Saint Blasius, which has two paintings by Lucas Cranach, are all of interest. It became a free imperial city in 1253. Pop. 32,564.

NORDHEIMER, nôrd'hîm-ër, **Isaac**, American Orientalist: b. Memelsdorf, Germany, 1809; d. New York, 30 Nov. 1842. He was graduated from Munich in 1834; in 1835 he came to New York and was instructor in sacred literature in Union Seminary (1838-42), and professor of Hebrew at the New York University (1836-42). His 'Hebrew Grammar,' an elaborate work in two volumes, appeared in its second edition in 1842. His other works include 'A Grammatical Analysis of Scripture or a Chrestomathy' (1838); 'A Philosophy of Ecclesiastes' (Biblical Repository July 1838). He left in manuscripts valuable grammars of Syriac and Arabic.

NORDHOFF, nôrd'hôf, **Charles**, American journalist and author: b. Erwitte, Westphalia, Prussia, 31 Aug. 1830; d. San Francisco, Cal., 15 July 1901. He came to the United States with his parents in 1835, and in 1843 was apprenticed to a printer in Cincinnati. In 1844 he joined the United States navy and served three years, in which time he made a voyage round the world. He continued to go to sea in merchant, whaling and fishing vessels until 1853, and from that time to 1871 (with the exception of four years spent in editorial work in a New York publishing house) was engaged in newspaper work. From 1871 to 1873 he traveled in California and Hawaii, and in 1874 became Washington correspondent for the New York Herald, retiring from journalism in 1890. He has described his experiences as a sailor in his 'Man-of-War Life' (1855); 'The Merchant Vessel' (1855); 'Whaling and Fishing' (1856; new ed., 1903), and 'Nine Years a Sailor' (1857). His sociological and political writings include 'Secession is Rebellion' (1860); 'The Freedmen of the South Carolina Sea Islands' (1863); 'Politics for Young Americans' (1875), which was adopted as a school textbook, and 'The Communistic Societies of the United States' (1874); this last is a description and history of different communistic colonies, and is a valuable contribution to descriptive sociology. His other works include 'Stories of the Island World' (1857); 'California for Health, Pleasure and Residence' (1872); 'Northern California, Oregon and the Sandwich Islands' (1874); 'God and the Future Life' (1881), and 'Peninsular California' (1888).

NORDICA, nôr'dî-ka, **Lillian**, American opera singer: b. (LILLIAN NORTON) Farmington, Me., 1859; d. Batavia, Java, 10 May 1914. She studied in the Boston Conservatory and under O'Neill made her first appearance in 1876 as a concert artist; in 1878 went to Europe with Gilmore's Band, studied at Milan under Sangiovanni and made her operatic début at Brescia in 'Traviata.' Her success was great; she was immediately engaged for the Imperial opera at Saint Petersburg, and after two years there appeared in Paris in 1882. In the same year she retired from the stage to marry Frederick A. Gower, whom she sued for divorce in 1885, but who disappeared at about the time of the suit, probably having been killed in a balloon

accident. She first appeared in London in 1887, and in New York in 1895. In 1894 she played Elsa in 'Lohengrin' at the Wagner Theatre in Baireuth, and in 1896 married the Hungarian tenor Doeme, who took the title rôle in 'Parsifal' at Baireuth in 1894. She obtained a divorce from him in 1904 and in 1909 was married to an American banker, George W. Young. Her repertoire was large and she was especially successful in Wagnerian opera and in 'Les Huguenots' and 'Aida.' In 1907-08 she was a member of Oscar Hammerstein's Manhattan Opera Company. In 1912 she appeared with the Boston Opera Company, and thereafter appeared only on the concert stage. In 1913 she set out on a concert tour of the world. She died as the result of exposure after the wreck of the steamer *Tasman* on the island of Java.

NÖRDLINGEN, nêrd'ling-ën, Germany, town in the northwestern part of Bavaria, on the Eger River, 75 miles northwest of Munich. Its history dates back to the year 900, and some of the buildings still remaining bear evidence of an even earlier date. It became an Imperial city in 1215. Two of the decisive battles of the Thirty Years' War were fought in Nördlingen; one 16 Sept. 1634, where Ferdinand, the king of the Romans, was successful and South Germany was freed from foreign rule, and the other 13 Aug. 1645 between the Imperial forces and the French,—the French were victorious. Nördlingen has considerable manufacturing interests in linen and woolen goods, carpets, leather, agricultural implements, furniture and toys, and there are large nurseries. It has schools of note and a large library. Pop. 8,705.

NORDRAAK, nôr'drâk, **Rikard**, Norwegian composer: b. Christiania, 12 June 1842; d. Berlin, 20 March 1866. He was a piano pupil of Kiel and Kullak in Berlin. At a very early period in his life he turned his attention to the study of Norwegian folksongs and composed music to the national hymn, "Ja, vi elsker dette landet," written by his cousin, Bjørnstjerne Bjørnson (1832-1910). In 1864 he met Grieg and inspired him with the idea of devoting his genius to Norwegian melody and the cultivation of a specifically national art. He wrote incidental music to Bjørnson's dramas of 'Mary Stuart' and 'Sigurd Slembe,' piano pieces and songs.

NORDSTRAND, nôrd'strânt, Germany, an island belonging to the North Friesian group, in the North Sea; area, about 21 square miles. Prior to 1634 the area was about 210 square miles, but that year a flood swept over the island, destroying the greater part of the land and drowning over 6,000 people. Many people on the islands of the vicinity were drowned. Pop. about 3,000.

NORE, nôr, a river in Ireland which has its rise in the mountains in the northeastern part of Tipperary, flows northeast into Queen's County, then southeast through Kilkenny, and after a course of about 70 miles, joins the Barrow River about two miles above New Ross. Kilkenny is the largest city on its banks.

NORFOLK, nôr'fôk, **Charles Howard**, 11th DUKE OF, English politician: b. 5 March 1746; d. London, 1815. Breaking with the traditions of his family, notably his father, a Roman Catholic and author of pamphlets on penal laws

against the Catholics, the son became a Protestant and a Whig; opposed the war with America; sat in Parliament 1780-84; became a lord of the treasury in the Portland Cabinet in 1783, and was dismissed in 1798 from the lord-lieutenancy of the West Riding for toasting the "sovereign English people" in terms displeasing to the Crown. He was noted for his convivial habits and his dislike of soap and water. At his death the title passed to Bernard Edward Howard, the first Roman Catholic peer to sit in the House after the Act of Emancipation in 1829.

NORFOLK, Henry Fitzalan-Howard, 15TH DUKE OF, English politician: b. Carlton Terrace, 27 Dec. 1847; d. London, 11 Feb. 1917. He succeeded to the title in 1860 upon the death of his father, whom he resembled in his zeal for the Roman Catholic Church. He was president of the Catholic Union of Great Britain; acted as special envoy to the Pope in 1887; with the Unionists he opposed Gladstone's Home Rule program; and from 1895 to 1900 was Postmaster-General. He served in the South African War.

NORFOLK, Henry Granville Fitzalan-Howard, 14TH DUKE OF, English politician: b. 7 Nov. 1815; d. Arundel Castle, Sussex, 25 Nov. 1860. He studied at Trinity College, Cambridge, became a zealous Whig and was always an ardent Catholic. He was a member of the House of Commons from 1837 to 1852; then breaking with his party on the Ecclesiastical Titles Bill of 1850 spent several years in Paris, where he was known as a friend of Montalembert, and in 1856, upon his father's death, entered the House of Lords, where he vigorously opposed Palmerston. He wrote various pamphlets on the Catholic question and the 'Lives of Philip Howard, Earl of Arundel, and Anne Dacres, His Wife' (1857).

NORFOLK, Henry Howard, 6TH DUKE OF, English nobleman, friend of Evelyn, the diarist: b. 12 July 1628; d. Arundel, Sussex, 11 Jan. 1684. He was a younger son of the 3d Earl of Arundel, lived abroad until the Restoration, and in 1667 presented the Arundel Library to the Royal Society and the famous Arundel marbles to Oxford University. He was envoy to Morocco in 1669, and succeeded his brother as duke in 1670. Consult Evelyn, 'Diary.'

NORFOLK, Henry Howard, 7TH DUKE OF, English politician, son of the 6th duke: b. 11 Jan. 1655; d. London, 2 April 1701. He studied at Magdalen College, Oxford; became lord-lieutenant of Norfolk, Berkshire and Surrey, and was so strong a Protestant that in spite of his personal attachment to James II he signed the petition for the Convocation Parliament in 1688, brought over the eastern counties to William of Orange and was made privy councillor in 1689.

NORFOLK, John Howard, 1ST DUKE OF (2d creation), English admiral, supporter of the house of York: b. about 1430; d. Bosworth, Leicestershire, 22 Aug. 1485. He was a great-grandson of Sir William Howard, founder of the family and chief justice of common pleas under Edward I and Edward II. He served in France, was elected to the Commons in 1455 by the interest of John Mowbray, last Duke of Norfolk of that name, thus becoming allied to

the house of York. He was knighted upon the accession of Edward IV, fought again in France and against the Lancastrians and in spite of this was made a baron by Henry VI. He became a lieutenant of Richard III, who made him Duke of Norfolk, earl marshal and admiral of England in 1483, and fighting for Richard at Bosworth he was killed. The title of Duke of Norfolk revived for him had been held by the Mowbrays, from whom he was descended on the distaff side.

NORFOLK, Thomas Howard, 2D DUKE OF, English soldier and statesman, son of John Howard, 1st Duke of Norfolk (q.v.): b. 1443; d. Framlingham, Suffolk, 21 May 1524. He was created Earl of Surrey in 1483, the title by which he is best known. Like his father he fought for Edward IV at Barnet (1471) and for Richard III at Bosworth (1485), and was attainted and imprisoned for over three years. He arranged the marriage between Margaret, daughter of Henry VII, and James IV of Scotland (1501). One of the best generals of his day, he put down the Yorkshire rising of 1489, defeated the Scotch at Flodden (1513), being created Duke of Norfolk after that battle, and on the "Evil May Day" of 1517 repressed with terrible severity a riot in London. The entire subservience to the Crown which marked his later years was shown by his concurring in the condemnation of Buckingham for treason, after acting as lord high steward of the court which tried his friend.

NORFOLK, Thomas Howard, 3D DUKE OF, English statesman, son of 2d Duke (q.v.): b. 1473; d. Kenninghall, Norfolk, 25 Aug. 1554. He married Anne, daughter of Edward IV; served in the navy and in 1513 under his father at Flodden. He opposed the policy of Wolsey and angered the king against him; was less successful in his opposition to Thomas Cromwell, and shared the spoil of the monasteries; and in 1546 with his son Henry, Earl of Surrey, was accused of high treason. He won the battle of Solway Moss in 1542. He was condemned and saved from death only by the demise of Henry VIII. He remained in the Tower during Edward VI's reign; but was restored to favor under Mary; and in his 81st year showed equal bravery and rashness in leading the forces against Wyatt (1544). His grandson, THOMAS HOWARD, 4th Duke of Norfolk, son of the Earl of Surrey: b. 1536; d. Tower Hill, 2 June 1572; became duke in 1554; gave largely to the foundation of Magdalene College, Cambridge, was sent to Scotland in 1568 to inquire into affairs there; attempted to marry Mary, Queen of Scots; and as head of the English nobility played a prominent part in the Ridolfi plot in her behalf. He was tried for treason and executed.

NORFOLK, Thomas Mowbray, 1ST DUKE OF (of the first creation), English statesman: b. about 1366; d. Venice, 1399. He was summoned to Parliament in 1383 as Earl of Nottingham; served in Scotland in the following year; joined in the prosecution of the favorites of Richard II by the Merciless Parliament; but was soon reconciled to the king and assisted him greatly in his tyrannical policy toward the nobles. Norfolk arrested Gloucester, Arundel and Warwick, and when bidden to produce

Gloucester for trial he said that the prisoner was dead, and very possibly he was responsible for Gloucester's death. He was made Duke of Norfolk in the same year, 1397; but in 1398 was accused of treason and banished from England.

NORFOLK, England, a county bounded north and east by the North Sea, south and southeast by Suffolk and west by Cambridgeshire and Lincolnshire. Norfolk is the fourth largest county in England. Its area is 2,053 square miles. The eastern and central portions, consist of an undulating plain with pretty river valleys and low chalk downs in the north. The principal rivers of the eastern section are the Yare and its tributaries Wensum, Bure and Waveney. Most of this part of Norfolk is well wooded and fertile and there is little heath land. The western part of Norfolk includes part of the fen country. Here the rivers are the Great Ouse and its tributaries, the Little Ouse, or Brandon which flows across the western boundary line of Suffolk, the Wissey and the Nor. The district known as Bedford Level extends from Welney and Hilgay Fens near the junction of the Great and Little Ouse northward to the Wash. In the middle eastern section lie the famous Norfolk Broads, shallow meres and marshes of an average depth of eight feet, luxuriant with reeds and water plants intersected by the lower courses of several rivers, particularly the Bure and its tributaries. The Broads abound in pike, bream and other fish and a vast number of water fowl, such as heron, bittern, snipe, teal, mallard and kingfisher. Generally speaking the coast line is flat and low with few river mouths. Several villages existing in 1066 have been engulfed by the ever-encroaching sea. From the mouth of the Yare—Yarmouth to Happisburgh—the shore is bordered by sand dunes, then come cliffs from 50 to 200 feet in height and then a low sandy coast extending to Saint Edmund's Point. West of Lynn much land has been reclaimed from the sea in modern times and south of this a Roman embankment runs into Lincolnshire. Submarine forests exist off the coast, particularly in Brancaster Bay and in the vicinity of Cromer and Happisburgh. Fossils of large mammals are occasionally found here by fishermen. The climate is cold owing to the exposed position of the coast to east and northeast winds. Fogs are common in the nearby districts and a characteristic mist called the "cynd" frequently covers the eastern parts.

Norfolk is mainly in the diocese of Norwich with small portions in those of Ely and Lincoln. The county is divided into six Parliamentary divisions. It returned members to Parliament as early as 1290. The city of Norwich now returns two members; the boroughs of King's Lynn, Norwich and Great Yarmouth each return one member in addition to the six divisions. The total number of civil parishes is 700. The municipal boroughs are King's Lynn, Norwich, Thetford and Yarmouth. The urban districts are Cromer, Diss, Downham Market, East Dereham, Hunstanton, North Walsham, Sheringham, Swaffham, Walsoken and Wells-next-the-Sea. Among the other towns are Holt, Fakenham and Wymondham. Assizes are held at Norwich. The Great Eastern Railway pro-

vides the principal railroad communication to Norwich and Yarmouth; Ely to Lynn; Lynn to Swaffham. There are many branch lines, including the Midland and Great Northern from Lynn to Kromer, Norwich, North Walsham and Yarmouth. Boats run down the eastern rivers to the port Yarmouth. The Great and Little Ouse are also navigable and are connected to Lynn by canals. The chief industries of Norfolk go back to historic times. Sheep raising flourished, horses were bred, bees were kept, salt was made, fisheries were important and there were about 600 water mills when the Domesday book was prepared (1086). Flemish immigrants introduced the worsted trade in the 13th century and the name came from the fact that this product first was manufactured at the town of Worstead. The leather business flourished in Norman times. Linen was made in Aylsham in the 14th century. Agriculture is still one of the features of Norfolk. About four-fifths of the total area is under cultivation. Wheat and barley are grown and oats for which Norfolk is famous. A fair amount of small fruit is cultivated. Pasture land is fine and much attention is given to the raising of sheep and cattle. The old Norfolk "polled stock" is a distinct breed. Fisheries are important, particularly those of Yarmouth. The Yarmouth "bloater," nicknamed the "Yarmouth pheasant," makes the tour of the world in tins or as "bloater paste." Silk is manufactured at Yarmouth, Wymondham and North Walsham. Worsted is one of the chief places in England for the manufacture of cloth; Norwich manufactures silk and wool, boots and shoes, weaves shawls and has extensive mustard and starch works. Flour mills and works for making agricultural implements are numerous throughout the county. Pop. 321,733. Consult 'Victoria History of the County of Norfolk' (London and New York 1901-06); Emerson, P. H., 'Pictures of East Anglian Life' (London 1888); Davies, G. C., 'Norfolk Broads and Rivers' (Edinburgh 1884); Dutt, W. A., 'Norfolk and Suffolk Coast' (New York 1910).

NORFOLK, Neb., city in Madison County on the Elkhorn River, 75 miles southwest of Sioux City on the Chicago and Northwestern and the Union Pacific railroads. It is a busy commercial centre and is situated in a rich agricultural district. Norfolk has a Federal courthouse, a public library, a State Hospital for the Insane, a United States weather bureau station, a fine park and municipal waterworks. Farming and cattle-raising are important industries. Large flour and cereal mills, creameries, bottling-works, packing-houses, concrete block, threshing-machine and washing-machine factories, a planing-mill and shops of the Northwestern system are other activities of the city. Pop. (1920) 8,634

NORFOLK, Va., city, port of entry, and United States naval station in Norfolk County, the second largest city of Virginia, on the Elizabeth River, which is an arm of the Chesapeake Bay, the Albemarle and Chesapeake Canal and Dismal Swamp Canal. It is 116 miles by water and 70 miles in a direct line southeast of Richmond, on the Atlantic Coast Line Railroad, the Seaboard Air Line, the Chesapeake and Ohio, the Norfolk and West-

ern, the Norfolk and Southern, the Southern and the New York, Philadelphia and Norfolk railroads. The city covers an area of about nine and one-half square miles and is laid out on rather level ground. The climate is genial, being tempered by the Gulf Stream, which runs nearer the shore off Capes Henry and Hatteras than at any other point along the Atlantic Coast. Among the prominent buildings are Saint Paul's Church, built in 1737, public library, Carnegie library, city hall, custom house, Saint Vincent's Hospital, Protestant hospital, post office, Norfolk Mission College, upward of 30 churches, an academy for young ladies, an institution for colored students, and there is a beautiful public park covering 95 acres. Norfolk has the commission form of government, which displaced the older form of mayor, common council and board of aldermen. The city budget exceeds \$5,642,934 annually; the principal items being interest on the net city debt of \$29,765,000; fire department, schools, street, sewer and drain department and police department. The municipal waterworks were built in 1872 and cost \$1,236,000. There are 70 miles of street mains in the system. The city's annual income is about \$6,000,000. The assessed valuation of all real estate of the city is \$145,109,662. Bank clearings in a recent year were \$399,747,000 and the gross postal receipts were \$730,948.

Norfolk is eight miles distant from Hampton Roads and 17 miles from the Atlantic Ocean. Norfolk and Portsmouth, on the opposite side of the Elizabeth River, constitute the largest naval station in the United States. The Norfolk navy yard is located at Portsmouth. The coaling station here handles over 3,000,000 tons annually. The harbor is commodious, accessible for the largest warships and has a main channel 30 feet deep. The defenses include Fortress Monroe. A United States customs district embraces both Norfolk and Portsmouth. The foreign trade in a recent year was represented by exports, \$17,541,324; imports, \$1,295,347. Norfolk is the terminus of many steamship lines, transatlantic and coastwise, and has a large boat traffic with the interior by canal. It is already an important commercial centre and is growing rapidly in this direction. The commerce of the port includes lumber, coal, grain, cotton, peanuts, oysters, fruit and vegetables. It is the leading peanut market of the world; is the fourth cotton port of the United States, with a business of 600,000 bales annually; an oyster trade of \$2,500,000 and a trucking business of \$6,000,000. Norfolk has several national and State banks, a chamber of commerce, board of trade, cotton exchange, real estate exchange. The Union stock yard here has an annual business of over \$2,500,000. The manufacturing industries represent capital to the amount of over \$11,000,000, with a production valued at about \$14,000,000. The industries include cotton knitting-mills, cotton compress-mills, fertilizer factories, shipyards, tobacco and cigar factories, iron foundries, machine shops, steel works, carriage and wagon shops, creosoting works, housing factories, steel shutter and blind factory, lumber mills, silk mills, barrel, box and crate factories, brickyards, bottling works, grain elevators, electric supply works and numerous

minor concerns. There are gas and electric light plants here, an electric traction system and daily and weekly newspapers. The town of Norfolk was first settled in 1680. It was bombarded and nearly destroyed by the British under Lord Dunmore, 1 Jan. 1776. In 1736 the town was incorporated as a borough and was chartered as a city in 1845. The city suffered severely in 1855 from an epidemic of yellow fever. During the Civil War, in April 1861, General Taliaferro entered the city with a large body of Virginia troops. In May 1862, the Federal army took possession of the city and during the interval from April 1861 to May 1862 the city was the chief Confederate naval station. A new charter was granted in 1906, and was amended two years later. In 1906, Berkeley, a suburb, was annexed. Pop. 115,777. Consult Burton, H. W., 'History of Norfolk' (Philadelphia 1877); Forrest, W. S., 'Historical and Descriptive Sketches of Norfolk and Vicinity' (Philadelphia 1853); Lamb, 'Our Twin Cities of the 19th Century' (Norfolk 1888).

NORFOLK ISLAND, in the Pacific Ocean, 400 miles northwest of North Cape, New Zealand, nearly midway between that colony and New Caledonia, and about 800 miles east of Australia, is six miles long and has an area of 10 square miles, rising in Mount Pitt to a height of over 1,000 feet. The climate is healthful and the soil fertile and well watered; lemons, grapes, figs and pineapples flourish; distinctive features of its flora are the Norfolk Island pine, growing to a height of 200 feet, and the Norfolk Island cabbage, a dwarf pine. Norfolk Island was discovered by Cook in 1774. Between 1788 and 1805, and again between 1826 and 1855, it was a penal settlement for convicts sent from New South Wales. In 1856 many of the inhabitants of Pitcairn Island (q.v.) were transferred hither by the British government. The people are indolent and owing to intermarriage, a decaying race; they fish, farm and supply provisions to passing vessels. Formerly under New South Wales, the island was in 1914 placed under the government of the Australian commonwealth. It is a station of the British All-Red cable. Pop. 985.

NORFOLK ISLAND PINE. See ARAUCARIA.

NORFOLK SPANIEL. See SPANIEL.

NORFOLK AND WESTERN RAILWAY COMPANY, a company incorporated 24 Sept. 1896 under the laws of Virginia, as successor to the Norfolk and Western Railroad. Additional lines were acquired from time to time, including the Cincinnati, Portsmouth and Virginia Railroad, and a half-interest in the Winston-Salem Southbound Railroad (the other half being owned by the Atlantic Coast Line Railroad). The company also controls the Pocahontas Coal and Coke Company. The Pennsylvania Railroad Company and its subsidiary companies own \$11,320,000 preferred and \$41,975,900 common stock of the Norfolk and Western, or about 38 per cent of the total capital stock.

On 31 Dec. 1917 the directly operated lines of the company consisted of 2,086.45 miles, including 1,542.98 miles of main lines owned, 529.49 miles of branches owned, and 13.98 miles

of traffic rights. The main line runs from Norfolk, through the West Virginia soft-coal fields to Cincinnati, Ohio, and Columbus, Ohio, with lines to Richmond, Va., Hagerstown, Md., Winston-Salem, N. C., Durham, N. C., and Bristol, Tenn. Most of its mileage, however, lies in the State of Virginia and West Virginia. For the year ended 31 Dec. 1917 its total operating revenues amounted to \$65,910,242; total operating expenses, \$41,161,503; total operating income \$19,651,816; total other income, \$3,530,239; gross income, \$23,182,055; net income, \$18,946,137; surplus for year, \$8,393,840; leaving the percentage earned on common stock outstanding at end of year at 14.96 per cent. On 31 Dec. 1917 the equipment included 431 passenger cars, 41,908 freight cars of all kinds, 10 barges, 241 side dump cars, 41 derrick tool cars, and 1,180 maintenance, wrecking cars, etc. On 27 Dec. 1917 the complete operation of this railroad property was taken over by the United States government and the road in 1918-19 was operated by the Director-General of Railroads.

NORIA, a hydraulic machine used in Spain, Syria, Egypt and other countries for raising water. It consists of a water-wheel with revolving buckets or earthen pitchers, but its modes of construction and operation are various. As used in Egypt it is known as the *sakieh*. These machines are generally worked by animal power, though in some countries they are driven by the current of a stream.

NORIAN, *nō-rē-āk*, **Jules**, pseudonym of Claude Antoine Jules Cairon: b. Limoges, France, 1827; d. Paris, France, 1 Oct. 1882. His novels won a high reputation and among the most widely known are 'The Countess of Bruges' (1878); 'The Chevalier de Cerny' (1879), etc.

NORM, a standard of reference in accordance with which an entity or state of affairs is approved or disapproved. Our standards of right and wrong, truth and falsity, beauty and ugliness, pleasure and pain, are all norms, and the sciences which concern themselves with applying these standards — namely, ethics, logic, aesthetics and what may be called *hedonics* — are classed as normative sciences. Not every criterion is a norm; an act of approval or disapproval must depend on the application of the criterion. Thus, when one is weighing in an experiment the electrolytic deposit on a piece of metal, he is not applying a norm, but when he weighs a purchase to determine whether it is less in weight than it should be, he is applying a norm, as in this latter case the discovery of a deficiency in weight is the object of disapproval. This approval or disapproval seems on introspection to be the same in nature throughout all the different norms with which it is associated, and to be insusceptible to any obvious analysis. The distinction between the several normative sciences, or sciences which are concerned in evaluation according to norms, resides not in any distinction between the sorts of approval involved in each, but to the object of that approval and to the scope of the consciousness in which it is approved. A normative judgment is ethical when the range of consciousness has been enlarged to the greatest possible extent, and an attempt has been made to consider every relevant antecedent, concomitant and conse-

quent circumstance. It is aesthetic when the range of consciousness is restricted to what lies within the object of evaluation, but embraces every possible detail within the limits of this restriction. It is logical when the content of the mind consists entirely of propositions which, by disregard of their peculiar matter, have been reduced to mere schemata. It is hedonic when the existing state of consciousness is taken as it is found, with no attempt to broaden or deepen its scope. See *ÆSTHETICS*; *ETHICS*; *LOGIC*.

NORMA. Italian opera in two acts, by Bellini, first performance at La Scala, Milan, by Pasta, Grisi and Donzelli, 26 Dec. 1831. London first heard the work at King's Theatre, 20 June 1833; Paris at the Italiens, 8 Dec. 1835; and New York, at Niblo's, 30 Sept. 1843, Corsini and Perozzi singing Norma and Pollione. The New York Academy of Music, Irving Place, was opened with Norma, sung by Grisi and Mario, 2 Oct. 1854. Romani's libretto of Norma was taken from Soumet's tragedy of the same name, produced at the Théâtre Français, 6 April 1831, about a year before Norma was heard at La Scala. The successful opera killed the play. The scene is laid among the Druids in Gaul during the occupation by the Roman legions. The first and most celebrated representative of the Druid priestess was Pasta. Norma became one of Grisi's most famous parts. It was also splendidly sung by Malibran, Titiens and Lilli Lehmann. Rubini and Mario were famous in the part of Pollione. The prayer "Casta Diva," sung by the Druid priestess, after she cuts the sacred mistletoe, is one of Bellini's most popular melodies and exhibits his marvelous skill with ornate embellishment. His air has lately been revived and sung in concerts by Alma Gluck. Consult 'Omaggio à Bellini nel primo centenario della sua nascita' (Catania 1901); Lloyd, William A., 'Vincenzo Bellini' (London 1916); Upton, 'Standard Operas' (Chicago 1890).

NORMAL, *nôr-mal*, Ill., city in McLean County, at the junction of the Chicago and Alton and the Illinois Central railroads, about 60 miles northeast of Springfield. It was settled about 1840. It is in a productive agricultural region in which considerable attention is given to the cultivation of fruit and nursery stock and to the raising of Norman and French draft horses. It has canning factories, novelty works and a large trade in farm products, nursery stock and horses. It is the seat of the Illinois State Normal University and the Illinois Soldiers' Orphans' Home. Pop. (1920) 5,143.

NORMAL COLLEGE (now **HUNTER COLLEGE**) OF THE CITY OF NEW YORK, founded in 1869, for the training of teachers. The first attempt in New York City to provide public means for teachers to procure professional training was in 1856, when a daily normal school was established, which remained in existence only three years. This was followed by the Saturday Normal School, which proved a source of inspiration to the teachers, and made them strong advocates for more thorough professional work. In 1869 the Normal and High School for young women was established by the board of education; in 1870 the name was changed to Normal College. Graduates of grammar grades were then admitted and the course was for three years. The

first president was Thomas Hunter. The entrance requirements and the course of study have been raised, and now the institution has a four-year course of academic work, based on a four-year course in the city high schools. The degree of A.B. is conferred. It has in addition a model kindergarten and a model elementary school, a model high school, an excellent library and well-equipped laboratories. A large number of the teachers in New York City are graduates of this college. The teaching staff at present numbers 130 and the students 1,450; the high school department has 70 teachers and 1,100 pupils, the model elementary school 22 teachers and 750 pupils, and the kindergarten five teachers and 100 pupils. In 1914 the name was changed to Hunter College in honor of the first president, Thomas Hunter. None but residents of New York City are eligible for admission. The board of trustees consists of the president of the college and the members of the New York board of education.

NORMAL SCHOOLS. See **TEACHERS**, PROFESSIONAL TRAINING OF.

NORMAN, nôr'man, **SIR Henry**, English traveler and author: b. Leicester, England, 19 Sept. 1858. He was graduated from Harvard in 1881 and later studied at Leipzig. In 1882 he began a public agitation for the preservation of Niagara Falls, which resulted in the purchase of land on both sides of the falls by the State of New York and the Dominion of Canada for use as a public park. He was for several years on the editorial staff of the *Pall Mall Gazette* and later of the London *Daily Chronicle*, and retired from journalism in 1910. He traveled widely in the United States and Canada and also in Japan, Russia, Siberia, central Asia, Korea, China, Siam, the Malay Peninsula, Egypt and the Balkans. In 1902 he founded the 'World's Work,' an illustrated monthly which he also for some time edited. From 1900 to 1910 he represented (in the Liberal interest) South Wolverhampton in the House of Commons and after the latter date Blackburn. He was chairman of the War Office Committee on Wireless Telegraphy in 1912; and after the outbreak of the Great War was a member of the Inventions Panel of the Ministry of Munitions. He was knighted in 1906 and created a baronet in 1915. He has written 'An Account of the Harvard Greek Play' (1881); 'The Preservation of Niagara Falls' (1882); 'The Real Japan' (1892); 'The Peoples and Politics of the Far East' (1895); 'The Near East' (1899); 'All the Russias' (1902), and 'Delhi' (1902).

NORMAN, Okla., city, county-seat of Cleveland County, on the Atchison, Topeka and Santa Fé Railroad, about 48 miles south of Guthrie and 20 miles south of Oklahoma. It is an agricultural region in which the cultivation of wheat and cotton and cattle-raising are the chief occupations. The principal manufactures are flour, cottonseed oil and ice. It has considerable trade in wheat, flour, cotton, cottonseed oil and livestock. It is the seat of the University of Oklahoma (q.v.) and of the State Insane Asylum. There are several churches, public schools and banks. The government is vested in a mayor and a board of aldermen of eight members. The city owns its water-supply system. Pop. (1920) 5,004.

NORMAN ARCHITECTURE, a variety of the Romanesque style originated by the Normans and introduced into England by William the Conqueror. Within the generation of their conquest of the district known to-day as Normandy they began to erect churches and cathedrals in memory of their victories. Their conquests supplied them with the means for making these large edifices. Not content with the small churches then common in France, they desired monuments worthy of their great conquests. While retaining the general style of the French churches the Normans erected much larger buildings. They borrowed also to a limited extent from the early Gothic. Size and massiveness characterize the early period when the Latin plan (derived from the Basilica) of a central portion with aisles at the sides, and with a semi-circular apse at the east end is followed. The tower was a favorite and in Norman hands became highly developed. Ornamentation consisted of the billet, chevron, zigzag, etc., but remained of a simple design. Semi-circular arches crowned doors and windows. At first single pillars supported the nave arches, but in later examples shafted piers are found. The main central part of the structures at first were without vaults because of the great width, and wooden roofs were substituted, with vaults on the side aisles only. The masonry of the early period is rude, with large joints, and the stones generally unhewn. The style prevailed from about the beginning of the 10th century until the death of William the Conqueror, near the close of the 11th century. Normandy has many fine extant examples, among which perhaps the best known are the churches of Caen erected in the time of the Conqueror. This style of architecture was brought into England by the Normans at the Conquest in 1066. They there extended the scale of the buildings, as they had done in Normandy, preserving, however, many local peculiarities of the Saxon style, which they found in the country. An example of pure Norman is the White Tower chapel of the Tower of London. There are, however, many buildings, both in England and in Scotland, which date from before the end of the 12th century, when the pointed style began to be used. Durham, Lindisfarne, Canterbury, Dunfermline are partially Norman, besides many other churches and castles. The Anglo-Norman is heavier than the French-Norman, the cylindrical nave piers of the above-named buildings being much more massive than those of French works. To relieve this heaviness, the chevron, spiral and other groovings were cut in the piers. The moldings and forms of doors, windows, etc., are the same as those of Normandy. There is one remarkable difference in the plans of the early Norman churches in the two countries: in France, the apse at the east end is always semi-circular; in England, this form was gradually given up; and toward the last the square east end was universally adopted. Consult Browne, E. A., 'Norman Architecture' (New York 1907); Dehio and Bezold, 'Kirchliche Baukunst des Abendlandes' (Stuttgart 1892), and Ruprich-Robert, V. M. C., 'L'Architecture normande' (2 vols., Paris 1884-90).

NORMAN CONQUEST, in English history, the successful attempt made by William

of Normandy in 1066 to secure the English crown from his rival Harold, son of Earl Godwin. It was no real conquest of the land and people by an alien race, but rather resembled in its chief characteristics the accession of William of Orange to the throne in 1688. Any immediate evil effects were more than counterbalanced by the advantages which it conferred on England, such as the grafting on Anglo-Saxon institutions of the better organization and greater mastery of law of the Normans; the bringing of England more into touch with European politics and the consequent beginning of her ever-widening foreign relations; the repression of internecine strife and the greater security of life and property; the great impetus given to architecture and to many of the industrial arts, and finally its great influence on the development of the old English language into modern English. See GREAT BRITAIN — THE CONQUESTS.

NORMAN FRENCH, the language spoken by the Normans at the time of the Conquest. Its development in England was largely, if not altogether, independent of foreign influences, and latterly varied from every form of French, and even from the dialect of Normandy, with which it had at the outset coincided. It ceased to be a spoken language after 1400. It was the legal language of England till the reign of Edward III, and certain law phrases and legal words have been incorporated into English. It exercised a considerable influence on the Anglo-Saxon, and is still spoken among the native population of the Channel Islands (q.v.), the remnant of the Norman possessions belonging to Great Britain. See NORMANDY.

NORMAN LAW. See LAW; NORMANDY.

NORMANBY, nôr'man-bî, **Constantine Henry Phipps**, 1st MARQUIS of, English statesman: b. England, 15 May 1797; d. South Kensington, England, 28 July 1863. He was educated at Trinity College, Cambridge, and in 1818 entered Parliament, sitting for Scarborough in the liberal interest. In 1832 he was appointed captain-general and governor of Jamaica and in 1835 was made lord-lieutenant of Ireland, where he was extremely popular. He was Secretary for War and the Colonies in 1839 and later was transferred to the Home Secretaryship which he occupied until 1841. He was Ambassador to France 1846-52 and to Florence 1854-58. He wrote 'The English in Italy' (1825); 'A Year of Revolution' (1857); 'Vindication of the Duke of Modena' (1861), and several novels, one of which was 'The Contrast' (1832).

NORMAND, nôr'mand, **Henrietta Rae**, English painter: b. London, 30 Dec. 1859, daughter of T. B. Rae; married Ernest Normand, painter, 1884. She was educated in London art schools and was awarded a medal at the Paris and Chicago Universal Expositions. Since 1880, when she first exhibited at the Royal Academy, she has been represented there every season. Some of her most important pictures are 'Ariadne' (1885); 'A Naiad'; 'Eurydice'; 'Death of Procris'; 'Ophelia'; 'Apollo and Daphne'; 'Diana and Calisto'; 'Sir Richard Whittington and his Charities,' a fresco for the Royal Exchange; 'In Listening Mood'; 'Hylas and the Water-Nymphs'; 'Spring's Awakening,' and portraits of the

Marquess of Dufferin and Sir Alfred J. Newton.

NORMAND, nôr'mân, **Jacques Etienne**, French communist: b. Abbeville, France, 1809; d. San Antonio, Tex., 1867. He was a Saint Simonist, and during the Revolution of 1848 in France petitioned the legislature for permission to establish a communistic colony; he was banished from France when Louis Napoleon became President and came to the United States. Buying considerable land near San Antonio, Tex., he established a communistic colony called Réunion, which prospered for a time, but which was finally suppressed by the Texas legislature. While trying to establish another colony he was arrested and imprisoned. He wrote 'Principes de socialisme' (1846); 'Théorie de la Commune Naturelle' (1855); 'Théorie de la République Communiste Universelle' (1860).

NORMANDY, nôr'man-dî, France, an ancient province bordering on the English Channel, now divided into the departments of Seine-Inférieure, Eure, Orne, Calvados and La Manche. It is a fertile region, with well-cultivated fields and fruitful orchards and the people are intelligent and industrious, ranking among the best and most energetic of French provincials. Under the Romans this portion of the country formed part of *Gallia Lugdunensis Secunda*; after the Frankish invasion it was a constituent part of the kingdom of Neustria, and was given by Charles the Bald to the Duke of Paris. From the middle of the 9th century its coasts were harried by the vikings or Northmen (see NORMANS), who early in the 10th century established themselves in such force along the Seine that Charles, king of the Western Kingdom, was glad to arrange a treaty with their leader, Rolf (Rollo, Rou), at Clair-sur-Epte in 912, practically ceding the region, which henceforth was known as Normandy. Its capital was Rouen, and it comprised Upper Normandy, with the towns of Dieppe, Evreux, Harfleur, Havre, Honfleur, Lisieux, Rouen and Yvetot, and Lower Normandy with Caen the chief town, Alençon, Avranches, Bayeux, Cherbourg, Constances, Falaise, Granville and Saint Lô. Rollo's most distinguished successor was William I, Duke of Normandy, who invaded England in 1066, and as William I established a Norman dynasty, thereby uniting Normandy with the latter country. Philip Augustus conquered Normandy in 1204, the French holding it till 1417, when it was recovered by the English, who held it till 1450, when it was finally wrested from them by Charles VII. The Channel Islands (q.v.) are a remnant of the Norman possessions still belonging to the descendants of the Norman kings of England, where down to the present day the law administered in the royal courts is virtually the *Grand Coutumier de Normandie*, or the old customary law of Normandy. One feature survives in the Cry of Haro. This ancient customary law of Normandy seems to have been collected in writing on three separate occasions. The earliest collection was apparently written down by private persons in 1200 and about 1220 and had no official character; the third collection (1585) is a revised edition of the second, the *Grand Coutumier*, completed early in the 14th century. Consult Freeman, 'Norman Conquest'

(1877); Haskins, 'Normandy and William the Conqueror' (1909); Palgrave, 'History of Normandy' (1878); Powicke, 'The Loss of Normandy, 1189-1204' (1913); Prentout, 'Essai sur les origines de la fondation du duché de Normandie' (1911); Spence, 'Dreamland in History' (1890).

NORMANS, or NORTHMEN, a general name given the people of ancient Scandinavia or Norway, Sweden and Denmark. This name was given to them in the Netherlands, in Germany and France: in Great Britain they were called Danes. They were fierce and warlike tribes, who made piratical expeditions to all parts of the European seas, plundering by land and by sea, and often overrunning large tracts of country, in which they practised every enormity. "They had scarcely any inducements," says Mackintosh, the English historian. "to spare countries which they visited only to plunder, and where they did not hope to dwell; they were less than others liable to retaliation, and they had neither kindred nor family nor home. They were, perhaps, the only barbarians who applied the highest title of magistracy to denote the leaders of piratical squadrons, whom they termed *vikingr* or *sea-kings*. Not contented with their native and habitual ferocity, some of them sought to surpass their companions by working themselves into horrible and temporary insanity." *Vikingr* does not, however, mean sea-kings, but is derived from *vik*, a bay or creek. The poverty of their country compelled them to adopt this means of subsistence, and their religion inspired them with a love for daring enterprises, since it taught them that warriors fallen in battle were admitted to Valhalla, the northern paradise.

In 795 some Norwegians established themselves in the Farøe Isles and in Orkney; toward the middle of the 9th century they founded the governments of Novgorod and of Kiev, in Russia; and after the discovery of Iceland certain powerful Norwegian families, taking refuge from the persecutions of Harold, king of Denmark, settled in that island. The Northmen began their piratical excursions in the first part of the 9th century, and soon covered the sea with their boats, and ravaged the coasts of England, Germany, Friesland, Flanders and France. Under the feeble reigns of Charles the Bald and Charles the Fat they ascended the rivers to the very heart of France and plundered Paris itself. It became necessary to purchase their retreat with gold. Their incursions into France were afterward renewed and Charles the Simple was obliged (912) to cede to them a part of Neustria, which was afterward called, from them, *Normandy* (q.v.), and to give his daughter in marriage to Rollo, their chief. Rollo embraced the Christian religion, was baptized under the name of Robert and became the first Duke of Normandy and a vassal of the king of France. His followers received the religion of their leader and abandoned their roving and piratical habits: though they still retained, as also did their descendants for a long time, marks of their Scandinavian origin and that warlike ardor which had rendered them so terrible to those against whom they directed their attacks. Great Britain was, for about two centuries, desolated by the Danes, as the Northmen were there called. Egbert, in the beginning of the 9th century, had no sooner

made some approaches toward a regular government and the establishment of tranquillity, than the "Scandinavian heathens," as the Saxons termed them, made their appearance. Alfred (871-901) finally delivered the country from the invaders, after they had subdued the whole land except the "isle of the nobles," into which the king had retreated with a few nobles. But the relief was only temporary: they returned, under his successors, in greater force, obtained possession of the northern and eastern part of the country, and in the beginning of the 11th century three Scandinavian princes (Canute, Harold and Hardicanute) ruled over all England for the space of about 25 years. The Saxon line was then restored; but in 1066 William, Duke of Normandy, obtained the English throne. This conquest, as it is commonly called, had a most important influence on the Saxon manners, language and constitution, which had hitherto escaped with little change, and is, therefore, one of the most important epochs in the English history. In the year 1000, according to the Saga narratives, Leif, son of Eric the Red, leaving Greenland, which had been discovered and settled by his father, a Norwegian, proceeded southward in a ship, accompanied by 35 men, and discovered the American coast, to which he gave the name of Vinland. In 1007 a rich Greenlander, with a following of 60, emigrated to Vinland, and there planted a colony, which seems to have thriven, but after a time we hear nothing more about it. The Normans also established a new kingdom in Naples in 1016. The foreign expeditions of the Northmen gradually diminished their numbers and strength at home, and rendered them less formidable.

Consult Depping, 'Histoire des expéditions maritimes des Normands' (1826); Du Chaillu, 'The Viking Age' (1890); Fischer, 'Discoveries of the Norsemen in America' (Eng. tr. 1903); Freeman, 'History of the Norman Conquest of England' (1877); Hov-gaard, 'The Voyages of Norsemen to America' (1914); Keary, 'Vikings in Western Christendom' (1891).

NORNS, *nórnz*, in Scandinavian mythology, the three Fates, representing the past, the present and the future, whose decrees were irrevocable. They were represented as three young women, named respectively Urd, Verdandi and Skuld. They sit by the well of Urd, under the world-tree Yggdrasil in Asgard, and there determine the fate of both gods and men. Besides these three there are many inferior norns, both good and bad, answering to the genii of classical mythology; to such are attributable the unequal destinies of men in the world. Women who possessed the power of prediction or magic also bore this name.

NORQUAY, John, Canadian statesman: b. near Fort, Gerry, Manitoba, 8 May 1841; d. Winnipeg, 5 July 1889. He was of mixed Scotch and Indian parentage and was educated at Saint John's Academy, Red River Settlement. During the negotiations after the Red River Rebellion he secured the confidence of both the authorities and the half-breeds in 1869, and on the formation of the government was elected to the first Manitoba Parliament in 1870. In 1871 he was appointed Minister of Public Works and Agriculture, to which he was

again appointed in 1876, having in the meantime resigned and joined the Davis administration (1875). In 1878 he formed a ministry and became Premier and Colonial Treasurer. From 1874 until his death he sat in the legislature. He was Premier of Manitoba from 1878 to 1887, when he resigned. Norquay promoted legislation on municipalities, drainage and county courts; upheld the rights of his native province and initiated the struggle for enlarged boundaries; finally granted in 1912. On several occasions he represented the province to the federal government at Ottawa. He also contended successfully against the monopoly in railway construction conferred upon the Canadian Pacific. Consult Begg, Alexander, 'History of the Northwest' (Toronto 1894). His portrait appears in *Canadian Magazine* (July 1903).

NORRIDGEWOCK INDIANS, an American tribe of the Algonquin family and the leaders in the Abnaki confederacy. They formerly lived along the Kennebec River in Maine and were frequently called Kennebec Indians. They were patrons of the French missionaries, who first ministered to them in 1688, and were regarded as dangerous enemies of the English colonists. The latter sent an expedition against the Norridgewocks in 1724, when the Indians were defeated, the resident priest, Father Rasle, killed, and the tribe dispersed, some going to the Penobscot and Passamaquoddy and others to Saint Francis, in Canada. Those who returned to their old home were dispersed for a second time in 1754 and made their way to Canada.

NORRIS, nôr'is, Edwin, English linguist: b. Taunton, Somerset, England, 24 Oct. 1795; d. Brompton, England, 10 Dec. 1872. His early youth was spent in tutoring, and in 1818-37 he was a clerk with the East India Company. In 1837 he became assistant secretary of the Royal Asiatic Society and in 1859 its secretary. His time was principally devoted to the study of the Semitic languages and the Celtic dialect and he was an authority on cuneiform writing. His greatest work is his 'Assyrian Dictionary' (1868-72).

NORRIS, Frank, American novelist and journalist: b. Chicago, 5 March 1870; d. San Francisco, 25 Oct. 1902. He studied at the University of California and at Harvard, after three years as an art student in Paris; was correspondent of the *San Francisco Chronicle* in South Africa in 1895-96; edited the *San Francisco Wave* 1896-97; wrote articles from Cuba for *McClure's* in 1898, and was the author of several virile realistic novels: 'McTeague' (1899), in illustration of slum life in San Francisco; 'Moran of the Lady Letty,' a romantic story (1900); 'The Octopus,' a story of wheat raising and the transportation trusts (1901), and 'The Pit,' dealing with wheat exchange and gambling. The two last named stories are epical and Zolaesque in manner, and were to have been concluded by 'The Wolf,' a story of European famine.

NORRIS, George Washington, American lawyer and financier: b. San Francisco, Cal., 5 July 1864. He was educated at the University of Pennsylvania, was engaged in the practice of law in Philadelphia from 1886 to 1894 and from 1894 to 1911 was a member of the banking firm

of Edward B. Smith and Company. From 1911 to 1915 he was director of the department of wharves, docks and ferries of Philadelphia; in 1916 served as vice-chairman of the Federal Reserve Bank of Philadelphia. On 6 Aug. 1916 President Wilson appointed Mr. Norris member of the Federal Farm Loan Board, of which he is active executive officer. Mr. Norris is trustee of the Philadelphia Bureau of Municipal Research and of many social societies.

NORRIS, George William, American statesman: b. Sandusky County, Ohio, 11 July 1861. He was born on a farm and spent his early years farming in the summer and attending schools in the winter, receiving most of his early education at Baldwin University, Ohio. He was graduated at the Indiana Normal College in 1881. He studied law and was admitted to the bar of Ohio in 1883, but removed to Nebraska in 1885. Here he was elected as a Republican and re-elected prosecuting attorney of Furnas County for three terms from 1895 to 1903, and from 1895 to 1902 he was judge of the 14th Nebraska district. He was elected to the 58th United States Congress in 1903 and served continuously until 1913, when he became United States senator (Republican) from Nebraska. He was a member of important committees and in March 1910 was not only one of the 35 congressmen who struggled to overthrow Speaker Cannon, but a leader in the fight. He introduced a resolution providing for the election of a committee by the House and for the elimination from it of the speaker; but when the resolution was adopted by means of a coalition with the Democrats, Norris refused to vote for the deposition of Cannon. In 1912 he declined to join the Progressives.

NORRIS, Kathleen, American author: b. San Francisco, 16 July 1880. Her maiden name was Thompson and she was educated by her parents and by private teachers and took a special course at the University of California. In 1909 she was married to Charles Gilman Norris, also a writer. She began to write short stories which appeared in the *Atlantic*, *McClure's*, *Everybody's*, the *Ladies' Home Journal*, etc., and developed into a novelist. Her books are 'Mother' (1911); 'The Rich Mrs. Burgoyne'; 'Poor Dear Margaret Kirby'; 'The Treasure' (1914); 'Saturday's Child' (1914); 'The Story of Julia Page' (1915); 'The Heart of Rachael' (1916); 'Martie, the Unconquered'; and 'Undertow' (1917).

NORRIS, Mary Harriott, American novelist: b. Boonton, N. J., 16 March 1848; d. 14 Sept. 1919. She was graduated from Vassar College in 1870, was principal of a private school in New York 1890-96, and dean of the woman's department of Northwestern University, Evanston, Ill., 1898-99. Among her published books are 'A Damsel of the 18th Century' (1889); 'The Gray House of the Quarries' (1898); 'The Grapes of Wrath' (1901); 'The Story of Christina' (1907); 'The Veil' (1908); 'The Golden Age of Vassar' (1915).

NORRIS, Tobias Crawford, Canadian statesman: b. Brampton, Ontario, in 1861. In his youth he moved to Manitoba and became a farmer and an auctioneer of livestock. Entering municipal politics, he soon advanced and was elected as a Liberal for Lansdowne in the Manitoba legislature, where he served for seven

years. He was returned in 1907 and in 1909 elected leader of the Liberal opposition. In May 1915 he became Premier of Manitoba.

NORRIS, William Edward, English novelist: b. London, England, 18 Nov. 1847. He was the son of a former chief justice of Ceylon, was educated at Eton and admitted to the bar in 1874 but never practised. His first novel, 'Heaps of Money,' appeared in 1877, and was successful. It was succeeded by 'Mademoiselle de Mersac' (1879); 'Matrimony' (1881); 'No New Thing' (1882); 'His Grace' (1892); 'A Deplorable Affair' (1893); 'A Victim of Good Luck'; 'Billy Bellew'; 'A Dancer in Yellow' (1896); 'Clarissa Furiosa' (1897); 'Marietta's Marriage'; 'The Widower' (1897); 'Giles Ingilby' (1899); 'An Octave' (1900); 'Lord Leonard the Luckless' (1903); 'An Embarrassing Orphan' (1904); 'Barham of Beltana' (1905); 'Pauline' (1908); 'Not Guilty' (1910); 'The Rt. Hon. Gentleman' (1913); 'Barbara and Company' (1914), all of which have enjoyed popularity. He has shown not a little skill in character drawing and his dialogue is entertaining and natural.

NORRISTOWN, Pa., borough, county-seat of Montgomery County, on the Schuylkill River, the Schuylkill Canal and on the Philadelphia and Reading and the Pennsylvania and Stony Creek railroads, about 15 miles northwest of Philadelphia. It was settled about 1688 by a colony from Wales, laid out in 1785, and incorporated as a borough in 1812. It was named in honor of Isaac Norris, who owned a large tract of land in what is now Montgomery County. It is in an agricultural and mining section of the State and has extensive manufacturing interests. The chief manufactures are knitting machines, hosiery, men's underwear, glass, iron, wire, screws, tacks, boilers, bolts, silos, rugs, paper boxes, machine-shop products, agricultural implements, iron and wood furniture. It has considerable trade in manufactured articles and farm products. Granite, limestone and marble are mined nearby. Some of the prominent buildings are county courthouse, city buildings, Masonic Temple and the county prison. It has a State Hospital for the Insane, Charity Hospital, Saint Joseph's Protectors (Roman Catholic) for girls, Friend's Home and the Agnes Stinson Home for Aged Ladies. The educational institutions are a high school, public and parish schools, the Montgomery Historical Society and the McCann Library. The tomb of Winfield Scott Hancock (q.v.) is here in Montgomery Cemetery, also a memorial shaft to John F. Hartranft. Valley Forge (q.v.) is only six miles west by north and many other places of historic and scenic interest are in the vicinity. The government is vested in a burgess, who holds office three years, and a council. The electric-lighting plant is owned by the municipality. Pop. 32,319. Consult Heysham, Theodore, 'Norristown, 1812-1912' (Norristown 1913).

NORRKÖPING, nór'hé-píng, Sweden, seaport, on the southeast coast, on the Bravik River, about 80 miles southwest of Stockholm. It was founded in 1384, but it has several times been destroyed by fire. The Motala, a rapid river, flows through the city and furnishes extensive water power which is used for manufac-

turing. It is an important commercial city and has docks, shipbuilding yards, an extensive trade in its manufactures of cotton and woolen goods, carpets, sugar, paper, beer, etc., and in the imports which are reshipped at Norrköping for the interior. Pop. 45,416.

NORRLAND, nór'lánd, Sweden, the largest of the three historical divisions of Sweden, in the northern part; area, 80,785 square miles. It has a cold climate, well-wooded in the south, scanty vegetation in the north. The towns and villages are chiefly in the southern part; but few settlements are in the northern part. Pop. 963,397. See SWEDEN.

NORSE, the language of Scandinavia, especially in its earliest forms. Old Norse is represented by the classical Icelandic and still with wonderful purity by modern Iceland. See ICELANDIC LANGUAGE; ICELANDIC LITERATURE; DANISH LANGUAGE; DANISH LITERATURE; NORWEGIAN LANGUAGE; NORWEGIAN LITERATURE; SWEDISH LANGUAGE; SWEDISH LITERATURE.

NORSE MYTHOLOGY. See SCANDINAVIAN MYTHOLOGY.

NORSEMAN, or **NORTHMEN**. See NORMANS.

NORTH, Christopher, the pseudonym of one of the authors of the 'Noctes Ambrosianæ.' See WILSON, JOHN.

NORTH, Sir Dudley, English financier and economist; 3d son of the 4th Lord North: b. Westminster, 16 May 1641; d. Covent Garden, 31 Dec. 1691. He early entered the employ of a merchant; became a leading merchant in and treasurer of the Turkey Company; resided for many years in Constantinople and returned to England in 1680; was one of the sheriffs of London in 1682 and a commissioner of customs in 1683, and retired from public life shortly after the accession of William and Mary. He was a man of great ability, one of the first Englishmen to urge the doctrine of free-trade and the author of an important pamphlet on the 'Currency.'

NORTH, Elisha, American physician: b. Goshen, Conn., 8 Jan. 1771; d. New London, Conn., 29 Dec. 1843. His father and grandfather were physicians and he early determined to follow their profession. Studying medicine in Harvard under Lemuel Hopkins and in Philadelphia under Benjamin Rush, he practised in Goshen until 1812, when he removed to New London. Here he practised until his death. Dr. North kept abreast of the times and was always foremost in adopting new ideas. He was among the first to practise vaccination in the United States, and sent a newly vaccinated patient to Dr. Edward Miller in New York for the purpose of supplying vaccine from the pustule. Dr. North paid special attention to the diseases of the eye and established the first eye infirmary in the United States at New London in 1817. When the new and obscure disease called spotted fever appeared in New England and raged from 1806 to 1810 Dr. North coped successfully with it. His 'Treatise on a Malignant Epidemic commonly called Spotted Fever' (New York 1811), received general approbation. His other works are 'Outlines of the Science of Life' (1829), and 'Uncle Toby's Pilgrim's Progress

in Phrenology' (New London 1836). Consult Bolton, H. Carrington, 'Life and Writings of Elisha North' (printed privately 1887).

NORTH, Francis, 1st BARON GUILFORD, English lord chancellor, brother of Dudley and Roger North (qq.v.): b. Kirtling, Cambridge-shire, October 1637; d. Wroxton, Oxfordshire, 5 Sept. 1685. He was educated at Cambridge and studied law at the Middle Temple. His rise was rapid: in 1671 he was knighted; in 1673 he was returned to Parliament and became Attorney-General, and from 1675 to 1682 was chief justice of the Court of Common Pleas. In 1682 he became lord keeper and presided at the trial of the Popish plot conspirators and stained his reputation by his partisanship in the trial and execution of Stephen College, the Protestant joiner. He was created Baron Guilford in 1683 and died soon after assisting at the coronation of James II. His uncompromising royalism made him the object of contemporary attack and present misunderstanding, notably in Lord Campbell's 'Lives of the Lord Chancellors.' It is to an early attack of this nature, namely, that in Kennett's 'Complete History' that we owe Roger North's 'Apology' for his brother, which grew into the 'Lives of the Norths.' The conflict of testimony makes his personal character problematical, but it is certain that he was a learned lawyer and a patron of literature, the art and the sciences.

NORTH, Frank Mason, American Methodist Episcopal clergyman: b. New York City, 3 Dec. 1850. He was graduated from the Wesleyan University in 1872 and ordained a Methodist clergyman; became pastor of a church in Florida, N. Y., in 1873-74. He then had the following charges: Amenia, 1874-76; Cold Spring on the Hudson, 1876-78; New York City, 1879-81; White Plains, N. Y., 1882-84; Calvary Church, New York, 1884-87, and Middletown, Conn., 1887-92. He was corresponding secretary of the New York City Church Extension and Missionary Society from 1892 to 1912. In 1912 the General Conference elected him one of the three corresponding secretaries of the board of foreign missions, which he still holds. He was also corresponding secretary of the Methodist National City Evangelization Union (1896-1912) and chairman of the executive committee of the Federal Council of Churches in America. In 1914 he traveled in the Orient to visit the missions. From 1892 to 1912 he was editor of the *Christian City*. Wesleyan gave him the degree of A.M. in 1875 and D.D. in 1894.

NORTH, Frederick, LORD, 2ND EARL OF GUILFORD (better known as Lord North), English statesman, George III's Prime Minister during the American Revolution: b. London, 13 April 1732; d. there, 5 Aug. 1792. His father was Francis, 1st Earl of Guilford. He was educated at Eton and Oxford; studied and traveled abroad for three years; and in April 1754 was elected to the House of Commons for one of his father's pocket-boroughs. From June 1759 to July 1766 he was a junior lord of the treasury; and in 1767 became Chancellor of the Exchequer and leader of the House of Commons upon the death of Townshend, whose measures taxing the American colonies Lord North carried through, and in this particular, as in general

showed himself the 'king's friend' and entirely indifferent to the wishes of the people; indeed he prided himself that he had never voted for popular measures. Early in 1770 he became Prime Minister, but was none the less merely the king's tool; in March 1774 he succeeded in passing the celebrated Boston Port Bill and Massachusetts Bill; and though he seems to have seen soon after the king's policy was a mistaken one and could result only in the loss of the colonies, and although he urged in 1775 that the colonies, if they taxed themselves, should not be taxed by Parliament, he still supported the king's obstinate policy and remained in office, while his government grew steadily weaker because of the defection of men whose scruples, identical with his, carried force with them. On 20 March 1782 he resigned, just in time to forestall a motion for the dismissal of the cabinet. In February of the next year, by a dexterous coalition with his old enemy, Fox, he secured the dismissal of Shelburne, was a member of the coalition cabinet in 1783 and thereafter acted with the opposition against Pitt. The last five years of his life Lord North was blind, but still took some interest in politics, and spoke occasionally in the House of Lords, of which he became a member in 1790 upon his father's death. Personally he was clumsy, awkward, very short-sighted, with an unintelligent puffy face, expressionless eyes and heavy lips, closely resembling George III. As Prime Minister he was the king's agent and completely subservient to the obstinate king; indeed, he refused to be called Prime Minister, denying the place of any such office in the British Constitution. After his coalition with Fox he broke with the Crown, however, and refused George III's urgent offers to make him Premier in 1783. He was neither a great statesman nor a great orator, but had a gift of humor, wit and pleasant temper. Consult Donne, 'Correspondence of George III with Lord North' (1867); Lecky, 'History of England' (1882-87); Lewis, 'Administration of Great Britain' (1864); Lucas, Reginald, 'Lord North' (1913).

NORTH, Maranne, English flower painter and botanist: b. Hastings, England, 1830; d. Gloucestershire, England, 1890. She inherited her passionate love of flowers from her father, Frederick North, member of Parliament from Hastings, who retired from public life in 1865. He then traveled with this daughter, who had studied flower-painting under Valentine Bartholomew, visiting nearly every quarter of the globe and exploring the forests of Java, Borneo, India, Chile, North America and Australia, as well as those of Europe, in a search for new specimens. A fever contracted in Borneo was the ultimate cause of her death. Her water-colors, displaying much beauty, as well as scientific accuracy, were exhibited in London in 1879, and she presented her entire collection to the Botanical Gardens at Kew, adding the gift of a gallery in 1882, in which she arranged them herself with great taste. Students of botany owe much to her travels and skilful brush. Five botanical species have been named in her honor. Her autobiography, 'Recollections of a Happy Life,' was edited by her sister, Mrs. John Addington Symonds (2 vols., London 1893), who also published extracts from her diary, 'Further Recollections of a Happy Life'

(London 1893). Consult Hemsley, W. B., 'The Gallery of Marianne North's Paintings of Plants and their Homes,' Royal Garden's View, descriptive catalogue (London 1883).

NORTH, Roger, English colonist in America: b. about 1585; d. 1652. He was the son of Sir John North, and a grandson of Roger, 2d Baron North, and in 1617 accompanied Sir Walter Raleigh to Guiana, did good service against the Spaniards on the Orinoco and remained faithful to his commander to the last. In 1619 he applied for a patent to trade along the Amazon, and, when this was denied him because of Gondomar's influence with the king, he sailed from Plymouth without leave in May 1620, and was imprisoned upon his return. In 1627 he received letters patent to found Guiana, but spent the last years of his life in England. North planted the English power in South America, and was one of the most notable colonial projectors of his day.

NORTH, Roger, English lawyer and historian, brother of Dudley North and Francis North (qq.v.): b. Tostock, Suffolk, 3 Sept. 1653; d. Rougham, Norfolk, 1 March 1734. He studied at Jesus College, Cambridge; became a barrister at the Middle Temple; rose rapidly in the practice of law, becoming Attorney-General to the queen in 1686. He entered Parliament in 1685, and voted against the court party on the question of the dispensing power. As he was a staunch nonjuror, he left political life upon the accession of William and Mary; and spent the rest of his life in retirement. He was a famous book-collector, but is best known for his 'Lives of the Norths,' an invaluable picture of the life of the period, as is his 'Autobiography.' Both these books are included in Bohn's Library (1890). His strong Tory sentiments are to be seen in the 'Examen,' a critical inquiry into the truth of White Kennett's 'History of England.' North also wrote 'Memoires of Musick' (ed. by Rimbault in 1846).

NORTH, Simon Newton Dexter, American statistician: b. Clinton, N. Y., 29 Nov. 1849; d. Wilton, Conn., 3 Aug. 1924. He was graduated at Hamilton College in 1869; was editor of the *Utica Morning Herald* 1869-86. In that year he went to Albany as editor and part proprietor of the *Express*. He was appointed chief statistician for manufacturers of the twelfth census, and in 1903-09 director of the United States Census, in both of which positions he showed exceptional ability. In 1906 he held the chairmanship of the American Tariff Commission to Germany, and in 1910 he was elected president of the American Statistical Association. For 15 years (1888-1903) he was secretary of the National Association of Wool Manufacturers and editor of its *Quarterly Bulletin*. The degree of LL.D. was conferred upon him by Bowdoin in 1902 and the University of Illinois in 1904. His writings include 'History and Present Condition of the Newspaper and Periodical Press in the United States' (1884); 'A Century of American Wool Manufacture, 1790-1890' (1895); 'Old Greek—An Old-Time Professor in an Old-Fashioned College,' a memoir of his father, Dr. Edward North (1905); 'Simeon North—First Official Pistol Maker of the United States' (Concord 1913).

and many pamphlets and articles on economical, educational and industrial subjects.

NORTH, Sir Thomas, English translator of Plutarch, son of the 1st Baron North: b. about 1535; d. about 1601. He studied at Peterhouse, Cambridge; entered Lincoln's Inn 1557; and was knighted about 1591. He has been called 'the first great master of English prose.' In 1579 he published his version of Plutarch's 'Lives,' actually a version from the French of Amyot. It was dedicated to Queen Elizabeth, was very popular in her day and was the immediate source of most of Shakespeare's classical plays, notably 'Antony and Cleopatra,' 'Coriolanus,' 'Julius Cæsar' and 'Pericles,' some of which have entire speeches taken scarcely with a change from North. North also translated Guevara's 'Libro aureo,' a Spanish adaptation of the 'Meditations of Marcus Aurelius'; and a collection of Oriental fables from the Italian of Doni. Consult Skeat, 'Shakespeare's Plutarch' (1875); and Leo, 'Four Chapters of North's Plutarch' (1878). The complete version is to be found in the 'Temple Classics,' and in a splendid reprint in the 'Tudor Translations' (1895).

NORTH, William, American soldier: b. Fort Frederick, Pemaquid, Me., 1755; d. New York, 3 Jan. 1836. He entered the Revolutionary army in 1775 and served under Arnold in the Quebec expedition. In 1779 he was aide-de-camp to Baron Steuben, whom he greatly assisted and who at his death bequeathed to North a large part of his property. He was present at the surrender of Cornwallis and remained in the army after the war, rising to the rank of brigadier-general in 1798. He sat in the New York State assembly, of which he was twice speaker, and from 1789-99 was a United States senator. He was mustered out of service in 1800. He wrote a biography of Baron Steuben.

NORTH ADAMS, Mass., city in Berkshire County, on the Hoosac River and on the Boston and Maine and the Boston and Albany railroads, about 50 miles northwest of Springfield. It was settled in 1765 and was part of Adams until 1878 when it was incorporated as a town and in 1895 was chartered as a city. It includes the villages of Brayton, Greylock, Beaver and Blackington. It is situated in a beautiful section, amid the Berkshire Hills, at the base of Greylock, the highest peak in the State. In the western part of the city is the site of old Fort Massachusetts; captured in 1746 by French and Indians under command of Vaudreuil. In the eastern part of the city is the starting point of the Mohawk Indian trail, a macadamized road of great scenic beauty following the old trail of the Mohawk Indians used in their journeys between the Hudson River and the Connecticut River; built by the State of Massachusetts at a cost of \$350,000. Hudson Brook and its natural bridge are points of interest, and near is the famous Hoosac Tunnel, electrified by the New York, New Haven and Hartford Railroad in 1912. The chief industrial establishments are machine shops, cotton and woolen mills, boot and shoe factories, print-goods factories, creameries and cigar factories. The trade is chiefly in manufactures, farm and dairy products. It has a city hospital, good municipal buildings and a number of fine church edifices. The edu-



A HERD OF WINNIPEG BUFFALO

cational institutions are a State Normal School, high schools, public and parish schools and the North Adams Library. The charter of 1895 provides for a mayor, who holds office one year, and a council. The school committee, assessors and library trustees are elected by popular vote. The city owns and operates the waterworks. Pop. 22,282. Consult Spear, 'History of North Adams'; 'Berkshire Hills'; Rowe and Fairfield, 'North Adams and Vicinity, Illustrated' (North Adams 1898).

NORTH AMERICA. See AMERICA.

NORTH AMERICAN BUFFALO (*Bison Americanus*), the only species of the ox indigenous to America, though the *Bovidae* include the American antelope, Rocky Mountain sheep and goat, and the musk-sheep, or musk-ox. The bison is called buffalo by the Americans and Canadians, although it is very different from the buffaloes of the Old World. A generation ago it was found in vast numbers in the great prairies between the Mississippi and the Rocky Mountains; it occurs as far north as the vicinity of Great Marten Lake, latitude 63° or 64°, extensive level and marshy tracts there affording it suitable food. The American buffalo is very similar to that of Europe. It is generally smaller in size, and is said to attain at times a weight of 2,000 pounds. Its limbs and tail are short and the tail has fewer vertebrae than that of Europe. The horns are shorter and more blunt. The foreparts are still more shaggy, and retain more of that quality in summer. See BUFFALO; BISON.

NORTH AMERICAN INDIANS. See INDIANS, AMERICAN.

NORTH AMERICAN PHALANX, the most important colony founded by the Fourierists in the United States. It was organized in 1843 and located in Monmouth County, N. J., about 40 miles south of New York. The organization was on the joint-stock principle and all the members were engaged in the co-operative labor of the colony; they were paid a certain amount for labor, for talent (or administration) and for capital invested; the rule was to pay the highest prices for the hardest and most disagreeable labor. The labor was at first mostly agricultural, products being sold outside the colony; but later mills were built and a considerable amount of manufacturing done. A common-school education was provided. The life was simple and pleasant, there was a library and reading-room, but the colony lacked many of the elements of culture that distinguished the life of Brook Farm (q.v.). The management was good and for many years the colony prospered; in 1853 dissensions resulted in a secession of some of the members and the founding of a new phalanx; in 1854 the mills were burned down, a serious loss that badly crippled the colony; and in 1856 the organization was formally dissolved. Consult Noyes, 'History of American Socialisms.'

NORTH ANDOVER, Mass., town in Essex County, on the Boston and Maine Railroad and on the Essex River, about 30 miles north of Boston. It was a part of Andover until 1855 when it was incorporated as a town. It is a manufacturing place, but a large portion is reserved for residential purposes and it is noted for its beauty and healthfulness. The chief manufactures are woollen goods, mill ma-

chinery and wood products. The government is administered by town meeting. The waterworks are owned and operated by the town. Pop. (1920) 6,366.

NORTH ANNA, Operations on the. After the loss of 18,000 men in assaulting General Lee's lines at Spottsylvania Court House, General Grant concluded to turn Lee's position by a movement that would bring him nearer to Richmond and possibly interpose his army between Lee and that place. The movement was begun on the night of 20 May 1864 by Hancock's Second corps, which, preceded by Torbert's cavalry, marched for the Mattaponi and North Anna rivers. Torbert attacked and drove Kemper's brigade from an entrenched position at Milford Station and across the Mattaponi, Hancock following and entrenching beyond the river on the 21st. Other corps followed Hancock and Grant's advance reached the North Anna in the forenoon of the 23d at Island and Jericho fords and Chesterfield bridge the latter a mile above where the Richmond and Fredericksburg Railroad crosses the river. But Lee was in his front. He had detected the movement and put his army in motion for Hanover Court House, and on the morning of the 23d was south of the North Anna, in position covering the roads and railroads leading to Richmond. Here he was joined by General Breckinridge from the Shenandoah Valley, and by Pickett's division from near Richmond. Ewell's corps was on the right, Anderson's in the centre and A. P. Hill's on the left. Breckinridge and Pickett were in reserve. General Warren, with the Union Fifth corps, crossed the river at Jericho Ford, constructed a pontoon bridge and at 4.30 p.m. of the 23d his entire corps was in line of battle about half a mile from the river and on the edge of a wood next to it, the front being covered by the wood. Cutler's division was on the right, Griffin's in the centre and Crawford's on the left, its flank resting on the North Anna. About 6 p.m. Wilcox's division of A. P. Hill's corps fell upon Cutler's division and part of Griffin's, driving back Cutler in some disorder, following him and uncovering Griffin's right; but Griffin drew back his right, Bartlett's brigade hastened to his support and Wilcox was driven back with a severe loss in killed and wounded, and nearly 1,000 prisoners. Warren lost about 350 men. About the same time Hancock had prepared to force a passage at Chesterfield bridge. A part of Kershaw's division held a bridgehead north of the stream; that was charged and carried about 6 p.m. by the brigades of Colonels Pierce and Egan, with the loss of 150 men, the Confederates retreating across the river. The crossing of the river by Warren and Wilcox's unsuccessful effort against him forced General Lee to change and shorten his line during the night of the 23d, until it was nearly in the form of a right-angled triangle, with the right angle opposite Ox Ford and extending down the river three-fourths of a mile, then southeast to near Hanover Junction. The left, under A. P. Hill, ran from Ox Ford southwest across the Virginia Central Railroad to Little River. On the morning of the 24th Hancock crossed the river unopposed and began to entrench within 700 yards of Lee's line, where about 6 p.m. Smyth's brigade was attacked and became sharply engaged. Barlow's division was got ready to

attack, but Lee's entrenchments were found so strong that the attack was abandoned. At the same time Wright's Sixth corps crossed the river at Jericho Ford and joined Warren. Burnside's Ninth corps arrived at Ox Ford but could not cross in the front of the blunt angle of Lee's line holding the south side, upon which Potter's division was sent to the left and, crossing lower down, formed on Hancock's right, while Crittenden's division moved up stream to near Quarle's Mill and crossing joined Crawford's division of Warren's corps. Crittenden, supported by Crawford, moved forward to connect with and open the way for Wilcox's division to cross, but was attacked by Mahone's division and was driven back with severe loss. Everywhere Lee was found well entrenched. Grant found himself in a false position; his two wings on one side of a stream, difficult at times to cross and liable to sudden rise by heavy rains, while his centre was on the other side, with Lee's centre like a blunt wedge, standing ready to receive him and interposing between his wings, neither of which could support the other. The trains were ordered to recross the river on the 25th and on the night of the 26th Grant recrossed and, marching to the left 32 miles, crossed the Pamunkey at and near Hanover Town by the afternoon of the 28th, and was in connection with his new base at White House. Consult 'Official Records' (Vol. XXXVI); Humphreys, 'The Virginia Campaign of 1864-65'; Walker, 'History of the Second Army Corps'; Grant, 'Personal Memoirs' (Vol. II); Pennypacker, 'Life of General Meade'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. IV).

E. A. CARMAN.

NORTH ATTLEBORO, ä't-l-bür-ö, Mass., town in Bristol County, on the New York, New Haven and Hartford Railroad, about 30 miles southwest of Boston. It includes the villages of Oldtown, Adamsdale, Falls Village and Robinsonville. It was settled in 1637 and incorporated in 1887. The chief industries of the town are connected with the manufacturing and sale of jewelry. It has establishments for the manufacture of boxes, buttons, braid, cotton yarn, rope, silverware, machinery and supplies for the jewelry business. Some of the prominent buildings are the G. A. R. Memorial Hall, Elks Home, the Holmes Memorial building, the high school and the Richards Memorial Library (public). The government is administered by town meetings. The town owns and operates the electric-light plant and the waterworks. Pop. 9,562.

NORTH BALTIMORE, Ohio, town in Wood County, 36 miles south of Toledo, on the Baltimore and Ohio and the Cincinnati, Hamilton and Dayton railroads. The town was settled in 1842 and incorporated in 1873. It is situated in an oil-field and has a supply of natural gas. Manufactures of oil-well machinery, bricks, stone-ballast and cigars engage the inhabitants and there are also flour-mills and grain elevators. Pop. 2,503.

NORTH BATTLEFORD, Canada, town in the district of Battleford, Saskatchewan, 230 miles northwest of Regina, on the Canadian Northern Railway. It is situated at the union of the Saskatchewan and Battle rivers. The town has a government building, a collegiate institute, electric light and power-

systems, waterworks and market. The industries include machine and engine works, sash and door factories, stone works, cement blocks and sills. Pop. 5,868.

NORTH BAY, Canada, capital of Nipissing district in the province of Ontario, on the north shore of Lake Nipissing, and on the Grand Trunk, Canadian Pacific, Canadian Northern and Temiskaming and Northern Ontario railroads. There are normal and high schools, lumbering and mining industries in the vicinity, planing and saw mills, machine and car repair shops and box factories. North Bay is the headquarters of the French River tourist traffic. Pop. 7,737.

NORTH BRADDOCK, Pa., borough in Allegheny County, on the Pennsylvania Railroad, about six miles east of Pittsburgh and two miles east of Homestead. It was a part of Braddock until 1897 when it was incorporated as a separate township. It has extensive steel rail interests, but a portion of the borough is a residential reserve. The government is vested in a burgess, who holds office three years, and a council. Pop. 14,928.

NORTH BROOKFIELD, Mass., town in Worcester County, 15 miles west of Worcester, on the Quaboag River and a branch of the Boston and Albany Railroad. It owns a public library and municipal waterworks. The industries include boots, shoes, rubber-goods, overalls and woolen and cotton fabrics. Pop. about 3,075.

NORTH CAPE, a promontory of Magerö Island, off the northern coast of Norway, in lat. 71° 11' N. It rises 968 feet above the sea and is regarded as the northernmost point of Europe, although a point nearby, the Knio-skjoerodde, is really a few minutes further north.

NORTH CAROLINA, kār-ō-lī'nā, one of the original 13 colonies, midway between Maine and Florida; bounded by Virginia on the north, by Tennessee on the west, by South Carolina and Georgia on the south and southwest and the Atlantic Ocean on the east. It extends from lat. 33° 51½' to 36° 34' N., and long. 75° 27' to 84° 20' W. from Greenwich, taking the greatest width each way. Tennessee originally was part of North Carolina, but in 1790 was ceded by it to the United States.

Area.—North Carolina ranks the 19th State in size in the Union, and is the largest on the Atlantic Coast save Georgia and Florida. It contains 52,286 square miles (including the area 3,620 square miles of its sounds and rivers) and is slightly larger than England. Its surface is very nearly a one thousandth part of the land area of the globe. Its greatest length from east to west from "Cherokee to Currituck" is more than 500 miles and its greatest width north and south is 188 miles.

Topography.—The State is divided by nature into three divisions—eastern, which is generally level, with many swamps and sandy, farther back with two great sounds near the ocean, the Albemarle and Pamlico; the central or hilly regions; and the western, which is mountainous. The coast line of more than 300 miles runs at first east of south, thence southwest. Along the whole ocean coast stretches a chain of narrow, barren sand banks, broken occasionally by inlets which are constantly changing, occasionally filling up entirely in the course

NORTH CAROLINA

Abbotsburg, (G4)	78	Brookford, (B2) ..	709	Crumpler, (B1)...	100	Fayetteville, (G3) ..	8,877	Highpoint, (D2) ..	14,302
Aberdeen, (F3)...	858	Browns Summit,		Culberson, (A7)...	190	Flatrock, (E7)...	300	Highshoals, (B3) ..	600
Acme, (H5).....	183	(E1).....	100	Cullasaja, (C7) ..	250	Floral College, (F4) ..	190	Hildebran, (A2)...	172
Addor, (E3).....	113	Bryson City, (B7) ..	882	Cumberland, (G3) ..	80	Forest City, (A3) ..	2,312	Hillsboro, (F1)...	1,180
Advance, (C2)...	280	Buffalo City, (N2)	203	Cummock, (F2)...	200	Forestville, (H2) ..	137	Hobbsville, (L1) ..	150
Ahoskie, (L1)...	1,429	Buies, (F4).....	78	Currie, (H5).....	100	Fork, (D2).....	300	Hobgood, (K1)...	336
Albemarle, (D3) ..	2,691	Buies Creek, (G3) ..	291	Currituck, (N1)...	200	Fort Barnwell, (K3)	140	Hobucken, (L3)...	200
Alexander, (D6) ..	118	Bunn, (H2).....	150	Dallas, (B3).....	1,397	Fort Landing, (M2)	300	Hoffman, (F3)...	385
Alexis, (B3).....	110	Burgaw, (J4).....	1,040	Danbury, (D1)...	400	Fountain, (J2)...	243	Hollister, (J1)...	500
Almond, (B7).....	146	Burlington, (F1) ..	5,952	Davidson, (C3)...	1,156	Fouroaks, (H3)...	583	Holly Springs, (G2)	333
Altamahaw, (F1) ..	300	Burnsville, (E6)...	422	Davidsons River,		Franklin, (C7)...	773	Hollyville, (L3) ..	107
Andrews, (B7)...	1,634	Buxton, (N3).....	300	(D7).....	150	Franklinton, (H1) ..	1,058	Hookerton, (J3) ..	294
Angier, (G2).....	375	Bynum, (F2).....	150	Davis, (L4).....	250	Franklinville, (E2) ..	631	Hoover Hill, (E2) ..	200
Ansonville, (D3) ..	300	Calypso, (H3)...	405	Daybook, (E6)...	300	Fremont, (H2)...	1,294	Hope Mills, (G4) ..	783
Apex, (G2).....	926	Camden, (M1)...	100	Delco, (H5).....	210	Frisco, (N3).....	150	Hot Springs, (D6) ..	495
Arapahoe, (L3) ..	250	Cameron, (F3)...	241	Dellwood, (C6)...	150	Fuquay Springs, (G2) ..	555	Howard, (L2).....	200
Archdale, (E2) ..	178	Candor, (E3).....	267	Denton, (D2)...	559	Garland, (H4)...	301	Hudson, (B2).....	403
Arden, (D7).....	151	Canton, (D6)...	2,584	Denver, (B2)...	243	Garner, (C7)...	376	Howardsville, (C3) ..	833
Arthur, (K2).....	104	Capelsie, (E3)...	400	Deppe, (K4).....	130	Garysburg, (J1)...	263	Huntersville, (C4) ..	447
Ashboro, (E2)...	2,559	Caroleen, (A3)...	1,892	Derita, (C3).....	100	Gaston, (E6).....	100	Icemorale, (C3)...	837
Asheville, (D6) ..	28,504	Carboro, (F2)...	1,129	Dillsboro, (C7) ..	228	Gastonia, (B3)...	12,871	Idalia, (L3).....	100
Atkinson, (H4) ..	296	Carthage, (F3)...	962	Dobson, (C1)...	368	Gates, (L1).....	150	Indiantrail, (C3) ..	224
Atlantic, (M4)...	610	Cary, (G2).....	645	Double Shoal, (A3)	100	Gatesville, (L1) ..	203	Ingold, (H4).....	124
Aulander, (K1)...	803	Casar, (A2).....	300	Dover, (K3).....	670	Germantown, (D1) ..	132	Iron Station, (B3) ..	223
Aurora, (L3).....	524	Cash Corner, (L3) ..	130	Draper, (E1)...	1,000	Gibson, (E4).....	264	Ivanhoe, (H4)...	170
Autryville, (G3) ..	99	Castalia, (J1)...	263	Drexel, (A2)...	392	Gibsonville, (E1) ..	1,302	Jackson, (K1)...	579
Avoca, (L1).....	150	Catawba, (B2)...	250	Drumhill, (L1) ..	100	Gilkey, (A3).....	200	Jackson Hill, (D2) ..	150
Avon, (N3).....	400	Cedar Creek, (G4)	100	Dublin, (G4)...	99	Glen Alpine, (A2) ..	346	Jacksonville, (K4) ..	656
Ayden, (K3).....	1,673	Cedar Falls, (E2) ..	222	Duck, (M1).....	100	Glen Raven, (F1) ..	350	Jalong, (G1).....	100
Aydlett, (N1)...	150	Central Falls, (E2)	500	Dudley, (H3)...	240	Glenwood, (E1)...	132	James City, (K3) ..	1,200
Azalea, (E6).....	100	Cerrogrado, (G5) ..	261	Duke, (G3).....	500	Godwin, (G3).....	90	Jamestown, (E2) ..	150
Badin, (D3).....	800	Chadborn, (G5) ..	1,121	Dunn, (G3).....	2,805	Goldhill, (D2)...	261	Jamessville, (K2) ..	389
Bailey, (H2).....	518	Chapel Hill, (F2) ..	1,483	Durham, (G2)...	21,719	Goldpoint, (K2)...	130	Jerry, (M2).....	200
Bakersville, (E5) ..	332	Charlotte, (C3) ..	46,338	Eagle Rock, (H2) ..	100	Goldsboro, (J3) ..	11,296	Jarvis, (B1).....	100
Balsam Grove, (D7)	190	Cherry, (M2).....	99	Eagle Springs, (E3)	100	Goldston, (F2)...	239	Jarvisburg, (N1) ..	400
Banners Elk, (A1) ..	264	Cherryfield, (D7) ..	200	Earl, (B3).....	100	Grace, (D6).....	100	Jason, (J3).....	60
Barco, (M1).....	190	Cherryville, (B3) ..	1,884	Earleys, (K1)...	300	Graham, (F1)...	2,336	Jefferson, (B1)...	196
Barium Springs, (C2)	110	Chestnutridge, (C1)	100	East Bend, (D1) ..	508	Grandy, (N1)...	100	Julian, (E2).....	100
Bartlett, (M1)...	105	China Grove, (C2)	1,027	East Durham, (G2)	1,500	Granite Falls, (B2) ..	101	Jonesboro, (G2)...	886
Bath, (L3).....	274	Chinquapin, (J4) ..	350	East Kings Moun-		Granite Quarry, (D2)	466	Jonesville, (C1)...	787
Battleboro, (J1) ..	309	Chocowinity, (K2)	127	tain, (B3).....	835	Grappiteville, (E6)	100	Jupiter, (D6).....	87
Bayboro, (L3)...	349	Cisco, (L1).....	100	Eastlake, (N2)...	250	Grass Creek, (C1) ..	100	Kannapolis, (C3) ..	900
Bear Creek, (F2) ..	280	Claremont, (B3) ..	435	East Laurinburg,		Greenmountain, (E5)	100	Kelford, (K1)...	223
Beagrass, (K2)...	108	Clarendon, (G5) ..	135	(F4).....	541	Green Park, (A1)...	100	Kenansville, (J4)...	302
Beaufort, (L4)...	2,968	Clark, (K3).....	250	East Lumberton,		Greensboro, (E1) ..	19,861	Kenly, (H2).....	827
Bee Log, (E6).....	150	Clarkton, (G5)...	368	(G4).....	1,011	Greenville, (K2)...	5,772	Kernersville, (D1) ..	1,219
Bee Tree, (E6)...	200	Clayton, (H2)...	1,423	East Monbo, (C2) ..	250	Gregory, (M1)...	150	Kerr, (H4).....	100
Becross, (M1)...	150	Claymons, (D2) ..	100	East Spencer, (D2)	2,239	Gritton, (K3).....	375	Kimesville, (E2) ..	150
Belhaven, (L2) ..	1,816	Cleveland, (C2)...	366	Edenton, (L1) ..	2,777	Grimesland, (K2) ..	463	King, (D1).....	200
Belmont, (B3)...	2,941	Cleveland Mills, (A3)	400	Edgemont, (A2) ..	100	Grover, (B3).....	296	Kingsdale, (F4) ..	100
Belvidere, (L1) ..	100	Cliffside, (A3)...	1,000	Edward, (L3)...	153	Guilford, (E1)...	130	Kings Mountain,	
Belwood, (A2)...	140	Clinton, (H4)...	2,110	Elford, (F1)...	300	Guilford College,		(E3).....	2,800
Bennett, (E2)...	190	Clyde, (D7).....	363	Elhanan, (E6)...	150	(E1).....	200	Kinston, (G2)...	9,771
Benson, (H3)...	1,123	Coats, (G3).....	526	Elizabeth City,		Gulf, (F2).....	200	Kipling, (K2)...	150
Benton Heights, (C3)	324	Coifield, (L1)...	100	(M1).....	8,925	Gumneck, (M2)...	350	Kittrell, (H1)...	223
Bessemer City, (B3)	2,176	Cojnock, (M1)...	150	Elizabethtown, (G4)	335	Guyton, (G4)...	160	Kitty Hawk, (N1)	100
Bethania, (D1)...	110	Colerain, (L1)...	215	Elkin, (C1).....	1,195	Haliifax, (J1)...	299	Knotts Island, (N1)	250
Bethel, (K2).....	817	Coleridge, (E2) ..	100	Elkpark, (E5)...	452	Hallsboro, (G5) ..	180	Lagrange, (J3)...	1,399
Beulahville, (J4) ..	354	Colfax, (E1).....	100	Ellenboro, (A3) ..	383	Hamilton, (K2)...	474	Lake Comfort, (M3)	300
Big Lick, (D3)...	162	Colington, (N1)...	200	Ellerbe, (E3)...	473	Hamlet, (E4)...	3,808	Lake Landing, (M3)	300
Biltmore, (D6)...	172	Collettsville, (A2) ..	123	Elm City, (J2)...	725	Hampton, (A3)...	175	Lake Toxaway, (D7)	100
Biscoe, (E3).....	755	Columbia, (M2) ..	738	Elmwood, (C2) ..	150	Hamptonville, (C1)	100	Lakeview, (F3)...	100
Blackcreek, (J2) ..	274	Columbus, (E7)...	168	Elon College, (E1) ..	425	Harbinger, (N1)...	500	Lake Waccamaw,	
Black Mountain,		Como, (K1).....	300	Elrod, (F4).....	170	Harkers Island, (L4)	200	(G5).....	237
(E6).....	531	Concord, (C3)...	9,903	Embro, (H1)...	160	Harmony, (C2)...	200	Landis, (C2).....	972
Bladenboro, (G4) ..	459	Conetoe, (K2)...	160	Enfield, (J1)...	1,648	Harrellsville, (L1) ..	131	Lasker, (K1).....	196
Blowing Rock, (A1)	133	Connelys Springs,		Engelhard, (N2) ..	300	Harrisburg, (C3) ..	100	Lattimore, (A3)...	262
Bluff, (D6).....	140	(A2).....	500	Enochville, (C2) ..	81	Hassell, (K2)...	85	Laurelhill, (E4)...	350
Boardman, (G5) ..	828	Conover, (B2)...	681	Eskota, (E6).....	200	Hatteras, (N3)...	250	Laurinburg, (E4) ..	2,643
Bolivia, (H5)...	199	Contentnea, (J2) ..	246	Eure, (L1).....	100	Hawriver, (F1)...	950	Lawndale, (A3)...	774
Bolton, (H5)...	699	Conway, (K1)...	294	Eureka, (J2)...	187	Hayesville, (B7) ..	257	Leaksville, (E1) ..	1,603
Bonlee, (F2).....	178	Coolemece, (C2) ..	2,000	Everetts, (K2)...	230	Haywood, (F2)...	141	Leasburg, (F1)...	300
Bonnerton, (L3) ..	100	Gordova, (E4)...	250	Evergreen, (G5) ..	139	Hazelwood, (C7)...	484	Leechville, (L2) ..	151
Bonsal, (G2).....	85	Corepoint, (L3) ..	120	Excelsior, (H5) ..	130	Helton, (B1).....	200	Leicester, (D6)...	153
Boomer, (B1).....	100	Cornelius, (C3) ..	1,141	Fairbluff, (F5)...	397	Hemp, (E3).....	100	Lenoir, (A2)...	3,718
Boone, (A1).....	374	Corolla, (N1)...	100	Fairfield, (M2)...	250	Henderson, (H1) ..	5,222	Lewara, (E4)...	424
Boonford, (E6)...	100	Council, (H5)...	92	Fairmont, (F5) ..	1,000	Hendersonville, (E7)	3,720	Lewiston, (K1)...	244
Boonville, (C1) ..	162	Cove City, (K3) ..	258	Fairview, (E7)...	130	Hennietta, (A3)...	1,856	Lewington, (D2) ..	5,254
Bosley, (L1).....	100	Crabtree, (D6)...	100	Faison, (H3)...	477	Henry, (B2).....	100	Liberty, (E2)...	636
Bostic, (A3).....	206	Cramerton, (B3) ..	200	Faith, (D2).....	348	Hertford, (L1)...	1,704	Lilesville, (E3)...	440
Bowdens, (H3) ..	418	Cranberry, (F5) ..	400	Falcon, (G3)...	200	Hickory, (B2)...	5,076	Lillington, (G3) ..	593
Brevard, (D7)...	1,658	Credmoor, (G1) ..	392	Falkland, (K2) ..	198	Hiddenite, (B2)...	250	Lilly, (M1).....	100
Bridgeton, (K3) ..	548	Creston, (A1)...	100	Fallston, (B3)...	200	Highfalls, (F3)...	150	Lincolnton, (B3) ..	3,390
Bridgewater, (A2) ..	200	Creswell, (M2)...	393	Farmington, (C1)	150	Highlands, (B2)...	1,062	Linden, (G3).....	191
Broadway, (G3)...	250	Crouse, (B3)...	209	Farmville, (J2) ..	1,780	Highlands, (C7)...	313		





NORTH CAROLINA - Cont'd.

Linville, (F5)....	250	Mount Olive, (H3) 2,297	Potocasi, (K1)....	130	Sidney, (L3).....	150	Vandemere, (L3)..	308
Linwood, (D2)....	150	Mount Pleasant, (D3) 770	Powells Point, (N1)	400	Siler City, (F2)....	1,253	Vass, (F3).....	467
Littleton, (J1)....	1,010	Moyock, (M1)....	Powellsville, (L1) ..	157	Siloam, (C1).....	350	Vaughan, (J1)....	273
Locust, (D3)....	95	Murfreesboro, (K1) 621	Princeton, (H3)....	403	Skyland, (D7)....	150	Verona, (K4)....	100
Longisland, (B2) ..	200	Murphy, (A7)....	Princeville, (K2) ..	562	Sladesville, (L3) ..	150	Waco, (B3).....	189
Long View, (B2) ..	755	Nags Head, (N2) ..	Proctor, (B7).....	200	Smithfield, (H2) ..	1,895	Wade, (G3).....	190
Louisburg, (H1) ..	1,954	Nashville, (J2)....	Proctorville, (F5) ..	204	Smokemont, (C6) ..	100	Wadesboro, (D4) ..	2,648
Lowell, (B3).....	1,151	Nealsville, (F6)....	Punch, (L2).....	300	Smyrna, (L4)....	110	Wagram, (F4)....	174
Lowesville, (C3) ..	150	Nebo, (F6).....	Raeoford, (F4)....	1,235	Sneads Ferry, (K4)	140	Wakefield, (H2) ..	287
Lucama, (H2)....	316	Newbern, (K3)....	RALEIGH, (G2) 24,418		Snowden, (M1)....	100	Wake Forest, (G1)	1,425
Lumber Bridge, (F4)	202	Newell, (C3)....	Ramseur, (E2)....	1,014	Snow Hill, (J3)....	700	Walkertown, (D1) ..	400
Lumberton, (B4) ..	2,691	Newhill, (G2)....	Randleman, (E2) ..	1,967	Sound, (L2).....	300	Wallace, (H4)....	648
Lynn, (E7).....	200	Newland, (A1)....	Red Hill, (E5)....	100	South Biltmore, (D6)	245	Walnut, (D6)....	215
McAdenville, (B3)	1,162	Newlife, (B1)....	Red Springs, (F4) 1,018		South Creek, (L3) ..	326	Walnutcove, (D1) ..	651
McCullers, (G2) ..	120	New London, (D3) 228	Reidsville, (E1)....	5,333	Southern Pines, (F3)	743	Walstonburg, (J2) ..	158
McDonalds, (F4) ..	120	Newport, (L4)....	Rennett, (G4)....	292	South Mills, (M1) ..	373	Wanchese, (N2)....	250
McFarlan, (D4)....	219	Newton, (B2)....	Richdiss, (B2)....	835	Southport, (H6)....	1,664	Warren Plains, (H1)	130
Maccalesfield, (J2)	294	Newtown Grove, (H3) 125	Richfield, (D3) ..	177	Southside, (B3) ..	200	Warrensville, (B1)	100
Mackeys, (L2)....	230	Norlina, (H1)....	Richlands, (J4)....	548	South Wadesboro,		Warrenton, (H1) ..	927
Macon, (H1)....	149	North Charlotte, (C3) 800	Rich Square, (K1) ..	475	(D4).....	293	Warsaw, (H4)....	1,108
Madison, (D1)....	1,247	North Harlowe, (L4) 220	Riddle, (M1)....	100	Sparta, (B1)....	159	Washington, (K2) ..	6,314
Maggie, (C6)....	150	North Lumberton, (G4) ..	Ridgecrest, (E6) ..	200	Spencer, (D2)....	2,510	Waterlily, (N1) ..	150
Magnetic City, (E5)	100		Ridgeway, (H1)....	300	Spindale, (A3)....	100	Watha, (J4)....	181
Magnolia, (J4)....	694	Northwilesboro,	Ringwood, (J1)....	147	Spoutsprings, (G3)	500	Waxhaw, (C4)....	750
Maiden, (B2)....	1,266	(B2).....	Roanoke Rapids,		Spray, (E1)....	1,250	Waynesville, (D7) ..	1,942
Makelyville, (M3)	150	Newwood, (D3) ..	(J1).....	3,369	Spring Hope, (E2)	1,221	Wayzerville, (D6) ..	606
Mamie, (N1)....	100	Oakboro, (D3)....	Roaring River, (B1)	100	Spruce Pine, (E6) ..	717	Webbs, (B2)....	100
Manchester, (G3) ..	200	Oak City, (K2)....	Robbinsville, (B7)	119	Stacy, (M4)....	200	Webster, (C7)....	74
Manly, (F3)....	141	Oakley, (K2)....	Robbrell, (E4)....	476	Staley, (E2)....	157	Weeksville, (M1) ..	100
Manns Harbor, (N2)	100	Oak Ridge, (D1) ..	Robersonville, (K2) 1,199		Stallings, (H1) ..	150	Weldon, (J1)....	1,872
Manson, (H1)....	100	Ocracoke, (M3) ..	Rockford, (C1)....	100	Stanley, (B3)....	584	Wendell, (H2)....	1,239
Manteo, (N2)....	394	Ola, (C6)....	Rockingham, (E4) 2,509		Stantonsburg, (J2)	424	Wentworth, (E1) ..	250
Maple, (M1)....	150	Old Fort, (E6)....	Rockwell, (D2)....	453	Star, (E3)....	467	West Durham, (F2)	2,000
Mapleton, (K1)....	99	Olds, (M1)....	Rocky Mount, (J2) 12,742		Stateroad, (C1) ..	120	West End, (F3)....	100
Marble, (B7)....	166	Old Sparta, (J2) ..	Rocky Mount Mills,		Stateville, (C2) ..	7,895	West Hickory, (B2)	1,266
Marbleville, (K1)	147	Oldtrap, (N1)....	(J2).....	833	Stecoh, (B7)....	130	West Jefferson, (A1)	462
Marion, (F5)....	85	Olin, (C2)....	Rocky point, (J5) ..	300	Stedman, (G3)....	121	West Lumberton,	
Marion, (F6)....	1,784	Olive Branch, (D3)	Rodanth, (N2)....	150	Steadman, (G3)....	290	(G4).....	231
Mariposa, (B3) ..	100	Orehill, (F2)....	Roe, (M4)....	150	Stem, (G1)....	245	West Raleigh, (G2)	120
Marlboro, (J2) ..	225	Oreill, (L3)....	Ronda, (C1)....	150	Stem, (G1)....	245	Westray, (J1)....	48
Marshall, (E6) ..	748	Orrum, (G5)....	Roper, (L2)....	1,043	Stokes, (K2)....	138	Wesley, (A1)....	150
Mars Hill, (D6) ..	364	Osgood, (F2)....	Roseboro, (G4)....	749	Stokesdale, (E1) ..	179	Whitakers, (J1) ..	723
Marshville, (D3) ..	828	Otula, (N1)....	Rosedale, (M1) ..	150	Stoneville, (D1) ..	472	Whitehall, (J3) ..	164
Mashoes, (N2)....	828	Otanol, (E7)....	Rosehill, (J4)....	516	Stony Point, (C2)	400	White Plains, (C1)	250
Mathews, (C3) ..	310	Otway, (L4)....	Rosemary, (J1)....	100	Stoval, (G1)....	414	Whiteville, (G5) ..	1,664
Maury, (J2)....	61	Oxford, (G1)....	Rosman, (D7)....	527	Stubbs, (A3)....	200	Whitell, (A2)....	100
Mayfield, (F4)....	1,397	Pactolus, (K2)....	Rougemont, (F1) ..	150	Stumpypoint, (N2)	200	Whittier, (C7)....	261
Mayodan, (D1)....	1,886	Paincourt, (D6) ..	Rowland, (F4)....	767	Sugar Grove, (A1)	200	Wilbanks, (J2)....	45
Maysville, (K4) ..	536	Palmyra, (K1) ..	Roxboro, (G1)....	1,651	Summerfield, (E1)	250	Wildwood, (L4)....	100
Mechane, (F1)....	1,351	Pantego, (L2)....	Roxobel, (K1)....	330	Sunbury, (L1)....	200	Wilkesboro, (B1) ..	814
Medina, (B6)....	150	Parkersburg, (H4)	Royall Cotton Mills,		Supply, (H6)....	150	Wilkins, (G1)....	100
Menol, (K1)....	150	Parkwood, (F3) ..	(G1).....	442	Swanquarter, (M3)	184	Willardville, (G1) ..	100
Merryhill, (L1) ..	170	Parkton, (G4)....	Ruffin, (E1)....	250	Swansboro, (K4) ..	420	Williams, (D1)....	53
Merry Oaks, (G2) ..	118	Parnele, (K3)....	Ruralhall, (D1) ..	300	Sweponville, (F2)	520	Williamston, (K2) ..	1,800
Mesic, (L3)....	200	Patterson, (A2) ..	Ruth, (A3)....	200	Swiss, (E6)....	120	Williston, (M4) ..	200
Mica, (E6)....	100	Patterson Springs,	Rutherford College,		Sylva, (C9)....	863	Wilmington, (H5)	33,372
Micaville, (E6) ..	100	(B3).....	(A2).....	275	Tabor, (G5)....	782	Wilmot, (C7)....	100
Micro, (H2)....	183	Peachland, (D3) ..	Rutherfordton,		Taft, (D6)....	130	Wilson, (J2)....	10,612
Middleburg, (H1)	104	Peedee, (E4)....	(A3).....	1,693	Tamarack, (A1) ..	250	Windsor, (K1)....	1,210
Middlesex, (H2) ..	697	Pelham, (F1)....	Saint Helena, (J4) ..	100	Tarboro, (J2)....	4,568	Windy Gap, (B1) ..	100
Milledown, (M3) ..	200	Pembroke, (F4) ..	Saint Pauls, (G4) ..	1,147	Taylorsville, (B2)	1,122	Winfall, (M1)....	288
Mill Spring, (E7) ..	150	Pendleton, (K1) ..	Salem, (H3)....	215	Teachys, (H4)....	164	Wingate, (D3)....	470
Milton, (F1)....	375	Pensacola, (E6) ..	Salisbury, (D2) ..	13,884	Tarheel, (G4)....	100	Winston Salem,	
Milwaukee, (K1) ..	197	Pikeville, (J3)....	Saluda, (E7)....	549	Thelma, (J1)....	130	(D1).....	48,395
Mineral Springs,		Pilot, (H2)....	Salvo, (N2)....	100	Thomas, (H4)....	150	Winterville, (K2) ..	650
(C4).....	84	Pilot Mountain, (C1)	Sandy Ridge, (D1)	250	Thomasville, (D2) ..	5,676	Winton, (L1)....	489
Mint Hill, (C3) ..	194	Pinebluff, (E3) ..	Sanford, (F2)....	2,977	Tillery, (J1)....	269	Wood, (H1)....	193
Mocksville, (C2) ..	1,146	Pinelevel, (H2) ..	Sarem, (L1)....	100	Todd, (A1)....	92	Woodard, (L2)....	150
Monbo, (C2)....	150	Pineola, (A1)....	Saxapahaw, (F2) ..	100	Topsy, (L1)....	100	Woodland, (K1) ..	400
Monroe, (G2)....	136	Pinetops, (J2)....	Scotland Neck, (K1) 2,051		Towansville, (H1) ..	206	Woodleaf, (C2) ..	187
Monroe, (C3)....	4,084	Pinetown, (L2) ..	Scranton, (M3)....	200	Trenton, (K3)....	488	Woodleigh, (M1) ..	150
Montezuma, (F5) ..	167	Pineview, (G3) ..	Seaboard, (K1)....	280	Trinity, (E2)....	400	Woodville, (M1) ..	381
Mooreboro, (A3) ..	228	Pineville, (C3) ..	Seagrove, (E2)....	189	Troutmans, (C2) ..	342	Worthville, (E2) ..	367
Mooreville, (C2)	4,315	Pink Hill, (J3)....	Seagull, (M1)....	150	Troy, (E3)....	1,102	Wrightsville, (J5)	270
Morehead City,		Pinnacle, (C1)....	Sealevel, (M4) ..	130	Tryon, (E7)....	1,067	Wrightsville Beach,	
(L4).....	2,958	Pisgah Forest, (D7)	Selma, (H2)....	1,601	Tuckertown, (D2) ..	200	(J5).....	20
Morganton, (A2) ..	2,867	Pittsboro, (F2) ..	Selwin, (L1)....	100	Tunis, (L1)....	142	Wysoking, (M3) ..	350
Morrisville, (G2) ..	166	Pleasant Hill, (J1)	Sevensprings, (J3) ..	250	Turkey, (H3)....	146	Yadkin College, (D2)	130
Mortimer, (A1) ..	188	Plymouth, (K1) ..	Severn, (K1)....	284	Turnersburg, (C2)	100	Yadkinville, (C1) ..	445
Morven, (D4)....	631	Point Caswell, (H5)	Shallotte, (K1) ..	174	Tyner, (L1)....	500	Yanceyville, (F1) ..	338
Mountain Island, (B3) 347		Point Harbor, (N1)	Sharpsburg, (J2) ..	334	Union, (L1)....	147	Yatesville, (L2) ..	100
Mountair, (C1) ..	4,752	Polkton, (D3)....	Shawboro, (M1) ..	150	Union Mills, (A3) ..	156	Yountsville, (H1) ..	414
Mount Gilead, (E3) 975		Pollokville, (K4) ..	Shelby, (A3)....	3,609	Unionville, (C3) ..	135	Zebulon, (H2)....	953
Mount Holly, (B3) 1,160		Pomona, (E1)....	Shelmerdine, (K3) ..	93	Valdese, (A2)....	200	Zephyr, (C1)....	150
Mount Mitchell, (E6) 100		Poplarbranch, (N1)	Shiloh, (M1)....	130	Vanceboro, (K3) ..	540		

of years and new ones being opened by storms. The eastern division extends inland from the ocean about 150 miles. The dividing line between it and the central division trends southwardly and was once the shore line of the ocean, all east of it having been in prehistoric ages the bed of the sea. This line is clearly marked by the falls of the rivers. This eastern division contains the two great sounds already named into which the Chowan, the Roanoke, the Tar, the Neuse and other rivers pour their waters. Farther south, the Cape Fear and its tributaries empty directly into the Atlantic. The central division, beginning at an elevation above sea-level of about 200 feet, extends an average width of 200 miles westwardly, rising gradually to an average elevation of 1,200 feet or more at the foot of the Blue Ridge. The western part of this central region is called the "Piedmont section." The western division contains 6,000 square miles and has an average elevation of 2,500 feet. The highest peaks east of the Rocky Mountains are to be found here. The highest of them, Mount Mitchell, is 6,688 feet. There are no less than 24 peaks which are higher than Mount Washington in New Hampshire. The principal mountain ranges are the Blue Ridge and Great Smoky Range, but there are also the Black Mountains and the Balsam. The general trend is from northeast to southwest.

Rivers.—The rivers of North Carolina are numerous, but they are navigable only to the falls, the old shore line of the ocean in the east, hence the grand total of near 3,500 miles (of which scarcely more than 400 miles is navigable) indicates a vast water power which marks out the future of this State as one of the greatest manufacturing States in the Union. Indeed it may be well doubted if there is another which equals it in water power. At the "narrows of the Yadkin" the river has a fall of 50 feet in a distance of two miles.

Sounds and Lakes.—Besides the two great sounds, Albemarle and Pamlico, there are smaller ones, Currituck, Croatan, Roanoke, Core and Bogue. There are many lakes, the largest being Alligator, Phelps, Mattamuskeet, Pungo and Waccamaw. The largest (Mattamuskeet) has an area of 100 square miles, and Lake Phelps is about half as large.

Capes and Bays.—From the shore-line jut out Cape Hatteras and Cape Lookout, between which is Raleigh Bay. Lower is Cape Fear, between which and Cape Lookout lies Onslow Bay. South of Cape Fear is Long Bay. The ocean front of North Carolina is considered the most dangerous on the Atlantic seaboard.

Islands.—Roanoke Island between Albemarle and Pamlico sounds is the largest in the State and has an area of about 25 square miles. This island was the scene of the first English settlement on this continent, in July 1585. Here also was born the first child of the English race on this continent, Virginia Dare, 18 Aug. 1587. This colony made under the auspices of Sir Walter Raleigh (in whose honor the capital of the State is named) was soon abandoned. Cedar Island is nearly as large. Smith's Island at the mouth of the Cape Fear has nearly 15 square miles.

Climate and Rainfall.—The mean temperature is 59 degrees or about the average tem-

perature of the northern hemisphere. The State is on the same isothermal line as middle California, southern France and northern Italy. The rainfall is 60 inches for the eastern belt, 45 inches for the central and 58 inches for the western.

Geology.—The eastern division is covered with a stratum 50 to 300 feet thick of Tertiary sands and clays. It shows numerous marl deposits and phosphate beds. Through the central part of the State is a three-foot seam of triassic, not carboniferous, coal which is estimated to cover 70 square miles. The western part of the State shows azoic formations only.

Soil.—The soil of the eastern division is generally sandy. Along the rivers are extensive bottom lands of clayey loam, which are very fertile, while the swamp lands have a deep peaty black soil, and when drained are exceedingly fertile. In the central and western divisions the soil is clay, and gravelly or sandy loam.

Agricultural Products.—North Carolina is the only State that fills every blank in the census of farm products, yielding all the crops grown in both the northern and southern sections of the Union. Its greatest crops, however, are corn, cotton and tobacco. Cotton is grown in the eastern division and in the southern half of the central division. The yield in 1912 was 1,106,000 bales, eight times the quantity produced by this State in 1861, being the largest percentage of increase shown by any State since the Civil War, save Texas. In tobacco production North Carolina is second only to Kentucky and the area has been steadily increasing. Nine-tenths of the tobacco known in the markets of the world as "Virginia Brights" is grown in North Carolina. Durham is the largest shipper of manufactured tobacco in the country. Corn is grown in every county. Rice is produced in large quantities in the eastern division and in the production of sweet potatoes the State stands first. In the last few years there has sprung up a great trucking industry, which extends from Currituck to Brunswick. Grape culture has largely increased of late years and before prohibition no small quantity of wine was produced and shipped.

Timber.—The extent and value of the forests are especially noteworthy ranging from the palmetto, magnolia and live oak around Wilmington to the fir, hemlock and white pine in the mountains of the west. The vast quantities of pine and cypress, and of hardwoods, especially oak, hickory, ash, walnut and gum, have not only attracted saw mills, but have created large furniture factories at High Point and at other places. High Point has the largest output of furniture in the Union except Grand Rapids, Mich. Of the various species of trees found in the States east of the Rocky Mountains all the eight varieties of pine, the seven varieties of magnolia, the five varieties of maple and both varieties of walnut are found in North Carolina, while it produces 19 out of the 20 varieties of oak, four out of the five varieties of spruce, three each out of the five varieties of elm and birch respectively and six of the eight varieties of hickory. Immense quantities of turpentine, resin, tar and pitch are also produced from the vast tracts of pine forests.

Fauna.—Deer, red and gray foxes, rac-

coons, squirrels, opossums and rabbits are numerous, while wolves, bear, wildcats, beavers and others are still to be found. Swan, geese, brant and wild duck swarm in the sounds, bays and rivers of the east in the cold months, while in all parts of the State quail, woodcock, snipe, doves and wild pigeons, larks and many other birds are numerous. The attraction to sportsmen has been so great that a close season for game has been enacted by the legislature, and an Audubon Society has been authorized by the legislature for the protection of birds.

Fisheries.—More than 20,000 men are employed in the fisheries on the sounds and at the mouths of the rivers. More than \$2,500,000 capital is invested. The shad and herring fisheries are especially valuable. Some of the seines are from a mile to three miles long and are operated by steam power. There are 26 counties interested in this industry, the principal ones being Currituck, Pasquotank, Chowan, Bertie, Beaufort, Dare, Pamlico, Craven, Carteret, Onslow, New Hanover and Brunswick. Herring are mostly cured in salt and shipped in barrels, but the shad, striped bass, chub, perch and other fish are shipped on ice, the large fisheries having each its own ice factory. The State in 1876 organized its fish commission, establishing fish hatcheries which largely increased the catch of fish. Of recent years the United States government has taken over this work and has a shad and herring hatchery at Edenton and a similar establishment for rock bass and salmon at Weldon, at the falls of Roanoke River. The young fish thus hatched are set free in all the principal rivers and waters of the State and in other States, some being shipped even to the rivers of the Pacific coast. The oyster and shellfish industry in the eastern waters are also of great value. The State has an oyster and shellfish commission which owns a steamboat and has many agents to encourage and protect this industry. The oysters are of fine quality, those of New River being especially prized. Diamond-back terrapins and turtles are found all along the coast and are shipped North and inland, as are also large quantities of clams.

Navigation.—Vessels drawing 24 feet can ascend the Cape Fear River 30 miles to Wilmington, while the river is navigable 120 miles further to Fayetteville, to which point the Federal government is deepening the channel to eight feet. The Roanoke is navigable 130 miles to Weldon, the Tar and the Neuse about 100 miles each and the Chowan for 75 miles. Two canals connect the Albemarle and Pamlico sounds with Chesapeake Bay, and Congress has passed a bill to establish an inland waterway along the whole front of the State by deepening the sounds which lie behind the sand banks that fringe the seaboard. Much of the work has been done.

Manufactures.—The water power of the State owing to the great non-navigable extent of its rivers and streams is very great, in fact more than twice enough to manufacture the entire cotton crop of the South. Already the State has more cotton factories than any other in the South and is a large manufacturer of tobacco. Other factories of all kinds have greatly increased in number. There are over 60,000 persons employed in tobacco manufacturing and over 70,000 in the cotton factories.

Child labor under 14 years of age is forbidden by law in factories of all kinds. The chief manufactories of tobacco are to be found at Durham, Winston, Reidsville and Henderson. There are also cotton factories at those points and at Charlotte, Raleigh, Concord, Salisbury, Fayetteville and at other towns as well as at many points on the streams remote from towns, especially in Alamance, Mecklenburg and Gaston counties, which counties have the largest number of cotton factories of any in the State.

Minerals.—The State has areas of coal, copper, gold, mica, iron, corundum, kaolin and marl. The last is to be found only in the eastern part of the State, the others in the centre and west. Silver, lead, zinc, zircon, graphite and manganese are also found. The deposits of iron are widely distributed over the State, the most abundant kind being the magnetic. The Cranberry iron mine in Mitchell County yields an ore unsurpassed in the world. There are two bituminous coal fields—one in Chat-ham and Moore counties and the other in Stokes and Rockingham. Both are in close proximity to extensive deposits of iron. Gold is found in 29 counties, mostly in the centre and west of the State, and more than 40 mines are being worked. Up to the discovery of gold in California, North Carolina was the largest gold producing State in the Union; the total yield up to date has been about \$30,000,000. Tin has been found in Cleveland County. At one time three-fourths of all the mica in the world was mined in this State and largely in Mitchell County. It is of a superior quality and plates three and four feet across are not unusual. Beautiful marble underlies large sections of Cherokee and Clay counties in the extreme west. Granite, sandstone and porphyry are to be met with in large quantities, and superior stone for grist mills is quarried in Moore County. Near Wilmington are valuable phosphate beds. The State produces more corundum than any other locality in the world and of the best quality. The valuable gems, diamonds, emeralds, rubies, garnets, amethysts, opals, agates and hiddenites are found. A fine exhibition of minerals, gems, marbles and stones of all kinds is to be seen in the Museum of the State Agricultural Department at Raleigh. At Dunn's Mountain near Salisbury is an exhaustless supply of granite almost as white as marble, and at Mount Airy is an equally large quarry of light gray granite. Near Raleigh is the granite quarry from which the material for the State Capitol was taken. Indeed granite quarries of good quality are to be found in most of the counties and sandstone quarries are numerous. Mineral springs are numerous, the most noted being the Panacea Springs in Halifax County and the Seven Springs in Wayne in the east, while in the centre and west are the Hot Springs in Madison, the Sulphur Springs in Jackson, the Glen Alpine and Connelly Springs in Burke, the Vade Mecum Springs in Surry, the Lithia Springs in Lincoln, Cleveland Springs in the county of that name, Jackson Springs in Moore, and there are many others. Among natural objects of interest are Mount Mitchell, the highest peak on this continent east of the Rocky Mountains; Linville and Cullasaja Falls; Hickory Nut Gap and the adjacent Chimney Rock; Table Rock and Paint Rock.

Railroads.—There are now over 5,000 miles

of railroad in operation and several hundred miles more under contract or in contemplation. There are street railways in all the larger towns and a few miles of rural trolley lines with many more proposed. The four principal railway systems are the Southern, the Seaboard Air Line, Norfolk Southern and the Atlantic Coast Line. The railroads are valued for taxation at \$125,000,000, but this is very much less than half their true value, as they were returned in the census of 1890 as worth at that time \$151,000,000.

Government.—The present constitution, adopted in 1868, amended by a convention in 1875 and by several amendments submitted by legislatures since and ratified by the people, provides for an executive department consisting of a governor (not re-eligible), a lieutenant-governor, secretary of state, treasurer, auditor, superintendent of public instruction and attorney-general, all elected by the people for four years. There is also a commissioner of agriculture, a commissioner of labor and a commissioner of insurance elected by the people and a corporation commission of three members elected by the people for a term of six years. The legislative department consists of 50 senators and 120 members of the house of representatives elected by the people every two years. The judicial department consists of a Supreme Court composed of a chief justice and four associates chosen by the people for eight years and 20 Superior Court judges, who are chosen for the like period by the people and who ride in rotation 10 Superior Court districts, the State being divided into two divisions.

Education.—North Carolina was the second State to establish a State university, which it did in 1789 at Chapel Hill. It has now also the State Agricultural and Mechanical College at Raleigh, a Training School for Teachers (women) at Greenville and a State College for Women at Greensboro. These four constitute a complete system of higher education by the State. There is also a State Agricultural College for the colored at Greensboro. There are also many sectarian colleges, of which the Baptists have one at Wake Forest, the Presbyterians at Davidson, the Methodists at Durham and there are others. There are also several colleges for women, and three colleges for the colored people. As early as 1825, the State provided a public school fund and in 1840 established a public school system. This now provides instruction in primary and intermediate grades, free of charge, to all children between the ages of 6 and 20. There are over 900,000 pupils in the public schools. There is an annual appropriation for normal institutes for the instruction of both white and colored teachers. The public school system supported by State appropriations is supplemented by graded schools for free education maintained in all the larger towns by local appropriations. The public funds for education are divided between the whites and blacks per capita. Besides the State Library of 80,000 volumes, and the Law Library of the Supreme Court of 40,000 volumes, both at Raleigh, several towns have public libraries and the university and all the colleges maintain libraries. The State has also established libraries for the public schools in the rural districts.

Penal and Charitable Institutions.—The

State has established a penitentiary at Raleigh, three insane asylums—one at Goldsboro for the colored people, the other two for the whites at Raleigh and Morganton. There is an Institution for Deaf-Mutes for the whites at Morganton and one for the colored deaf, dumb and blind at Raleigh and an Institution for the Blind for the whites also at Raleigh.

Counties.—There are 100 counties, of which Robeson is the largest and New Hanover the smallest. Guilford has the largest population and Clay the smallest. There are railroads in all the counties except seven.

Cities.—The principal towns are Wilmington, the chief seaport, 30 miles above the mouth of the Cape Fear, up to which vessels can come drawing 24 feet; Raleigh, the State capital, named in honor of Sir Walter Raleigh; Charlotte, Greensboro, Salisbury, Statesville and Winston in the central part of the State; Asheville, Waynesville and Morganton in the west, and Fayetteville, Goldsboro, Washington, Elizabeth City, New Bern and Beaufort in the east, the last four being, like Wilmington, seaport towns.

Colonies.—There is a growing stream of immigration from the North, which in some instances has taken the form of colonies, the most successful and prosperous of which is at Southern Pines in Moore County. This State has the smallest per cent of foreign population in the Union, and indeed irrespective of percentage the smallest foreign population of any State.

Population.—By the census of 1910 North Carolina had a population of 2,206,287; of which 1,500,513 were whites; 697,843 were negroes and 2,015 Indians. There were 1,098,471 males and 1,107,816 females. There were something more than two whites to every negro. The bulk of the negro population is in the eastern division and the southern half of the central division. There are very few negroes in the mountain country. The population (1920), according to the returns of the Census Bureau, is 2,559,123, of which about 70 per cent is white and 30 per cent colored.

History.—The coast of North America was first seen by John Cabot in 1497, and 87 years later the first attempt by the English to establish a colony on this continent was made by Sir Walter Raleigh, whose exploring expedition of two ships arrived at Wokoken Inlet on the coast of North Carolina 4 July 1584. This expedition landed at Roanoke Island and carried back two savages, Wanchese and Manteo. The next year Raleigh sent out a fleet of seven ships under Sir Richard Grenville which settled 108 colonists on the island under Gov. Ralph Lane. Falling into straits for want of food these colonists were taken home in June 1586 by Sir Francis Drake, who was returning with his fleet from a raid upon the Spaniards in the West Indies. Soon after they left, Sir John Grenville arrived with relief, but not finding the colony left 15 men and returned home. In 1587 a new colony consisting of 89 men, 17 women and 2 children came out under Gov. John White. His daughter, the wife of Ananias Dare, on 18 Aug. 1587 gave birth at Roanoke Island to Virginia, the first child of English parentage born on this continent. Governor White soon returned to England, but the Spanish Armada of 1588 prevented aid being sent to

the colony till 1590, at which time the colony had disappeared and the fate of the "Lost colony of Roanoke" is one of the unsolved problems of history. The next settlement by the English was made at Jamestown, Va., in 1607. In 1629 a grant of Carolina was made to Sir Robert Heath and an abortive attempt at settlement was made in 1639. Gradually scattering settlers came into the Albemarle and Pamlico region from Virginia, and in 1660 a New England colony bought land from the Indians and settled near the mouth of the Cape Fear. They soon left, but were succeeded in 1663 by a colony from Barbados under Sir John Yeamans, who repurchased the land from the Indians. This settlement was abandoned in 1690. On 24 March 1663 Charles II granted to the Duke of Albemarle (the restorer of the monarchy) and seven others, as Lords Proprietors, all the country between the Atlantic and Pacific oceans and between latitudes 36° and 31°, and William Drummond was appointed governor. In 1665 a second charter to the same Lords Proprietors was granted, extending the limits to lat. 36° 30' on the north. The first legislature was held in 1665. In 1669 the "Fundamental Constitutions of Carolina" drawn up by the famous John Locke were adopted by the Lords Proprietors and were sent out to the colony. They proved too elaborate and cumbersome for the handful of pioneers, residing mostly in the northeast of the province, on Albemarle Sound, and after a nominal existence were repealed in 1693. Twenty proprietary governors followed in rapid succession. For the most part, save Drummond and Archdale, they were very unfit, and often unworthy men. The sturdy colony deposed six of them and sent them back. One (Sothel) they put into prison and forced him to take an oath of abdication. In 1677 under Governor Culpeper there was open rebellion on account of undue taxation on tobacco and interference with trade regulations. Again in 1708 under Thomas Carey there was a rebellion on account of the taxation of Quakers and Dissenters for the support of the Established Church. For more than two years there was no government of any kind in force, the farmers attending to their crops and "doing and saying what they list." In 1691 was adopted a system of having one governor for Carolina with a lieutenant-governor each for Albemarle and Charleston, the two principal settlements. In 1708 Bath was incorporated as the first town. In 1710 Governor Hyde, a cousin of Queen Anne, came out as the first governor of North Carolina. On 20 Sept. 1711 the Tuscarora Indians, by preconcert, fell upon and massacred the settlers on the Roanoke, Neuse and Pamlico. The war lasted two years, but with the aid of troops from South Carolina the power of the Indians was broken with the capture of their fort at Nahucke in the spring of 1713. In 1718, Edward Teach, commonly known as "Blackbeard," the leader of the pirates who had troubled the colony, was killed in a sea fight off Bath, which put an end to piratical depredations. In 1728 the long boundary dispute with Virginia was settled, the line being surveyed to the foot of the mountains. In the same year seven of the Lords Proprietors sold out their interest to the Crown for \$87,500. Earl Granville retained his one-eighth which was set off to him as a

strip of land, 70 miles wide, next to the Virginia boundary, though he surrendered all right to share in the government. At this time there were three counties, Albemarle, Bath and Clarendon, divided into eight precincts. In 1729 the above counties were abolished, the precincts becoming counties, and the colony was definitively divided into North Carolina and South Carolina. The population of North Carolina was then about 40,000. The royal government thus established continued until the Revolution. There were five royal governors, George Burrington, 1729-34; Gabriel Johnston, 1734-52; Arthur Dobbs, 1754-65; William Tryon, 1765-71; Josiah Martin, 1771-75. During this period immigration came in rapidly, mostly from Virginia and Pennsylvania, so that at the outbreak of the Revolution the population had risen to 300,000 and there were settlements to the mountains and beyond. There were Scotch settlements made after Culloden on the Cape Fear. Germans and Moravians came in by way of Pennsylvania, from which also and from Charleston came many Scotch-Irish. In 1740 the province sent a battalion to join the English expedition against Carthage in South America. In 1749 the first printing-press was set up. The first book was printed in 1752 and a crude postal service was established in 1755. In 1758 the colony sent a regiment under Col. James Innes to Winchester, Va., to take part in the war against the French and Indians, and soon after sent other troops under Hugh Waddell against the Cherokees in the west of the province. The colony openly resisted the Stamp Act and on 16 Nov. 1765 forced the stamp master, William Houston, to resign his office and to swear not to receive the stamps. In February 1766 under the leadership of Hugh Waddell and John Ashe the inhabitants of Wilmington, without using any disguise, boarded the *Viper*, sloop of war, and demanded and obtained the release of certain merchant vessels which had been seized on account of failure to observe the Stamp Act. A few days later 700 armed militia surrounded the house of Governor Tryon and took therefrom in his presence the comptroller of the province and enforced him to do what Houston had done. In 1765 an agitation began against the exaction of exorbitant official fees and poll-tax which culminated in open war, known as the Regulators War, in which the insurgents were crushed by Governor Tryon at the battle of the Alamance 16 May 1771. This was really the first bloodshed in the Revolution. In August 1774 a Provincial Congress was held in New Bern in defiance of Governor Martin's prohibition, which elected delegates to the Continental Congress. In Edenton 51 women held the famous "Tea Party," subscribing to a paper to boycott the use of East India tea and to abide by the action of the Provincial Congress. Patriotic meetings were held in many counties. Soon after the receipt of the news of Lexington and Concord, the people of Charlotte assembled, 20 May 1775, and declared the country independent of Great Britain and by special messenger sent a copy of their proceedings to the Continental Congress. This was the first declaration of the kind in America. In honor of this event, "20 May 1775" is borne on the State seal and flag. Governor Martin fled from New Bern 14 June 1775 and took

refuge on a British man of war. On 12 April 1776 the new State instructed its representatives in the Continental Congress to vote for independence, being the first State to do this. A free constitution was adopted in that year. The first victory for the patriot cause was that gained by the North Carolina militia at Moore's Creek 27 Feb. 1776. The State furnished 10 regiments of "Continental" regulars and many thousands of militia for shorter "tours of duty." In 1780-81 the State was invaded by Cornwallis. On 7 Oct. 1780 a most damaging blow was inflicted on him by the destruction of Ferguson and his detachment at King's Mountain, the bulk of his assailants being from North Carolina and Tennessee (then a part of North Carolina). On 15 March 1781 was fought the battle of Guilford Court House. The Americans under Greene retired, but the result was a practical defeat for Cornwallis, who fell back to Wilmington, whence he marched to his fate at Yorktown. North Carolina was represented in the Federal Constitutional Convention at Philadelphia in 1787, but it was the last State but one to ratify the Constitution, which it did not do till assured of the adoption of the first 10 amendments to that instrument. It rejected the Federal Constitution in 1788, but ratified it in November 1789. Thus it did not participate in the first election for President. At the first census, 1790, it was the third State in point of population (391,000), coming after Virginia and Pennsylvania only, and ahead of New York and Massachusetts.

One of the first acts of the State as a member of the Union was the cession of Tennessee, which was accepted by the United States 2 April 1790. The permanent capital was located at Raleigh by statute in 1791. There soon set in a tide of emigration to Tennessee, then to other Southern and Western States, so that North Carolina which in 1790 ranked third in population was only eleventh in 1840. This tide showed no slackening until after 1850. In the War of 1812 the State furnished nine regiments, two of which went to Norfolk, and one to Jackson's aid in the Creek War. Capt. Johnston Blakely of Wilmington commanded the United States sloop *Wasp* and destroyed many English ships. Among its many privateersmen who preyed on the enemy's commerce Capt. Otway Burns was the most famous. In the Mexican War the State sent a regiment and two companies.

North Carolina was the next to the last State to enter the Federal Union in 1789 and she was the next to the last to leave it in 1861. The State voted against Secession in February of that year, but when President Lincoln called for troops to coerce the seceding States and Virginia had seceded, North Carolina on 20 May 1861 followed her example. The die was cast, she did her full duty to the cause she had espoused. With a voting population (white) of 112,000 in 1861 she sent over 127,000 men to the Confederate armies. Some 5,000 or more (whites and blacks) joined the Union forces. The first man killed on the Southern side in battle was a soldier from this State, Henry L. Wyatt, at Bethel, Va., 10 June 1861, and historians claim that the dead left nearest the enemies' lines at the pivotal battles of Gettysburg and Chickamauga were North Carolina's sons,

and they fired the last volley at Appomattox. The captures of Fort Hatteras, Fort Fisher, of Plymouth, the battle of Bentonville 19-21 March 1865, and the surrender of Joseph E Johnston 26 April 1865 were the most notable events of the war which took place on her soil. Wilmington was famous as a port for blockade running and was the last to be closed. Her war governor was Zebulon B. Vance, afterward for many terms United States senator. The State lost 42,000 killed and wounded, or about one-third of the troops she furnished to the Confederacy. In 1868 began the era of Reconstruction, when the blacks were first allowed to vote and the "carpet bag" rule began. The Ku-klux Klan (q.v.) was organized as a protest against this in 1869, and the State was in a turmoil until the whites regained full control of the government. In 1870 Governor Holden was impeached and removed from office. The State has grown rapidly in population and development since the War. In 1894 and 1896 the Populist and Republican parties combined and carried the State. In 1898 the State again became Democratic and the general assembly submitted a constitutional amendment disfranchising the uneducated negroes, which was ratified by the people in 1900. Prohibition was adopted on a referendum vote in 1908. The history of the State may be divided into three periods, i. e., the Proprietary Government (1663-1729), during which time the governors were appointed by Lords Proprietors and were as follows:

GOVERNORS OF NORTH CAROLINA.

Proprietary period (1663-1729)

William Drummond.....	1663-1667
Samuel Stephens.....	1667-1669
Peter Carteret.....	1669-1673
John Jenkins, President of Council.....	1673-1676
Thomas Eastchurch.....	1676-1677
Thomas Miller, President of Council.....	1677-1678
John Harvey, President of Council.....	1678-1679
John Jenkins.....	1679-1681
Henry Wilkinson.....	1681-1683
Seth Sothe (or Southwell).....	1683-1689
Phillip Ludwell.....	1689-1691
Alexander Lillington, Deputy Governor.....	1691-1694
Thomas Harvey, Deputy Governor.....	1694-1699
Henderson Walker, President of Council.....	1699-1704
Robert Daniel, Deputy Governor.....	1704-1705
Thomas Carey, Deputy Governor.....	1705-1705
William Glover, President of Council.....	1706-1707
Thomas Carey } Contestants (Carey's Rebellion)	1707-1710
William Glover.....	1710-1712
Edward Hyde, Deputy Governor.....	1712-1714
Thomas Pollock, President of Council.....	1714-1722
Charles Eden.....	1722
Thomas Pollock, President of Council.....	1722-1724
William Reid, President of Council.....	1724-1725
George Burrington.....	1725
Edward Mosely, President of Council.....	1725-1729
Sir Richard Everard.....	

The Second or Royal Period extended from 1729-1776. The following were the governors appointed by the Crown:

George Burrington.....	1731-1734
Nathaniel Rice, President of Council.....	1734
Gabriel Johnston.....	1734-1752
Nathaniel Rice, President of Council.....	1752-1753
Matthew Rowan, President of Council.....	1753-1754
Arthur Dobbs.....	1754-1765
William Tryon.....	1765-1771
James Hasell, President of Council.....	1771
Josiah Martin.....	1771-1775

In 1776 began the government under the republic. The governors thereunder were

elected by the legislature annually until 1837, and were as follows:

Richard Caswell	1775-1779
Abner Nash	1779-1781
Thomas Burke	1781-1782
Alexander Martin	1782-1784
Richard Caswell	1784-1787
Samuel Johnston	1787-1789
Alexander Martin, Federalist	1789-1792
Richard Dobbs Spaight, Sr., Republican	1792-1795
Samuel Ashe, Republican	1795-1798
William Richardson Davie, Republican	1798-1799
Benjamin Williams, Republican	1799-1802
James Turner, Republican	1802-1805
Nathaniel Alexander, Republican	1805-1807
Benjamin Williams, Republican	1807-1808
David Stone, Republican	1808-1810
Benjamin Smith, Republican	1810-1811
William Hawkins, Republican	1811-1814
William Miller, Republican	1814-1817
John Branch, Republican	1817-1820
Jesse Franklin, Republican	1820-1821
Gabriel Holmes, Republican	1821-1824
Hutchings G. Burton, Republican	1824-1827
James Iredell, Republican	1827-1828
John Owen, Democrat	1828-1830
Montford Stokes, Democrat	1830-1832
David Lowry Swain, Democrat	1832-1835
Richard Dobbs Spaight, Jr., Democrat	1835-1837

In consequence of the Convention of 1835 the governors were made elective, for a term of two years, by the people. During the period since, the following filled the office:

Edward B. Dudley, Whig	1837-1841
John M. Morehead, Whig	1841-1845
William A. Graham, Whig	1845-1849
Charles Manly, Whig	1849-1851
David S. Reid, Democrat	1851-1854
Warren Winslow (ex-officio), Whig	1854
Thomas Bragg, Democrat	1855-1859
John W. Ellis, Democrat	1859-1861
Henry T. Clark, Democrat	1861-1862
Zebulon B. Vance, Democrat	1862-1865
William W. Holden, Republican (appointed by President Johnson)	1865
Jonathan Worth, Conservative	1865-1867

In 1867 Maj. Gen. Daniel E. Sickles was appointed Military Governor of District No. 2 consisting of North Carolina and South Carolina, and was succeeded in that position by Maj. Gen. E. R. S. Canby in 1867, who held under the Constitution of 1868. William W. Holden was elected governor. He was removed by impeachment in August 1870. The following have been the governors since that date:

Todd R. Caldwell, Republican	1870-1874
Curtis H. Brogden, Republican	1874-1877
Zebulon B. Vance, Democrat	1877-1879
Thomas J. Jarvis, Democrat	1879-1885
Alfred M. Scales, Democrat	1885-1889
Daniel G. Fowle, Democrat	1889-1891
Thomas M. Holt, Democrat	1891-1893
Elias Carr, Democrat	1893-1897
Daniel L. Russell, Republican	1897-1901
Charles B. Aycock, Democrat	1901-1905
Robert B. Glenn, Democrat	1905-1909
William W. Kitchin, Democrat	1909-1913
Locke Craig, Democrat	1913-1917
T. Walter Bickett, Democrat	1917-1921
Cameron Morrison, Democrat	1921-

The Court System, adopted in 1776, provided for a Superior Court system of three judges. These were increased in number to four, and in 1800 an Appellate Court was established consisting of the Superior Court judges in conference. This title was changed to Supreme Court in 1805, but there were no separate judges until the Supreme Court was created by legislative enactment in November 1818, to take effect 1 Jan. 1819. This court consisted of three judges up to 1868, when the court was created by the constitution and consisted of five judges until 1 Jan. 1879, when the number was reduced to three. It was again

increased to five judges, to take effect 1 Jan. 1889. The chief justices have been as follows:

John Louis Taylor	1819-1829
Leonard Henderson	1829-1833
Thomas Ruffin	1833-1852
Frederick Nash	1852-1858
Richmond M. Pearson	1858-1878
William N. H. Smith	1878-1889
August S. Merrimon	1889-1892
James E. Shepherd	1892-1894
William T. Faircloth	1895-1901
David M. Furches	1901-1901
Walter Clark	1903-

Under the constitution of December 1776 the general assembly was elected annually. The members of the house of commons were chosen by manhood suffrage and the senate by freeholders owning 50 acres of land or more. The qualification of electors for the State senate was changed in 1856 to manhood suffrage. Free colored men were qualified as voters until disfranchised by the convention of 1835. The constitution of 1868 removed all disqualification of electors because of race, but in 1899 an amendment was adopted which disqualified negroes who were illiterates.

By the constitution of 1868 elections for the general assembly were made biennial, the office of lieutenant-governor to preside over the senate was created, and the term of State executive officers was made four years. The terms of the judges is eight years.

Bibliography.—The histories of the State are: Hugh Williamson (2 vols., up to 1771); Martin (2 vols., up to 1776); F. L. Hawks (2 vols., for the period 1663-1729); John H. Wheeler (1 vol., 1663-1850); John W. Moore (2 vols., to 1876); S. A. Ashe (Vol. I, to 1783, Vol. II to date, in preparation). Among the histories of certain periods are G. W. Graham, 'The Mecklenburg Declaration'; Foote's 'Revolutionary Sketches'; Mrs. C. P. Spencer's 'Last 90 Days of the War'; Clark, Walter, 'History of North Carolina Regiments' (5 vols., 1861-65); Battle, Kemp P., 'History of the University of North Carolina' (2 vols., 1798-1912); and Schenck, David, 'North Carolina' (1780-1781). The State has published 'The Colonial Records of North Carolina, 1629-1776' (10 vols., edited by W. L. Saunders), and 'The State Records of North Carolina, 1776-1790' (16 vols., edited by Walter Clark), with four volumes of Index to the above by Stephen B. Weeks.

WALTER CLARK,

Chief Justice Supreme Court, North Carolina.

NORTH CAROLINA, University of.

The University of North Carolina is situated among the hills of Orange County in the town of Chapel Hill, 500 feet above the sea. The charter of the university was granted in 1789. The cornerstone of its first building, the Old East, was laid on 12 Oct. 1793, now known as University Day. Its endowment by the State was in the form of old claims on sheriffs and other public officers and escheats, including unclaimed land warrants, to be located in West Tennessee, granted to soldiers of the Continental Line. Only a small sum was realized from these sources for many years. The money which enabled the doors to be opened in January 1795, was realized from donations in small amounts by friends of education and a loan of \$10,000 by the State, afterward converted into a gift.

The management was at first entrusted to Rev. David Ker, D.D., afterward Federal judge of Mississippi Territory, as presiding professor. The post fell successively to Profs. Charles W. Harris, Joseph Caldwell and James S. Gillaspie, but in 1804 the trustees elected Caldwell, a graduate of Princeton, to the office of president. Dr. Caldwell in 1812 resigned the presidency, in order to devote himself to his department of mathematics. His successor, Rev. Robert Hett Chapman, born in New York, held the presidency four years, when Dr. Caldwell was re-elected. In 1835 the residue of the Tennessee lands was sold and an endowment of about \$200,000 realized. The new president, ex-Governor David Lowrie Swain, was widely and favorably known. The number of students increased and when, in the decade beginning with 1850, the South became prosperous, the number of students reached as high as 461 in 1858-59.

The alacrity with which the students rushed into the Civil War may be gathered from the fact that out of the 243 freshmen in the three years ending in 1861 only 16 became graduates. Two hundred and seventy alumni are known to have lost their lives in the struggle. Although numbers diminished, the energy of President Swain kept the doors open until the end of the war, and until the trustees, elected under the Reconstruction Acts in 1868, dismissed all the faculty and suspended the exercises for six months.

The endowment of the university was lost during the Civil War. The new president, Solomon Pool, after a year's trial, was forced to close the doors. By a constitutional amendment the general assembly elected a new board of trustees in 1874. These were hindered by legal difficulties, thrown in the way, from taking charge until the next year. The doors were then reopened, alumni and friends repairing the buildings and the general assembly granting a small annuity, coming from the land scrip fund, Rev. Charles Phillips, D.D., being chairman of the faculty. Soon an annuity of \$20,000 from the State was secured, and that, with income from endowments and tuition money, enabled the trustees to increase the faculty largely and add to the library and apparatus.

In 1877 the university was the first institution in the South to inaugurate a summer normal school. It was continued with much success, and has been one of the chief agents in arousing the spirit of education in the State.

Since 1875 the old curriculum of Latin, Greek and mathematics, with a small amount of scientific and other studies, has been abandoned. An equal attention is paid to the sciences, well-equipped laboratories supplied and courses mapped out leading to the degree of A.B. The departments of the university have been increased until they now embrace a collegiate department leading to the degree of A.B., a graduate department giving the degrees A.M. and Ph.D., a law department having a two-years' course leading to B.L., a medical department giving two years at Chapel Hill and two years at Raleigh with the degree of M.D., a pharmacy department with a two-years' course leading to Ph.G., and an engineering department.

Women are admitted to certain courses. In 1922-23 the institution had 1,870 students and 125 members in the faculty. The campus covers about 50 acres and with the buildings and other

property is valued at \$4,000,000. The income is about \$480,000 annually and the library contains 100,000 volumes.

NORTH CAROLINA COLLEGE OF AGRICULTURE AND MECHANIC ARTS, a technical industrial institution founded in 1889 at West Raleigh. It was the result of a movement that had been agitated for some years by a small but earnest and determined set of men who became convinced that the industrial growth of the State was being retarded by the lack of technically trained men to assist and guide this development. The college opened its doors to students in October 1889, and, like all new enterprises, at first encountered some hostility, a great deal of indifference and incredulity being exhibited as to its power to do the work that was wanted. When the college opened it had only one building, very little equipment and only five professors present for duty. Since then, nine other large and comfortable buildings have been added, and the shops, the drawing-rooms, the chemical, the physical, the horticultural, the electrical laboratories, the barn, the dairy and all the class rooms have been equipped with the best modern apparatus to do thorough and practical work. The specific object of the college is to give young men, besides a general education, a technical training that will make them self-sustaining in life and intelligent directors of agricultural and mechanical enterprises. A regular college course, minus the classical languages but plus scientific studies in particular lines, is offered at tuition fees so low as to attract young men from all parts of the State. Four years' courses are offered in agriculture, civil, mechanical, electrical and chemical engineering, textile work, cotton manufacturing, and dyeing; the degrees conferred for the completion of these courses are bachelor of agriculture and bachelor of engineering; there are also graduate courses, two years' courses in agriculture, mechanic arts and cotton manufacturing and twelve weeks' courses in agriculture, carpentry, machine shop work, engine and boiler tending and machine drawing and designing. The experiment station is also connected with the college and receives an annual Federal appropriation. The college controls the national land grant of 1862, and also receives State and Federal appropriations; in 1922-23 the income amounted to over \$400,000. The library contains 20,000 volumes; the students numbered 1,225 and the faculty 102. The buildings and grounds and other property are valued at \$2,500,000.

NORTH CHICAGO, Ill., city in Lake County, on Lake Michigan, 35 miles from Chicago and three miles south of Waukegan, on the Chicago and Northwestern and the Elgin, Joliet and Eastern railroads. A United States naval training station is situated here. The town manufactures gas-machines, wire-fencing and gates, springs, brass and iron-castings, envelopes, cards, portable elevators and milk-machinery. It also owns machine-shops and zinc works. Pop. 3,306.

NORTH DAKOTA, *da-kō'ta*, is one of the North Central States of the American Union. It is bounded on the north by the Canadian provinces of Saskatchewan and Manitoba; on the south by South Dakota; on the east by Minnesota, and on the west by Montana.

Its area is 70,837 square miles, of which 654 miles is water. It extends 360 miles east and west and 210 miles north and south. Its capital is Bismarck.

Topography.—Extending in a curve from the northwest border to the centre of the State is the escarpment of the Coteau du Missouri. That portion of North Dakota which is to be found northeast of this coteau lies in the so-called Prairie Plain region of the American continent. Southwest of this escarpment the State lies in the Great Plain region. The prairie plain is level or gently rolling and is divided into two great tablelands. The eastern and lower of these is the famous Red River Valley which begins in Minnesota and extends through the State of North Dakota as far north as Lake Winnipeg in the province of Manitoba. This valley is remarkably level throughout its entire length, being 965 feet above the sea at Wahpeton, at its southeastern extremity, 836 feet at Fargo, some 60 miles north of that point and 798 feet at Pembina, or at the extreme northeast boundary of the State. West of the northern portion of the Red River Valley and 30 miles west of the river are the so-called Pembina Mountains, a range of low hills which forms a part of its escarpment and serve to partially divide it from the second of the prairie plains. In Walsh County and some 40 miles from the northern boundary of the State, this second plain is some 500 feet higher than the Red River Valley, from thence it gradually ascends to the so-called Coteau de Prairies in Sargent County at the southern boundary of the State, where it attains an elevation of about 2,000 feet. The surface of this area is level or gently rolling, but is not as a whole nearly as level as that of the first plain or Red River Valley. It has but one range of hills, the so-called Turtle Mountains, whose area is some 800 square miles, and a small portion of which is in Manitoba. The highest points of this range, however, are only 2,400 feet above the level of the sea. This region is of great beauty and is dotted with numerous lakes. West of this second prairie plain or plateau is another ridge or escarpment of some 400 feet in height and 20 to 50 miles in width, the northern portion of which forms the watershed between the Hudson Bay and the Gulf of Mexico. West of this ridge is the third plateau which comprises that portion of the State which is in the Great Plains as opposed to the Prairie Plains region. It comprises almost a half of the State and rises gradually toward the west until it reaches an altitude of some 3,300 feet in Bowman County. Thence it extends westward through Montana until it merges in the foot hills of the Rocky Mountains. In the southwest portion of this area are the so-called Bad Lands. Here the burning coal beds have baked the clay of the buttes into striking colors and the erosion of the centuries has given to them fantastic forms of rare beauty. This region, and in fact almost all of the country west of the Missouri River, lies beyond the limit of the glacial ice beds which spread over the rest of the State, and which not merely planed down the hills but filled the crevices and valleys with glacial drift. It is for this reason that the effects of the erosion of the waters is here more marked and that the western portion of the State, though nearly all

arable, is more rolling and uneven than is that of the east. There are no mountains in the State, merely hills and buttes.

The general topography of North Dakota can be best understood by a classification of its rivers and their valleys and watersheds. These are:

(1) The Red River of the North, which forms its eastern boundary and flows into Lake Winnipeg through a valley of rich bottom land 50 to 60 miles wide. The elevation of this valley is about 965 feet in the extreme southwest but gradually descends toward the north. The chief affluents of the Red River are the Shesenne in the south, the Goose in the centre and the Pembina in the north. The Red River is also joined at Grand Forks by the Red Lake River, but this latter river does not otherwise flow within the State.

(2) The Dakota or James River (French, "Riviere de Jacques"), which is to be found in the southern part of the State, and half way between the Red and the Missouri rivers. This is probably the longest unnavigable river in North America, and flows 600 miles from the central plateau through South Dakota and North Dakota until it joins with the Missouri. Its valley constitutes one of the most noted artesian districts on the continent and beneath it is a layer of Dakota sandstone.

(3) The Mouse or Souris River in the north and west of the centre of the State. This river flows south by east down from Canada and sweeping around in a great loop runs north into Canada again and joins the Assiniboine.

(4) The Missouri, which has a navigable course of about 300 miles in the State. Its coteau or plateau which is a stony upland, separates its bed from that of the Dakota or James, and is dotted with small alkaline lakes.

(5) The Little Missouri, which runs north and south in the extreme western triangle of the State and then turns east for another 100 miles to join the Missouri.

(6) The Cannon Ball, the Heart, and the Knife, which flow into the Missouri from the west and which are also to be found in the southwestern triangle. This triangle is a country of broad valleys and scattered buttes.

Geology.—A Cretaceous deposit overlies the greater portion of the State and often to a great depth. This fact makes a study of the older formations exceedingly difficult. Deposits of the Laramie-transition period are found in the western part of the State, while in the Bad Lands (q.v.) tertiary formations are frequently found. The Red River Valley is doubtless underlain by rocks of the Archean Age, the formation being characterized by granite, gneiss and schists. This floor is, however, probably overlaid by Cambrian Sandstone over a considerable part of its area, and in places by a thin layer of Silurian Limestone. The Cretaceous formations which are represented are the Fox Hills, Pierre, Niobrara, Benton and Dakota. The Dakota is mainly a sand deposit which has become more or less hardened, and underlies the upper Cretaceous and Drift throughout the greater part of the State, being comparatively thin in the eastern part, but increasing in thickness toward the central and western parts. The hardened Dakota or Dakota sandstone contains a large proportion of quartz and mica. The Ben-

NORTH DAKOTA

Abercrombie, (H6)	266	Bottineau, (D2)...	1,172	Conway, (G3)...	148	Enderlin, (G6)...	1,919	Grandin, (G5)....	330
Adams, (F3).....	404	Bowbells, (B2)....	643	Cooperstown, (F5)	1,112	Englevale, (G7)...	250	Grand Rapids, (F7)	125
Adrian, (F6).....	200	Bowdon, (E4)....	306	Coteau, (B2).....	150	Epping, (A3).....	116	Grano, (C2).....	112
Alamo, (A2).....	300	Bowesmont, (G2)...	200	Coulee, (B2).....	150	Epworth, (B3)....	110	Granville, (D3)...	394
Alexander, (A4) ..	274	Bowman, (A7)....	767	Courtney, (F5)...	490	Erie, (G5).....	200	Great Bend, (H7) .	142
Alfred, (E6).....	200	Braddock, (D6)...	216	Crary, (F3).....	307	Esmond, (E3)....	343	Grenora, (A2).....	358
Alice, (C6).....	250	Bremen, (F4)....	220	Crete, (G7).....	200	Fairdale, (F3)...	192	Guelph, (F7).....	180
Almont, (G6).....	563	Brinsmade, (E3) ..	191	Crocus, (E2)	37	Fairmont, (H7)...	706	Guthrie, (D3)....	120
Alsen, (F2).....	150	Brisbane, (C7)....	120	Crosby, (A2).....	1,147	Falsen, (D3).....	120	Gwinner, (G7)....	300
Amidon, (A6).....	145	Brocket, (F3)....	240	Crystal, (G2).....	319	Fargo, (H6).....	21,961	Hague, (E7).....	315
Ambrose, (A2)....	389	Buchanan, (F5)...	153	Cummings, (H4)...	200	Fessenden, (E4)...	731	Halliday, (B5)....	280
Auamoose, (D4)...	563	Bucyrus, (B7)....	113	Dahlen, (G3).....	130	Fillmore, (E3)...	180	Hamilton, (G2)...	200
Aneta, (F4).....	662	Buffalo, (G6)....	268	Davenport, (G6) ..	214	Fingal, (G6).....	500	Hamlet, (A2).....	180
Antler, (C2).....	265	Buford, (A4)....	160	Dawson, (E6)....	293	Finley, (G4).....	599	Hampden, (F2)...	199
Ardoch, (G3)....	153	Burlington, (C3)...	200	Dazey, (F5).....	293	Flasher, (C7)....	287	Hankinson, (H7) ..	1,477
Argusville, (H5)...	100	Burnstad, (E7)....	150	Deering, (D3)....	142	Flaxton, (B2)....	374	Hanks, (A2).....	220
Arnegard, (A4)....	250	Burt, (B7).....	120	De Lamere, (G7)...	250	Flora, (E4).....	150	Hannafoord, (F5) ..	431
Arthur, (G5).....	200	Buttzville, (G7)...	132	Denbigh, (D3)....	200	Forbes, (F8)....	293	Hannah, (F1)....	550
Arvilla, (G4).....	100	Buxton, (G4)....	450	Denhoff, (D5)....	340	Fordville, (G3) ..	320	Hansboro, (E2)...	218
Ashley, (E7).....	1,009	Caledonia, (H5)...	250	Deslacs, (C3)....	188	Forest River, (G3)	226	Hartland, (C3)...	250
Aurelia, (C3)....	125	Calio, (F2).....	132	Devils Lake, (F3) .	5,140	Forman, (G7)....	402	Harvey, (D4)....	1,590
Ayr, (G5).....	250	Calvin, (F2).....	400	Dickey, (F6).....	190	Fort Rice, (D7)...	220	Hastings, (F6)....	200
Backoo, (G2)....	100	Cando, (E3).....	1,111	Dickinson, (B6)...	4,122	Fortuna, (A2)....	198	Hatton, (G4).....	828
Baker, (E3).....	300	Canton, (G2)....	101	Dodge, (B5).....	172	Fort Yates, (D7) .	350	Havana, (G8)....	319
Balfour, (D4)....	322	Carpio, (C3).....	244	Dogden, (D4)....	252	Foxholm, (C3)...	200	Havelock, (B7)...	120
Bantry, (D3)....	400	Carrington, (E5)...	1,420	Donnybrook, (C3)	267	Fredonia, (E7)...	296	Haynes, (B8)....	113
Barlow, (E4)....	300	Carson, (F2)....	277	Douglas, (C4)....	284	Fryburg, (A6)....	120	Hazelton, (D6)...	382
Barney, (G6)....	225	Casselton, (G6)...	1,538	Doyon, (F3).....	200	Fullerton, (F7)...	202	Hazen, (C5).....	520
Bartlett, (F3)....	98	Cathay, (E4)....	185	Drake, (D4).....	517	Gackle, (E6)....	424	Heaton, (E5)....	190
Barton, (D2)....	158	Cavalier, (G2)....	819	Drayton, (G2)....	637	Galchutt, (H7)...	100	Hebron, (B6)....	1,374
Bathgate, (G2)...	352	Cayuga, (G7)....	182	Dresden, (F2)....	220	Galesburg, (G5)...	250	Heil, (C7).....	120
Beach, (A6).....	1,106	Center, (C5).....	700	Driscoll, (D6)...	250	Gardar, (G2)....	125	Heimdal, (E4)....	125
Beltfield, (A6)...	526	Chaffee, (G6)....	120	Dunn Center, (B5)	247	Gardena, (D2)...	99	Hensel, (G2)....	200
Benedict, (C4)...	195	Charbonneau, (A4)...	220	Dunseith, (D2)...	374	Gardner, (G5)...	250	Hettinger, (B7)...	817
Bentley, (B7)....	150	Charlson, (B3)....	120	Dwight, (H7)....	139	Garrison, (C4)...	714	Hickson, (H6)...	200
Bergen, (D4)....	300	Chaseley, (E3)....	100	Eastby, (F2)....	100	Gascoyne, (A7)...	60	Hillsboro, (G5)...	1,183
Berlin, (F7)....	130	Christine, (H6)...	210	East Fairview, (A4)	175	Geneseo, (G7)...	200	Hoople, (G2)....	250
Berthold, (C3)...	498	Churchs Ferry, (E3)	353	Edgeley, (F7)....	803	Gilby, (G3).....	320	Hope, (G5).....	699
Berwick, (D3)....	450	Clements ville, (F5)	220	Edinburg, (G2)...	278	Gladstone, (B6)...	240	Horace, (H6)....	200
Beulah, (C5)....	552	Cleveland, (E6)...	341	Edmore, (F3)....	501	Glenburn, (C2)...	228	Hunter, (G5)....	424
Binford, (F4)....	393	Clifford, (G5)....	200	Edmunds, (E5)...	120	Glenfield, (F5)...	220	Hurd, (C2).....	100
Bisbee, (E2)....	500	Clyde, (F2).....	300	Egeland, (E2)....	306	Glenullin, (C6) ..	875	Hurdsfield, (D5) ..	400
BISMARCK, (D6) 7,	122	Coal Harbor, (C4)	120	Elbowoods, (B4) ..	100	Golden Valley, (B5)	369	Inkster, (G3)....	368
Blabon, (G5)....	100	Cogswell, (G7)....	445	Elgin, (C7).....	429	Golva, (A6).....	320	Jamestown, (F6) ..	6,627
Blackwater, (C4) ..	100	Colfax, (H7).....	150	Ellendale, (F8) ..	1,334	Goodrich, (D4)...	476	Jessie, (F4).....	200
Blaisdell, (B3)...	100	Colgate, (G5)....	250	Elliott, (G7)....	125	Grace City, (F4) ..	150	Joliette, (G2)....	100
Blanchard, (G5)...	125	Columbus, (B2)...	332	Emdben, (G6)....	100	Grafton, (G3)....	2,512	Juanita, (F5)....	120
Bordulac, (F5)...	150	Concrete, (G2)....	125	Emerado, (G4)....	230	Grand Forks, (G4)14,	010	Jud, (F6).....	178



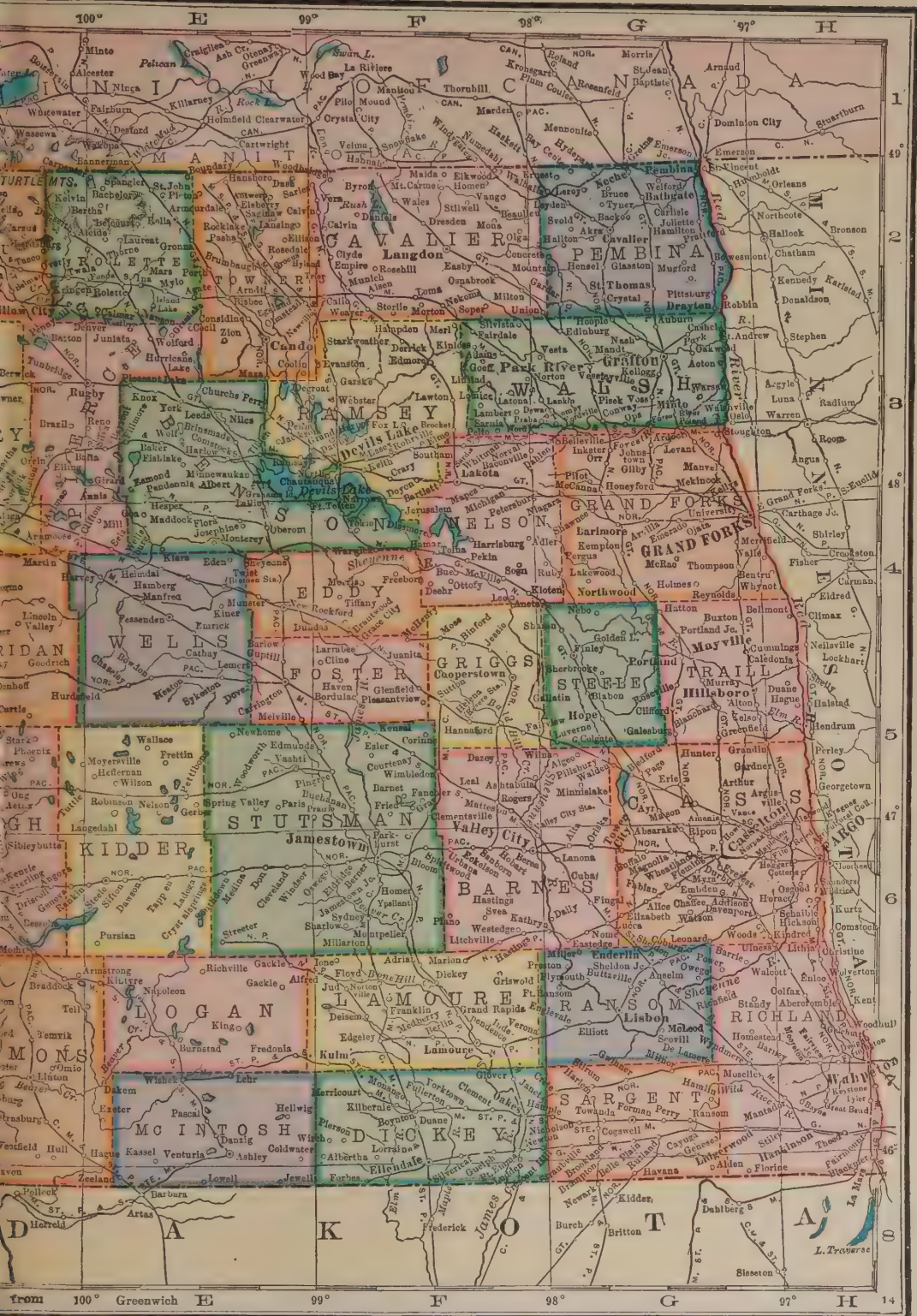
NORTH DAKOTA

SCALE OF MILES

0 10 20 30 40 50
83 MILES TO THE INCH

State Capital County Seat
Size of type indicates relative
importance of places

Hammond's 8 x 11 Map of North Dakota
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NORTH DAKOTA - Cont'd.

Judson, (C6).....	150	McLeod, (G7)....	100	Nome, (G6).....	267	Roth, (D2).....	100	Tioga, (B3).....	320
Karlsruhe, (D3)...	120	McVile, (F4)....	546	Noonan, (A2)....	376	Rugby, (E3)....	1,424	Tokio, (F4).....	120
Kathryn, (F6)....	289	Maddock, (E4)...	557	Norma, (C2)....	250	Ruso, (D4).....	120	Tolley, (C2).....	325
Kempton, (G4)....	150	Makoti, (C4)....	360	North Fargo, (H6)	390	Russell, (D2)...	119	Tolna, (F4).....	199
Kenmare, (B2)...	1,446	Mandan, (D6)....	4,336	North Minot, (C3)	432	Rutland, (G7)...	291	Tower City, (G6)	447
Kensal, (F5).....	415	Manfred, (E4)....	400	Northwood, (G4)	935	Ryder, (C4)....	483	Towner, (D3)....	610
Kermitt, (A4).....	37	Mannhaven, (C5)	120	Nortonville, (F7)	180	Saint John, (E2)	460	Trenton, (A3)...	140
Kief, (D4).....	307	Manning, (B5)....	250	Norwich, (D3)....	180	Saint Thomas, (G2)	500	Turtle Lake, (D4)	395
Killedeer, (B5)...	512	Mantador, (G7)...	220	Oakes, (F7).....	1,637	Sanborn, (F6)...	391	Tuttle, (D5)....	321
Kindred, (H6)....	334	Manvel, (G3)....	200	Oberon, (E4)....	320	Sanger, (C5)....	120	Underwood, (C5)	453
Kintyre, (E6)....	150	Mapleton, (H6)...	198	Olga, (F2).....	200	Sanish, (B4)....	337	Upham, (D2)....	196
Kloten, (G4)....	300	Marion, (F6)....	294	Olmstead, (E2)...	100	Sarles, (E2)....	348	Valley City, (F6)	4,681
Knox, (E3).....	173	Marmarth, (A7)...	1,318	Omeme, (D2)....	222	Sawyer, (C3)....	241	Van Hook, (B4)...	331
Kongsberg, (D4)...	100	Martin, (D4)....	350	Oriska, (G6)....	300	Schantz, (A4)...	300	Velva, (D3)....	836
Kramer, (D2)....	172	Max, (C4).....	473	Orr, (G3).....	150	Scranton, (A7)	353	Venturia, (E7)...	207
Krem, (C5).....	175	Maxbass, (G2)...	147	Osnabrock, (F2)	310	Selfridge, (C7)	153	Verona, (F7)...	258
Kulm, (F7).....	725	Mayville, (C4)...	1,218	Overly, (D2)....	193	Selz, (E4).....	120	Voltaire, (D3)...	125
Lakota, (F3).....	959	Medina, (G6)....	415	Page, (G5).....	452	Sentinel Butte, (A6)	292	Wabek, (C4)....	40
Lamoure, (F7)....	1,014	Medora, (A6)....	100	Palermo, (B3)...	179	Sharon, (G4)....	362	Wahpeton, (H7)...	3,069
Landa, (D2).....	200	Mekinock, (G3)...	200	Park River, (G3)	1,114	Sheldon, (G6)...	321	Walcott, (G6)....	400
Langdon, (F2)....	1,228	Melville, (E5)...	150	Parshall, (B4)...	376	Sherwood, (C2)...	423	Wales, (F2)....	400
Lankin, (G3)....	334	Menoken, (D6)...	120	Pekin, (F4)....	197	Sheyenne, (E4)...	500	Walhalla, (G2)...	634
Lansford, (C2)...	337	Mercer, (D4)....	150	Pembina, (G2)...	802	Shields, (C7)...	220	Walum, (F5)....	100
Larimore, (G4)...	1,089	Merricourt, (F7)	70	Penn, (E3).....	200	Silva, (E3).....	120	Warwick, (F4)...	290
Larson, (B2)....	114	Michigan, (F4)...	491	Perth, (E2)....	218	Simcoe, (D3)....	100	Washburn, (D5)	558
Lawton, (F3)....	227	Millerton, (F6)...	120	Petersburg, (F4)	367	Sims, (C6).....	202	Watford City, (A4)	260
Leal, (F5).....	88	Milnor, (F7)....	680	Pettibone, (E5)...	300	Solen, (D7)....	220	Webster, (F3)...	100
Leeds, (E3).....	704	Milton, (F2)....	393	Pillsbury, (G5)...	142	Southam, (F3)...	240	Wellsburg, (E4)...	180
Lefor, (B6).....	200	Minnewaukan, (E3)	564	Pingree, (F5)....	286	Souris, (D2)....	269	Werner, (B5)....	198
Lehigh, (B6)....	100	Minot, (C3)....	10,476	Pisick, (G3)....	300	Spiritwood, (F6)	250	Westhope, (C2)...	439
Lehr, (E7).....	362	Minto, (G3)....	602	Plaza, (C3)....	345	Spring Brook, (A3)	93	Wheatland, (G6)	520
Leith, (C7)....	158	Mohall, (C2)....	651	Pleasant Lake, (E3)	150	Stanley, (B3)...	591	Wheelock, (A3)...	250
Leonard, (G6)...	250	Monango, (F7)...	231	Portal, (B2)....	454	Stanton, (C5)...	325	White Earth, (B3)	247
Lidgerwood, (G7)	1,065	Montpelier, (F6)	186	Portland, (G5)...	623	Starkweather, (F2)	302	Whitman, (F3)...	120
Lignite, (B2)....	214	Mooreton, (H7)...	123	Powers Lake, (B2)	251	Steele, (E6)....	550	Wildrose, (A2)...	449
Linton, (D7)....	1,011	Mott, (B7).....	723	Raleigh, (C7)...	180	Sterling, (D6)...	137	Williston, (A3)...	4,178
Lisbon, (G7)....	1,855	Mountain, (G2)...	150	Rawson, (A4)...	160	Stirum, (G7)....	200	Willow City, (D2)	559
Litchville, (F6)	528	Munich, (F2)....	248	Ray, (A3).....	563	Strasburg, (D7)...	653	Wilton, (D5)....	1,026
Loma, (F2).....	300	Mylo, (E2).....	140	Reeder, (B7)...	258	Streeter, (E6)...	640	Wimbledon, (F5)...	521
Lonetree, (C3)...	190	Napoleon, (E6)...	554	Regan, (D5)....	202	Surrey, (C3)....	120	Windsor, (E6)...	120
Lorraine, (C2)...	74	Neches, (G2)....	528	Regent, (B7)...	262	Sutton, (F5)....	120	Wing, (D5)....	280
Lostwood, (B3)...	100	Nekoma, (F2)....	189	Reynolds, (G4)...	389	Sweet Briar, (C6)	100	Wishek, (E7)....	1,003
Lucca, (G6).....	200	Newburg, (D2)...	110	Rhame, (A7)....	302	Sykston, (E5)...	367	Wolford, (E3)...	300
Ludden, (F8)....	132	New England, (B6)	613	Richardton, (B6)...	626	Tagus, (C3)....	133	Woodworth, (E5)	297
Luverne, (G5)...	225	New Leipzig, (C7)	378	Robinson, (E5)...	240	Tappen, (E6)...	182	Wyndmere, (G7)...	570
McCanna, (G3)...	250	New Rockford, (F4)	2,111	Rock Lake, (E2)...	238	Taylor, (B7)....	285	York, (E3).....	300
McClusky, (D4)...	646	New Salem, (C6)...	711	Rogers, (F5)....	173	Temvik, (D6)...	250	Ypsilanti, (F6)...	150
McGregor, (B2)...	150	Newville, (E2)...	100	Rolette, (E2)....	409	Thompson, (G4)...	360	Zahl, (A2).....	200
McHenry, (F4)...	299	Niagara, (G4)....	199	Rolla, (E2)....	675	Thorne, (E2)...	78	Zap, (C5).....	257
McKenzie, (D6)...	150	Niobe, (B2).....	200	Ross, (B3).....	300	Timmer, (D7)...	100	Zeeland, (E8)...	323

ton and Niobrara formations are well developed in the central and northern part of the State, but seldom appear along the eastern border. They are principally composed of blue clays and shales, and immediately overlie the Dakota sandstone. The Pierre group is found throughout the centre of North Dakota and its debris forms much of the soil and subsoil and of the glacial deposits which are scattered over the eastern half. The Pembina Mountains, so called, are merely an eroded edge of this formation, and it is also everywhere found in the Turtle Mountain region. The Fox Hills group is to be found almost entirely under the Laramie and later deposits in the western part of the State, and, in portions of the Turtle Mountains and near Dickinson in Stark County, develops into an excellent building stone. The Laramie and its overlying Tertiary extend over a large portion of North Dakota west of the Missouri River. It consists principally of clays and shales, some of which are of great value for brick and pottery uses. In the same formation also are found immense beds of lignite coal. In addition to these deposits is the so-called Drift which is mainly to be found east of the Missouri River. This drift is composed of sand and clay mingled with gravel and boulders, and is merely the rock refuse which was carried along by and created by the glaciers of the past and which was deposited as the ice melted. It, however, has formed a soil which is of great depth and of great fertility.

Minerals.—About 32,000 square miles of the western portion of North Dakota are underlaid with lignite or half-made coal. The total production of this coal is hard to estimate as it is so abundant that the farmers often dig their own supplies from the hillsides. It is safe to say, however, that the annual output is at least 1,250,000 tons, and the government geologists estimate that the total deposits of the State are equal in heat units to the present total consumption of the United States for 99 years.

Lignite is a free burner and an excellent gas coal, and the cheap fuel to be derived therefrom is destined to be of great value not merely for household and heating purposes but in the development of manufacturing centres, which are certain to arise. Together with the coal, indeed, and in the same areas, are to be found valuable and inexhaustible deposits of various kinds of clay which are of the highest grade and capable of almost any brick and pottery use. There have also been found scattered throughout the Bad Lands, large quantities of paint rocks, of various colors, which only need the addition of oil or water for use. Antimony is also found in varying quantities. Natural gas is also found in more or less extended areas throughout the State.

There is in North Dakota comparatively little building stone that may be quarried, but large boulders are scattered everywhere throughout the western area. There is also limestone of excellent quality, as well as large quantities of cement material and glass sand.

Flora and Fauna.—The forested area of North Dakota is very small, and is mainly to be found in the Pembina, Turtle Mountains and the Devils Lake regions, where grow oak and ash, poplar and birch, willow and boxelder, plum and bullcherry and other deciduous trees.

Along the Missouri are large cottonwoods and along the Red River some elm. The characteristic wild animals are timber and prairie wolves, panthers and wild cats, gophers, prairie dogs and deer. Trappers also find otter, mink, beaver, raccoon and badger. Sportsmen shoot much grouse, prairie chicken, wild geese and wild ducks.

Climate and Rainfall.—The mean annual temperature for the State is 39° F. At Bismarck, in the south centre, it is 4° in January and 67° in July, with extremes of -44° and 106°. At Williston, in the extreme northwest, the extremes are -49° and 107°. The dryness of the atmosphere makes these great extremes not only bearable but healthful. The average annual precipitation for the whole State is about 17 inches, and decreases from 20 inches in the Red River Valley to 14 inches in the extreme west. As only 2 per cent of this, however, falls in the winter months, not only are the needs of agriculture fairly subserved but the suffering incident to humid cold is not present, and the winters, though cold, are healthful and stimulating.

Soils and Agriculture.—Few States in the Union have a larger percentage of tillable land than has North Dakota, and though the character of the soil, the climatic conditions and the rainfall vary to a greater or lesser extent over its vast expanse, there are but small areas which are not marvelously fertile. Even the so-called Bad Lands from an economic standpoint are bad only in that they are broken and difficult to travel, and the richness of their valleys and the abundance of the coal, clay, argillaceous limestone and glass sand deposits there to be found more than counterbalance any drawbacks which may come from difficulties of road building. The soil is no doubt the richest in the Red River Valley, which is a wonderful bottom land where a black rich top soil of decayed vegetation overlies alluvium and glacial drift to a great depth and down to a clay subsoil which is itself rich farming ground. The marvelous fertility of this region, its ease of cultivation and its freedom from rocks and stones, for many years prevented a proper appreciation of the western area of the State, but there the mineral resources and climatic conditions are more to be desired and the agricultural possibilities, though at first less apparent, are almost as great. The soil in the western portion of North Dakota, indeed, though thinner than in the Red River Valley, is almost everywhere rich in the elements of plant growth, and, though more sandy, is on that account more friable and quicker. The climate, too, in the trans-Missouri region is perceptibly warmer than in the northeastern portions of the State, and this fact is of great importance, especially to the maturity of corn which is now an established crop.

Perhaps, indeed, in no other State is the Creator's marvelous policy of compensation better illustrated than in North Dakota. The seasons for instance are comparatively short, but the days are proportionately long, and the hours of sunshine in the growing months of April, May, June, July and August are unusually high. During these months the total number of hours of possible sunshine at Springfield, Ill., is 2,174, while the number at Bismarck, North Dakota, is 2,269, and this fact is augmented by

the rapidity with which the atmosphere clears after rainstorms. So, too, though the weather is severe in the winter, the frost often goes from six to eight feet beneath the surface of the ground, thus preserving the moisture which, during the growing months, gradually thaws and rises to the surface and feeds the crops during periods when the rainfall might otherwise be inadequate. Not only is this so, but the cold and extreme depth of frost over the great snowless plains (for on account of the rarity of the atmosphere North Dakota is comparatively free from snow), destroy countless millions of the larvæ and eggs of the predatory worms and insects. Though the average rainfall decreases toward the western portions of the State, the data of many years has shown that all but 2 per cent of this rainfall falls during the growing season, and if properly conserved is adequate to the needs of diversified farming.

Crops.—The greatest crop of North Dakota is wheat, of which she raised in 1915 no less than 155,845,963 bushels, and for which her farmers received the sum of \$135,585,988. This sum, however, represents but a little over one-half of what was received for other agricultural products, the total being \$226,218,053, and being made up as follows: Wheat, 155,845,963 bushels, value \$135,585,988; oats, 102,856,040 bushels, value \$27,711,131; barley, 57,331,328 bushels, value \$25,225,784; rye, 3,675,165 bushels, value \$2,903,380; flax, 5,233,071 bushels, value \$9,314,866; speltz, 2,744,160 bushels, value \$1,042,781; potatoes, 7,775,910 bushels, value \$3,188,123; corn, 11,120,872 bushels, value \$7,450,984; tame hay, 527,002 tons, value \$4,216,016; wild hay, 1,670,000 tons, value \$9,519,000.

The chief crops, with their acreage, yield and value in 1922 were: corn, 680,000 acres, 18,700,000 bushels, \$9,350,000; wheat, 8,740,000 acres, 123,234,000 bushels, \$110,911,000; barley, 1,008,000 acres, 25,704,000 bushels, \$10,025,000; oats, 2,388,000 acres, 78,804,000 bushels, \$20,489,000; rye, 1,581,000 acres, 24,506,000 bushels, \$14,704,000; tame hay, 1,028,000 acres, 1,655,000 tons, \$12,412,000; potatoes, 198,000 acres, 17,820,000 bushels, \$5,524,000. On 1 Jan. 1923 there were in the State 797,000 horses, valued at \$44,632,000; 8,000 mules, valued at \$552,000; 503,000 milk cows, valued at \$22,132,000; 814,000 other cattle, valued at \$17,420,000; 240,000 sheep, valued at \$1,752,000, and 478,000 swine, valued at \$6,453,000.

Manufactures.—The enormous coal deposits and their close proximity to the fine pottery clays, which are to be found in inexhaustible quantities in the western part of the State, are destined in the near future to make a manufacturing centre of that region. At the present time, however, agriculture and cattle raising are the paramount industries and, with the exception of flour, creamery products, fire and pressed bricks, harnesses and candies, the factories of the State may be generally termed neighborhood manufactures. Of flour mills there are upwards of 87, with annual products valued at \$29,282,000. In 1919, 57 butter-making establishments turned out products valued at \$11,122,000. Cars and general shop construction, including repairs by railroads, amounted to \$3,183,000. There are numerous brick plants and potteries, the largest of which are at Hebron and Dickinson, and whose pressed brick is marketed as far west as the Pacific Coast.

In 1919, the capital invested in manufactures was \$24,549,838, and the value of the products was \$57,373,622.

Banks and Banking.—All private banks are compelled by law to take out charters as State banks. In 1922, there were 660 State banks and 183 National banks, carrying total deposits of about \$156,000,000. In addition to these institutions there were numerous building and loan associations, trust companies and other similar institutions.

Transportation.—The Missouri River is navigable throughout its length but needs a clever pilot. The Red River is navigable from Fargo to Winnipeg, but boats run only from Grand Forks. The total railroad mileage is 6,281 miles. There are three principal railroad systems and several small local lines. The principal systems are the Great Northern, the Northern Pacific and the Minneapolis, Saint Paul and Sault Sainte Marie. The two former cross the entire State from east to west, the first mostly north of the parallel of 48°, and the latter a little south of the parallel of 47°. The Minneapolis, Saint Paul and Sault Sainte Marie cuts the State diagonally through its centre and connects with the Canadian Pacific at the northern boundary. The Chicago and Saint Paul and the Chicago and Northwestern railroads also enter the State with short branches in the south. All of these roads have numerous branch lines.

Education.—The public schools have a land endowment valued at \$64,000,000. One-eighteenth of the lands of the State were reserved for their use in the outset by the constitution, making 2,531,200 acres. In addition to this some 500,000 acres were reserved for the support of the technical schools and schools of higher education and for the support of the charitable institutions. There were also set aside 50,000 acres for the use of the State capital. None of these lands may be sold for less than \$10 an acre, and the State is obliged to make good any shortages.

In 1920-21 \$13,306,724, was expended for the support of the public schools. Of these there were 5,650 employing 7,350 teachers, and possessing sites and buildings of a value of \$14,736,247. There are in addition to these schools the following institutions for higher and special education: an agricultural college at Fargo, State University at Grand Forks, with a School of Mines in connection, State Normal Schools at Valley City, Mayville and Minot, a Normal and Industrial School at Ellendale, a School of Forestry at Bottineau and a Scientific School at Wahpeton. There are also numerous agricultural experiment stations scattered through and supported by the State, and a large experiment and tree distributing station at Mandan, which is supported entirely by the Federal government.

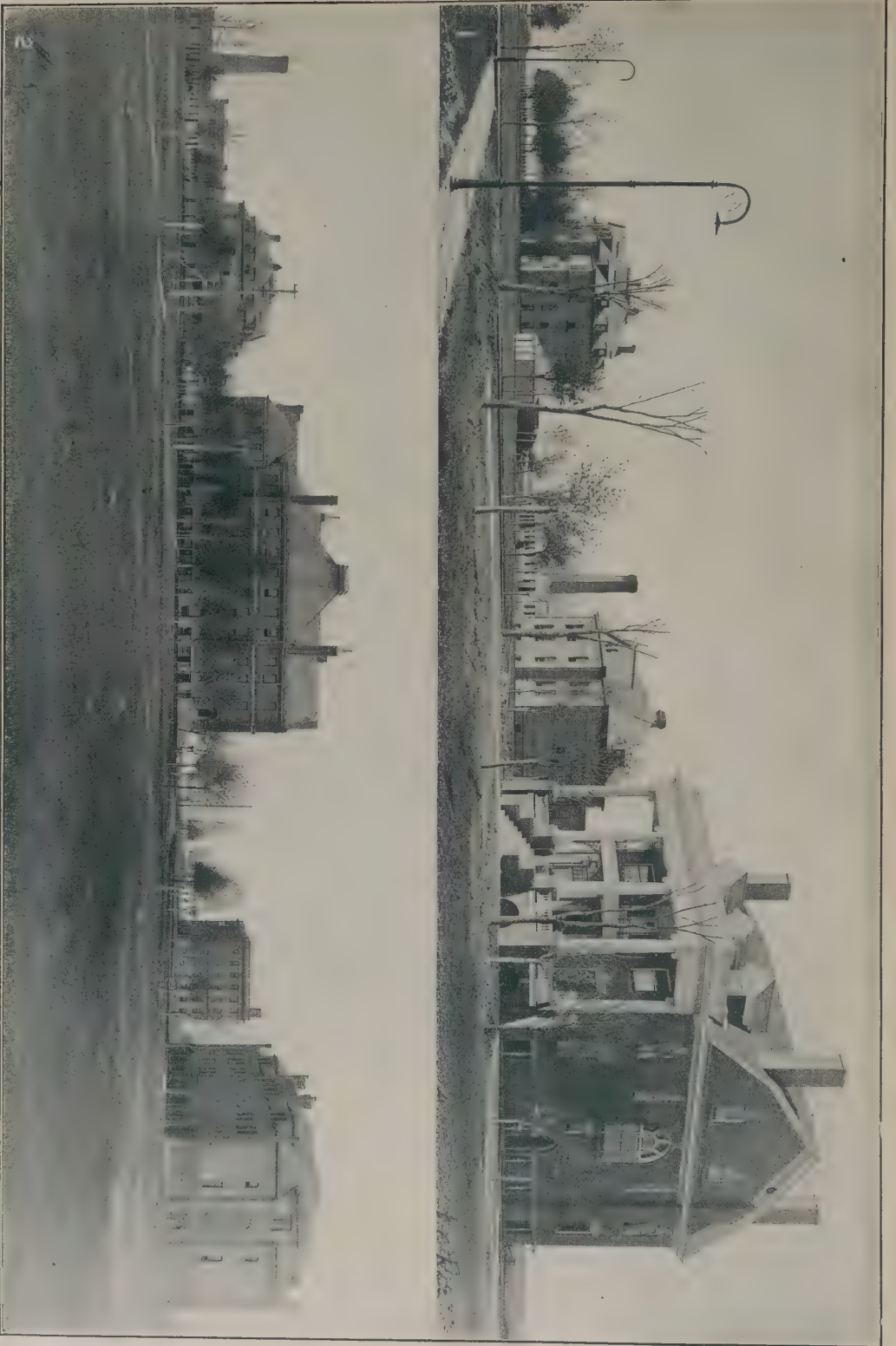
There is a college at Fargo, which was founded in 1887 by the Congregationalists, but which is now nonsectarian, a Methodist college at Grand Forks, which is affiliated with the State University, a Presbyterian college at Jamestown and a number of academies and parochial schools. The State also maintains a legislative reference bureau and an educational reference department. During 1915, the latter department ministered to the needs of

NORTH DAKOTA



State Capitol at Bismarck

NORTH DAKOTA



1 Davis Hall (for Young Women)
2 Mechanical Engineering Building

STATE UNIVERSITY OF NORTH DAKOTA, GRAND FORKS

Power House
Main Building

The College (for Young Women)
Science Hall

President's House
Budge Hall (for Young Men)

some 275 towns and answered the correspondence of 12,000 people. There are also 283 traveling libraries and 1,047 library stations. Three hundred and forty-four newspapers are published within the State.

Religion.—The Catholic population of the State is estimated to be nearly 96,000. The Methodist is about 13,500, the Baptist about 6,300, the Protestant Episcopal about 2,500, the Presbyterian 9,300, the Congregational 9,000, and the Lutheran about 72,100. There are probably 4,000 Jews in the State and about 150 synagogue families.

Charitable and Penal Institutions.—There is a soldiers' home at Lisbon, an asylum for the blind at Grafton, a school for the deaf at Devils Lake, a hospital for the insane at Jamestown, a sanitarium for tuberculosis at Dunseith, a reform school at Mandan, and a penitentiary at Bismarck.

Finances.—The assessed valuation of all property, both real and personal, in the State in 1922 was \$1,300,000,000. The real value of the State, however, is probably in the neighborhood of \$2,000,000,000, the assessments being based on a low percentage. Taxation for State purposes is limited to four mills, exclusive of the interest on the bonded debt. Local indebtedness may not exceed 5 per cent of the assessed valuation of the local property, although incorporated cities may, by special vote, increase this limit. On 1 July 1921 the State had on hand a balance of \$3,054,390.17. Receipts during the fiscal year 1921-22 amounted to \$14,762,853.87. Disbursements for the same period totaled \$15,411,760.94, leaving a balance on hand on 1 July 1922 amounting to \$2,405,483.10. The bonded debt of the State on the latter date was \$7,048,200.

Population and Civil Divisions.—In 1880 the population of North Dakota, which then constituted the northern half of the territory of Dakota, was 36,305, excluding Indians. It is 646,872, including 6,254 Indians, and the school census of 1920 was 233,065. Of the total population 66.7 per cent are either foreign born or of foreign descent. About 25 different nationalities are represented. There are probably 100,000 Norwegians, 60,000 German Russians, and there are also large settlements of Canadians, Icelanders, Swedes, Danes, Austrians, Irish, English, Hungarians, Scotch, Hebrews, French, Welsh, Bohemians, Dutch, Bulgarians, Greeks, Turks, Finns, Estonian and Italians.

There are no large cities in the State, and there is only one with a population which reaches 20,000—Fargo (21,961). There are, however, a number of thriving small ones, of which Grand Forks is the largest, having a population of 14,010. The next largest is Minot, with a population of 10,476. Then follows Bismarck with a population of about 7,000 and Dickinson, Jamestown and Valley City, and Devils Lake, all of which have over 5,000 people. Then a number of towns having a population of less than 5,000, but more than 1,000, and a still larger number of small villages. The Indians number about 6,250, and are found on four reservations, Standing Rock, Fort Berthold, Devils Lake and Turtle Mountain. There is a military post at Fort Lincoln near Bismarck, and another at Devils Lake. The State has 53 counties, which with their county seats are:

County	County seat	County	County seat
Adams.....	Hettinger.....	McHenry....	Towner.....
Barnes.....	Valley City	McIntosh....	Ashley.....
Benson.....	Minnewaukan	McKenzie....	Schafer.....
Billings.....	Medora.....	McLean.....	Washburn
Bottineau....	Bottineau....	Nelson.....	Lakota.....
Bowman.....	Bowman.....	Oliver.....	Center.....
Burke.....	Bowbells....	Pembina....	Cavalier....
Burleigh....	Bismarck....	Pierce.....	Rugby.....
Cass.....	Fargo.....	Ramsey.....	Devils Lake
Cavalier....	Langdon....	Ransom.....	Lisbon.....
Dickey.....	Ellendale....	Renville....	Mohall.....
Divide.....	Crosby.....	Richland....	Wahpeton....
Dunn.....	Manning.....	Rolette.....	Rolla.....
Eddy.....	New Rockford	Sargent.....	Forman.....
Emmons.....	Linton.....	Sioux.....	Fort Yates
Foster.....	Carrington..	Slope.....	Amidon.....
Golden Valley	Beach.....	Stark.....	Dickinson
Grand Forks.	Grand Forks.	Sheridan....	McClusky....
Grant.....	Carson.....	Steele.....	Sherbrooke..
Griggs.....	Cooperstown	Stutsman....	Jamestown..
Hettinger....	Mott.....	Trail.....	Hillsboro....
Kidder.....	Steele.....	Walsh.....	Grafton.....
LaMoure....	LaMoure....	Towner.....	Cando.....
Logan.....	Napoleon....	Ward.....	Minot.....
Mercer.....	Stanton.....	Wells.....	Fessenden..
Morton.....	Mandan.....	Williams....	Williston....
Mountrail....	Stanley.....		

State Government.—The governor is elected for two years. The State officers are elected in November of the even numbered years. The legislature is composed of a senate, whose members are chosen for four years, and a house of representatives, whose members are chosen for two. It meets biennially and its sessions are limited to sixty days. The Judicial Department consists of a Supreme Court, of five members holding office for six years, twelve district judges, holding office for four years, the county judges and justices of the peace. Some of the county judges are given general jurisdiction to a limited amount. Under the new apportionment three representatives are sent to Congress. The constitution makes it a misdemeanor for anyone to interfere with another's obtaining, or enjoying after having obtained, employment from anyone. It also provides for the prohibition of the liquor traffic. Residence in the State for one year is required before an application for a divorce will be entertained and the grounds therefor merely include adultery, cruelty, desertion, habitual drunkenness, incurable insanity and conviction of a felony. The Initiative and Referendum are both in use and on both constitutional and statutory provisions. A system of primary election for all public officers also prevails. Even before the adoption of the 19th amendment women voted in school elections and for non-constitutional officers.

GOVERNORS OF NORTH DAKOTA.

John Miller.....	Republican.....	1889-1891
Andrew H. Burke.....	".....	1891-1893
E. C. D. Shortridge.....	Democrat-Independent.	1893-1895
Roger Allin.....	Republican.....	1895-1897
Frank A. Briggs *.....	".....	1897-1898
Joseph M. Devine.....	".....	1898-1899
Frederic B. Fancher.....	".....	1899-1901
Frank White.....	".....	1901-1905
E. Y. Sarles.....	".....	1905-1907
John Burke.....	Democrat.....	1907-1913
L. B. Hanna.....	Republican.....	1913-1917
Lynn J. Frazier.....	Rep. (Non-Partisan)...	1917-1921
R. A. Nestos.....	Republican.....	1921-

* Died in office.

History.—The old Territory of Dakota took its name from the Dakotas (allies), another name for the Sioux Confederation. Lewis and Clark wintered at Mandan and were at the mouth of the Yellowstone in 1804. In

1810 Lord Selkirk built a fort at Pembina, supposing the territory to be a part of his purchase from the Hudson's Bay Company. The first steamer ascended the Missouri in 1830. Fremont in his explorations penetrated to Devils Lake in 1839. In 1832 George Catlin was here and painted some of his famous Indian portraits. The first purchases of land from the Sioux were made in 1851. In 1857 the first settlement in the Dakotas was made at Sioux Falls in South Dakota.

That part of North Dakota which lies south of the Pembina River was originally a part of the Louisiana Purchase. That part which lies north was conveyed in 1809 by the Hudson's Bay Company to Lord Selkirk and was brought into the United States by the location of the boundary at the 49th parallel in 1811. In December 1912 that portion of the original purchase which lay north of the 33d parallel and which extended to the international boundary was formed into the Territory of Missouri. In 1834 the Territory of Michigan was created and in it was included all of the country east of the Missouri River and north of the States of Missouri and Illinois. North Dakota and South Dakota were contained therein. In 1837 Michigan was admitted as a State and the remaining territory was termed Wisconsin. In 1838 North and South Dakota were taken from the Territory of Wisconsin and added to the Territory of Iowa, which also included Minnesota. In 1849 the eastern part of the Dakotas was merged into the newly created Territory of Minnesota, while in 1854 that part which lay west of the river was included in the Territory of Nebraska. In 1858 Minnesota was admitted into the Union and for a time that portion of the Dakotas which lay east of the Missouri River was unprovided for. This continued until 2 March 1861 when the Territory of Dakota was created and which included not only the Dakotas but Montana, Wyoming and a part of Idaho. From this area Montana was separated in 1873 and on 3 Nov. 1889 the present States of North and South Dakota were given their present boundaries and admitted into the Union.

With the exception of the years 1892 and 1912 North Dakota has always elected a Republican national ticket. It has, however, always been extremely progressive in its policies and was the first State in the Union to hold a preferential primary for the presidency of the United States. This was in 1912. It adopted a primary system in 1905 and the 1916 elections show a complete victory for an agrarian movement which advocates State-owned packing houses, flour mills, terminal grain elevators, State grain inspection and compulsory State hail insurance, a largely extended rural credit system, a State owned bank and the exemption of farm improvements and farm personal property from taxation. The woman's suffrage movement was very pronounced in the State.

ANDREW A. BRUCE,
Chief Justice of Supreme Court of North Dakota.

NORTH DAKOTA, State University of. The State University and School of Mines of North Dakota is located at Grand Forks. It was established by an act of the Territorial legislature approved 27 Feb. 1883. The fol-

lowing colleges or departments have thus far been organized: The College of Law, granting the degree of LL.B.; The College of Liberal Arts, granting the degrees of B.A. and M.A.; The College of Mechanical and Electrical Engineering, granting the degrees of M.E. and E.E. The College of Mining Engineering, granting the degree of E.M.; The Normal College; the School of Commerce; the School of Mines and the School of Pharmacy. The plant of the University consists of eight substantial buildings heated by steam and lighted by electricity. The University has received as a grant from the Federal government 126,080 acres of land which, under the terms of the grant and of the State constitution, may not be sold for less than \$10 an acre. It is probable that this grant will eventually yield a fund of not less than \$2,000,000. The University is maintained by an annual fixed appropriation of two-fifths of a mill on the dollar of the assessed valuation of the State for purposes of taxation. The total income of the University for the year 1922-23 was approximately \$552,300. The University owns, exclusive of its lands, property valued at \$1,575,000. Its library numbers 30,000 volumes. A public health laboratory, a weather bureau station and a station of the Geological Survey are maintained here. A mining substation is located at Hebron and a biological station at Devils Lake.

NORTH DAKOTA AGRICULTURAL COLLEGE, opened in 1891, at Fargo. The regular four years courses include agriculture, general science and mechanical engineering; the shorter courses are agriculture and steam engineering, two years, and a "farm school" of three months; there are also courses in domestic science, military science, literature and science, pharmacy, veterinary science, surgery. The college is open to women and there are women on the faculty. The campus includes 640 acres; a new sewerage system connecting all buildings and grounds with the main sewer of Fargo was completed in 1901. The income is derived mainly from State and Federal appropriations. The college organizes farmers' institutes in all parts of the State, under the supervision of the faculty. The faculty in 1917 numbered 85 and the students 918, of whom about 450 were women. The college grounds and buildings are valued at \$250,000. The annual income is about \$230,000. There are 25,000 volumes in the library.

NORTH DOWNS. See DOWNS.

NORTH FORELAND, för'länd. See FORELANDS, NORTH AND SOUTH.

NORTH GERMAN CONFEDERATION, the union of German States in 1866 under the leadership of Prussia. See GERMAN.

NORTH ISLAND. See NEW ZEALAND.

NORTH KINGSTOWN, R. I., town in Washington County, 23 miles south of Providence, on the New England Navigation Company Line. It is famous for its buildings such as the Old Narragansett Church built in 1707 and Smith's blockhouse built in 1638. There is also an Indian graveyard. Pop. 3,397.

NORTH LITTLE ROCK, Ark. See ARGENTA.

NORTH PLAINFIELD, N. J., borough in Somerset County, 24 miles west of Jersey City and 28 miles west of New York City, on the Central Railroad of New Jersey. Here are situated Mount Saint Mary's College and Herbert's Hall for Exceptional Children. In the neighboring county are stone-quarries, large orchards, stock-farms and dairies. The town's industries are chiefly fruit canneries, bottling works, a woodworking factory and a factory for telescopes. Tourists visit Washington Rock, Elsinore Castle and Wetumpka Falls. Pop. 6,916.

NORTH PLATTE, Neb., town, county-seat of Lincoln County, at the confluence of the North and South Platte rivers and a division point of the Union Pacific Railroad, about 225 miles direct west of Lincoln, capital of the State, on the Lincoln Highway. It is in a productive agricultural region where irrigation has been introduced. Considerable attention is given to stock-raising and the county fair held at North Platte each year is one of the best in the State. Cattle, sugar beets and alfalfa are exported. The Union Pacific Railroad has machine shops here and the roundhouse is the second largest on the system. The payroll averages \$60,000 a month. It has grain elevators, cold storage plant, stock, brick, lumber and coal yards. The school facilities are among the best in the State; in addition to the high school is a junior high school. The United States Land Office is located in the Federal building; also the United States Weather Bureau headquarters and State experimental station. There is a well-equipped Carnegie Library and an active chamber of commerce. The waterworks are municipal property. Pop. 10,466.

NORTH POLE. See ARCTIC REGION; POLAR RESEARCH.

NORTH PROVIDENCE, R. I., town and county-seat of Providence County, five miles northwest of Providence, of which it is a suburb. It is situated on the New York, New Haven and Hartford Railroad. The town owns a public library. The chief factories make woolen goods. Pop. (1920) 7,697.

NORTH RIVER, the name given to the lower course of the Hudson River. This name was applied in the early days when the Delaware was called the South River. See HUDSON RIVER.

NORTH SEA, or GERMAN OCEAN, a northeastern extension of the Atlantic Ocean lying between Great Britain and the continent of Europe; lat. 51° to 61° N.; long. 2° 30' W. to 7° 30' E.: Great Britain with the Orkney and Shetland islands being on the west; Denmark and part of Norway on the east; Strait of Dover, part of France, Belgium, Holland and Germany on the south; and the Arctic Ocean on the north. Extreme length, from the Strait of Dover to Unst, the most northern of the Shetland Isles, about 700 miles; greatest breadth, between Haddingtonshire, Scotland, and Denmark, about 420 miles; area, over 190,000 square miles. The shores of all the countries that surround the North Sea are deeply indented with bays, fiords, inlets and large estuaries; but its most remarkable arm is the Skager Rack,

between Denmark and Norway, which communicates through the Kattegat with the Baltic Sea. The North Sea is deepest on the Norwegian side, where the soundings give 190 fathoms; but the mean depth of the whole basin may be stated at no more than 31 fathoms. The bed of this sea is traversed by several enormous banks, one of which trends from the Firth of Forth, Scotland, in a northeasterly direction, to a distance of 110 miles; others run from Denmark and Jutland upward of 105 miles to the northwest; while the greatest of all, the Dogger Bank, occupies the centre of the sea, from lat. 54° 10' to 57° 24' N. and long. 1° to 6° 7' E. The great oceanic tidal wave which originates in the Atlantic, after having swept the west coasts of Great Britain and Ireland, enters the northern extremity of the North Sea, giving high water nearly simultaneously to the opposite shores of Scotland and Norway. Pursuing its course along the coasts of the former and of England, it rules the tides as far south as the Thames, making the tour of Great Britain in 18 hours. On entering the North Sea, on the north of Scotland, the tidal wave does not exceed 12 feet; but gradually increases to 14, 16, 18 and in the Humber to 20 feet; a difference of height depending on the figure of the shore, the form of the bottom and the direction of incidence of the wave. Three other currents enter the North Sea—the Polar, the Baltic and the Mediterranean currents. The fisheries are the most productive of the world and are specially valuable on the Dogger Bank, on all the shores that bound it, and in the direction of the Orkney and Shetland Isles. Among important rivers draining into it are the Thames, Humber and Forth, the Elbe, Weser, Ems, Rhine, Meuse and Scheldt. The Kaiser Wilhelm Canal affords an entrance into the Baltic without going round Jutland. The North Sea has been from the earliest times one of the most important highways of the world. Consult Mackinder, 'Britain and the British Seas' (1902).

NORTH SMITHFIELD, R. I., town in Providence County, six miles from Woonsocket, on the New York, New Haven and Hartford Railroad. The chief industry is bleaching. Pop. 2,699.

NORTH STAR, in astronomy, the north polar star, of the constellation Ursa Minor, also called Polaris. See URSA MAJOR.

NORTH STAR, ORDER OF. See ORDERS AND DECORATIONS OF HONOR.

NORTH SYDNEY, Canada, town and port of entry, Cape Breton Island and County, province of Nova Scotia, on the northern side of Sydney Harbor, five miles north-northwest of Sydney, and on the Intercolonial Railroad. Coal is mined in large quantities and there are large shipping interests besides some smaller manufactures. It is the general shipping point for farm products and general merchandise going into Newfoundland. Steamers also connect with Saint Lawrence River ports and Charlottetown, a ferry with Sydney, and the Sydney mines with electric railroad. Besides the public schools, Saint Joseph's Academy (Catholic) is located there. The town was first settled in 1792 by Loyalists. Pop. 5,418.

NORTH TARRYTOWN, N. Y., village in Westchester County, 26 miles north of New York on the east bank of the Hudson River and on the New York Central and Hudson River Railroad. It joins Tarrytown and is near Sleepy Hollow, made famous by Washington Irving's 'Legend of Sleepy Hollow.' The Old Dutch Church, erected in 1699, still holds its congregation. In the Sleepy Hollow Cemetery are the graves of Washington Irving, Paul Leicester Ford, Carl Schurz and many representatives of old Knickerbocker families. North Tarrytown manufactures silk and automobiles. Pop. (1920) 5,927.

NORTH TONAWANDA, tön-a-wön'da, N. Y., city in Niagara County, at the confluence of Niagara River and Tonawanda Creek, on the Erie Canal and on the New York Central, the Erie and the Lehigh Valley railroads, opposite Tonawanda, and five miles above Buffalo. Several other railroads, using leased tracks, and electric lines connect the city with Buffalo, Niagara Falls and other places. North Tonawanda is in an agricultural region, but the city is noted for its manufacturing and commercial interests. It has large lumber yards, and the chief manufactures are steam pumps, merry-go-rounds, pig iron, bolts, nuts, structural steel, concrete blocks, gasoline motors, automatic organs, steam radiators, pumps, motor boats, toy railroads, steam piping and a variety of lumber products. The industries represent an invested capital of \$10,000,000, and an annual product worth \$12,000,000. The public library has about 6,000 volumes. The charter of 1897 provides that the government shall be vested in a mayor, who holds office two years, and a council consisting of two members from each ward, and three at large. The city owns and operates the waterworks. Pop. (1920) 15,482.

NORTH VANCOUVER, Canada, city in British Columbia, on the north shore of Burrard Inlet and opposite the city of Vancouver, to which it is connected by ferry, bridge and railroad. A fine boulevard, 150 feet wide, surrounds the city. The magnificent scenery and the fine drives attract many tourists. Nearby are Grouse Mountain (4,350 feet), the Crown (5,600 feet) and the Lions (6,500 feet). The industrial establishments include shipbuilding, doors, sashes, awnings, furniture and cigar factories and numerous lumber mills. Pop. 9,987.

NORTH VERNON, Ind., city and county-seat of Jennings County, 65 miles southeast of Indianapolis and 21 miles southeast of Columbus, on the Baltimore and Ohio Southwestern, the Pittsburgh, Cincinnati, Chicago and Saint Louis and the Cleveland, Cincinnati, Chicago and Saint Louis railroads. It is situated in a fine agricultural district. North Vernon possesses an electric-light plant and waterworks, flour mills, lumber mills and factories producing glass-chimneys, lawn swings, snakes and wood brackets. Pop. (1920) 3,084.

NORTH YAKIMA, Wash., city and county-seat of Yakima County, 157 miles southeast of Seattle, on the Northern Pacific, the Yakima Valley Traction and the Oregon-Washington Railroad and Navigation systems. It is situated on the Yakima River in a rich agricultural and fruit-growing region. The industries are chiefly livestock, dairy-farms, fruit

canneries, flour, saw and lumber mills and cold-storage houses. The town has a Carnegie Library, a fine hospital, Federal and high-school buildings. The commission form of government has been adopted. Pop. 18,539.

NORTHAMPTON, north-äampton, England, a parliamentary and county borough, capital of the county of the same name, 66 miles northwest of London by rail, on the left bank of the Nen, and on the London and North-western and Midland railroads. The principal buildings are the town hall, the shire or county hall, the county and borough jails, corn exchange, barracks, infirmary, theatre, etc. There are a free library, museum, schools of science and art, grammar school, founded in 1552; mechanics' institute, an atheneum and other literary and artistic societies. The benevolent institutions include the infirmary, a lunatic asylum, the Royal Victoria Dispensary, Saint John's and Thomas-a-Becket hospitals, etc. The principal churches are All Saints', founded in 1160, destroyed in the great fire of 1675 and rebuilt by Wren in 1680; Saint Peter's, restored in 1850; Saint Giles', Saint Sepulchre's, dating from the 12th century, and one of the four round churches in England, and the Roman Catholic Cathedral. The staple manufacture is boots and shoes for home and export trade, which employs thousands of hands. The curing of leather is also carried on on a large scale. The races held on a race course north of the town attract great numbers of visitors. Besides two weekly markets there are 11 annual fairs. Northampton, known in Saxon times, was in possession of the Danes from 921 and appears in Domesday Book as Northaneton. It was the meeting place of several parliaments; and here the treaty of Northampton was signed in 1328, guaranteeing the independence of Scotland. In the vicinity Henry VI was defeated in battle by the Yorkists and taken prisoner (10 July 1460). The city was held for the parliament during the Great Civil War. There are interesting Romano-British remains. Consult Adkins, 'Northampton in English History' (London 1898); Campion, 'Northampton with its Surroundings' (Northampton 1907); and the Victoria County History. Pop. 90,064.

NORTHAMPTON, Mass., city, county-seat of Hampshire County, on the Connecticut River and on the New York, New Haven and Hartford and the Boston and Maine railroads, 18 miles north of Springfield, 109 miles west of Boston and about 140 miles from New York City. The largest part of the city is known as the "Center," and the remainder includes the villages of Bay State, Florence and Leeds. Nearby are Mount Holyoke and Mount Tom, both with electric railroads to the summit. The city is on a height which commands a fine view of the river valley. It was settled 14 May 1654 by English colonists and was named after Northampton in England. Jonathan Edwards (q.v.) lived here for some years. It was incorporated on 18 October of the same year and chartered as a city 1 Jan. 1884. It is in a productive agricultural section, but it has extensive manufacturing and commercial interests. The chief manufacturing establishments are sewing-silk mills, basket and paper box factories, lumber mills, brush factory, hardware

works, hosiery mills, sewing-machine and furniture factories, machine shops, pulp mills, emery wheel works and foundries. There are about 3,000 employees in the manufactories. The trade is principally in the manufactured articles and farm products. It has a number of fine buildings and prominent institutions, among which are the Dickinson Hospital, the State Asylum for the Insane (700 patients), and the opera house. The last mentioned, a gift from a native of the city, is owned and managed by the municipality. There are a number of fine church buildings. The educational institutions are Smith College (q.v.); the Burnham Classical School for Girls; the Clarke Institute for Deaf-Mutes, endowed by John Clarke; public and parish schools; three public libraries, gifts of natives of Northampton, and the "Home Culture Club," founded by George W. Cable (q.v.), and assisted by a gift of \$50,000 from Andrew Carnegie. The educational advantages of this club have been of great benefit to a large number of men and women; unique features are the instructions in household arts and amusements. The three national banks have a combined capital of \$650,000, and the three savings banks have a total deposit of \$4,975,000. The "Smith Charities" has peculiar features that make it a most remarkable and beneficent institution. It was founded by the will of a public benefactor, who desired to aid a special class of worthy persons. On certain conditions young men and women and widows receive annual gifts of money, young women receive gifts when they marry and young men, who learn a trade, receive a certain sum of money when they attain the age of 21. The charter of 1883 provides for a board of aldermen and a council of 21 members elected annually by the people. The board of education and the trustees of the Forbes Library are chosen by popular vote. The city owns and operates the waterworks and also its own Municipal Theatre. It is a most healthful community and has a live and energetic board of trade. Pop. 21,951. Consult Trumbull, 'History of Northampton.'

NORTHBRIDGE, Mass., town in Worcester County, on the Mumford and the Blackstone rivers and on the New York, New Haven and Hartford Railroad, about 10 miles southeast of Worcester. It was settled in 1662 and remained a part of Mendon until 1772 when it was incorporated as a separate town. It has a public library and a hospital. Its chief manufacturing establishments are large cotton and woolen mills, machine shops, cotton-mill machine works, furniture and cigar factories, embossed paper, silk mills, etc. The government is administered by annual town meetings. The Whitin Machine Works own and operate the town's waterworks. Pop. (1920) 10,174.

NORTHBROOK, Earl of. See **BARING**, THOMAS GEORGE.

NORTHBROOK, 1st BARON. See **BARING**, SIR FRANCIS THORNHILL.

NORTHCLIFFE, 1st BARON (ALFRED CHARLES WILLIAM HARMSWORTH), English journalist and newspaper proprietor: b. Chapelizod, county Dublin, Ireland, 15 July 1865; d. London, 14 Aug. 1922. He established in 1888 a successful weekly, *Answers*, which he nominally continued to edit; in 1894 he acquired the London

Evening News; and in 1896 he founded the *Daily Mail*, the first half-penny morning newspaper to achieve a distinctive success in England and in which American methods were freely borrowed. Journals of the same kind were established by him in other populous centres. In 1908 he secured control of the London *Times*, his most ambitious venture, and from that time he exercised, by means of his powerful syndicate of newspapers, a strong influence on the public life of the country. After the outbreak of the European War he showed himself a keen critic of the British War Office and its methods. In especial, the attacks on Lord Kitchener that were made by his journals in May 1915 aroused widespread resentment which had an immediately adverse effect on his circulations, and he was accused of endeavoring to assume a dictatorship. But it is not to be denied that his criticisms were fruitful of results—in the formation of a Coalition Ministry and the creation of a Ministry of Munitions; in the general enforcement of compulsory service in England and Scotland; and in an improved British aviation service; and that the strictures passed at the inception of the Allied campaign in Gallipoli were borne out by events. Lord Northcliffe's interests were wide and varied; he equipped the Arctic Expedition of 1894 under F. G. Jackson; he was an authority on motor-ing and did much to advance the science of aviation in the United Kingdom. He visited the United States on several occasions; in 1900 he was given charge for one day of a New York daily and produced it as a quarto, the form he considers newspapers should adopt. He was created a baronet in 1904 and was raised to the peerage as Baron Northcliffe in 1905. In 1918 he came to the United States on a special mission connected with the European War.

NORTHCOTE, nōth'kōte, James, English artist: b. Plymouth, England, 22 Oct. 1746; d. London, 13 July 1831. He early showed a taste for drawing and was encouraged to go to London, where he arrived (1771) with a letter of introduction to Sir Joshua Reynolds, under whom he worked for five years. He visited Italy in 1777, where he spent his time in copying the old masters, especially Titian. He returned to London in 1780, and six years later exhibited his first historical work, 'The Young Princes Murdered in the Tower.' He was elected an academician in 1787. Between 1783 and 1831 he exhibited no less than 229 historical paintings, taking subjects from English history or Shakespeare; these are chiefly remarkable for highly effective composition. The faces are Greek, the costumes absurd, the chiaroscuro fantastic and exaggerated, and the coloring inharmonious. His greatest skill is shown as an animal painter. His portraits are uneven, but those of men are better than those of women, while some of his children's and angels' faces are beautiful. This will be seen from his 'Portrait of Sir Simon Taylor'; 'A Dog and a Hawk'; 'Prince Arthur and Hubert'; 'Four Infant Angels in the Clouds.' He painted altogether some 2,000 works. He was the author of a somewhat commonplace memoir of Sir Joshua Reynolds (1813) and a 'Life' of Titian (1830). Consult Gwynn, Stephen, 'Memorials of an 18th Century Painter' (1898).

NORTHCOTE, Sir **Stafford Henry**, 1st EARL OF IDDESLEIGH, English statesman: b. London, 27 Oct. 1818; d. there, 12 Jan. 1887. He was educated at Eton and at Balliol College, Oxford, became private secretary to Gladstone in 1843; was called to the bar in 1847, and in 1851 succeeded his grandfather in the baronetcy. He sat in Parliament in 1855 for Dudley, in 1858 was elected member for Stamford, and in 1866 for North Devon, which he represented till 1885. In 1862 he published 'Twenty Years of Financial Policy.' In 1866 he became president of the Board of Trade; and 1867-78 was secretary for India. He was chairman of the Hudson's Bay Company 1869-74, and during the critical period of the company's transfer of Prince Rupert Land to the Canadian government visited Canada in its interests. In 1871 he was a member of the high joint commission which arranged the Treaty of Washington; and in 1874-80 was chancellor of the exchequer in the Cabinet of Disraeli. After the Liberals returned to power in 1880 he became Conservative leader in the Commons and as such assisted in effecting the compromise on the Franchise Bill of 1874. In 1885 he was practically superseded to make way for Lord Randolph Churchill, and in the short Salisbury administration of that year was appointed to the nominal office of first lord of the treasury and raised to the peerage. In the second Salisbury government (1886), he held the office of foreign secretary. Consult his published 'Letters and Essays' (1887); Lang, 'Life, Letters and Diaries of Stafford Northcote' (1890).

NORTHEAST, Pa., borough in Erie County, 14 miles northeast of Erie on the New York Central, Lake Shore and Michigan Southern and New York, Chicago and Saint Louis railroads. A Roman Catholic College (Saint Mary's) is situated here. The town has municipal waterworks. Fruit growing is the chief industry; but there are manufactures of grape-juice, canned goods, wines, wooden novelties, baskets, crates, flour, lumber, foundry products and copper. Pop. (1920) 3,481.

NORTHEAST BOUNDARY. See BOUNDARIES OF THE UNITED STATES.

NORTHEAST BOUNDARY DISPUTE, the disagreement between the United States and Great Britain from 1783 to 1842 respecting the northeast frontier. The Treaty of 1783 defined the northeast boundary of the United States, toward Canada, as extending from the source of the Saint Croix due north to the highlands or watershed between the Atlantic and Saint Lawrence systems, thence along those highlands to the northwesternmost head of the Connecticut River. Disputes arising over this definition, an arbitration treaty was signed in 1827, and in 1831 the King of the Netherlands, as arbitrator, made an award to which the American Senate withheld assent. Fresh negotiations were undertaken; friction took place in the disputed territory culminating in the "Aroostook War" (1839); and finally, by the Webster-Ashburton Treaty of 1842, the present line was agreed upon, not greatly differing from that suggested by the Dutch king, and giving about seven-twelfths of the disputed territory (extending in total to 12,027 square miles) to the United States and about five-twelfths to Great Britain.

It was reckoned, however, that in value the area awarded to the United States was equal to four-fifths of the whole. Consult Mr. James White's contribution in 'Canada and Its Provinces' (Vol. VIII, pp. 779-826; Toronto 1914). See BOUNDARIES OF THE UNITED STATES.

NORTHEAST CAPE. See CHELYUSKIN, CAPE.

NORTHEAST PASSAGE. See ARCTIC REGIONS; POLAR RESEARCH.

NORTHERN, nōr'tēn, **Adolph**, German painter: b. Münden, Prussia, 6 Nov. 1828; d. Düsseldorf, 28 May 1876. He was a pupil in the Düsseldorf Academy from 1847 to 1851, when he devoted himself to the delineation of soldier life and battle scenes. In 1852 he began a series of pictures illustrating the wars of Napoleon I. These included 'The Battle of Waterloo' (1855); and 'The Retreat of the Grand Army.' To these he added scenes from the war with Denmark, and from the German-Austrian war 1866. His series portraying the last Franco-Prussian war includes 'The Storming of Weinberg'; 'The Transport of French Prisoners'; and 'The Charge of the 16th Uhlan on a Square.'

NORTHER. See COLD WAVE.

NORTHERN BAPTISTS, the name given to describe the members of the Baptist denomination who live in the northern part of the United States to distinguish them from the Southern Baptists dwelling in the Southern States. The Northern Baptist Convention, a semi-official body, organized in 1907, administers their various activities, such as missions, etc.

NORTHERN BEAR, in international politics, a name often applied to Russia.

NORTHERN BOUNDARY. See BOUNDARIES OF THE UNITED STATES.

NORTHERN DRIFT, in geology, an obsolete name for the boulder-clay of the Pleistocene Period. The deposits were popularly supposed to have been brought by the polar currents from the far North.

NORTHERN GIANT, a name applied formerly in Europe to Russia, alluding to its size, growth and population.

NORTHERN LIGHTS. See AURORA BOREALIS.

NORTHERN MYTHOLOGY. See MYTHOLOGY.

NORTHERN SECURITIES CASE, an important case decided by the United States Supreme Court in 1903. The Northern Securities Company was a corporation organized to take over the stock and the control of the Northern Pacific and the Great Northern railway companies. The question brought before the Supreme Court under the Sherman Anti-trust Law of 1890 was whether the transaction constituted a "contract combination—or conspiracy in restraint of interstate or foreign trade or commerce." (Northern Securities Company v. United States, 193 U. S. 197). The combination was declared to be illegal. The constitutionality of the Act was then questioned; but the court decided that Congress had the power to enact it; and the Northern Securities Company was enjoined from exercising any rights of ownership or control in or

over the stock of the two subsidiary companies. Consult Canfield, 'The Northern Securities Decision and the Sherman Anti-Trust Act' (in *Columbia Law Review*, Vol. IV, New York 1904); Meyer, B. H., 'History of the Northern Securities Case' (Madison 1906); and Coudert, F. R., 'Certainty and Justice' (New York 1913).

NORTHERN TERRITORY. See AUSTRALIA.

NORTHFIELD, Mass., in Franklin County, one of the oldest towns in the Connecticut Valley. Its early history is connected with the French and Indian wars, and it is the most northern town in Massachusetts, located on both sides of the Connecticut River, midway between Greenfield, Mass., and Brattleboro, Vt., and on the Central Vermont Railroad. The town is in an agricultural region and contains some of the very best land in the Connecticut Valley. Its broad macadamized main street over two miles in length, with its four rows of beautiful large elm trees, set out in 1815 by Thomas Power, are the admiration of all visitors. It is famous as a centre of religious training. It is the birthplace of Dwight Lyman Moody and was his home and the scene of much of his work. The annual conferences of Christian workers and of students are held here during the summer. The Young Ladies Seminary, founded by D. L. Moody in 1879, is located here and the Mount Hermon School for boys, founded in 1881, in the adjacent town of Gill is connected with the Northfield educational work. The government is administered by town meetings. Its population 1,781, not including the seminary students.

NORTHFIELD, Minn., city in Rice County, on the Cannon River, and on the Chicago Great Western and the Chicago, Minneapolis and Saint Paul and Rock Island railroads; also on the Dan Patch Electric Line. It was settled in 1856 and in 1875 was chartered as a city. It is situated in an exceedingly fertile agricultural section in which dairying is the principal industry. It is the largest Holstein-Friesian cattle community in the country. It is the seat of Carleton College opened in 1866 by the Congregational Church but non-sectarian in teaching, an institution of 70 teachers, about 850 students and \$1,700,000 endowment. It is the home of Saint Olaf College founded in 1875 under the auspices of the United Lutheran Church, and now has over 928 students. The Scoville library and the Goodsell observatory are part of Carleton College. There is a Carnegie library and one of the best high schools in the State. It has the Odd Fellows Home, a community building, nine churches, electric power, gas, municipal waterworks and public baths. Northfield was settled in 1856 and is governed under a city charter of 1875 which provides for a mayor, elected biennially, and a unicameral council. Pop. (excluding students) 4,023.

NORTHFIELD, Vt., town, including a village of the same name, in Washington County, on the Dog River, and on the Central Vermont Railroad, about nine miles south by west of Montpelier. It is in a valley surrounded by low hills and mountains. Bald and Paine mountains are near. It contains the Carnegie and Brown libraries, a monument to Governor Paine and a soldiers' monument. In the vicinity

are black slate and granite quarries. The chief industries are connected with the quarrying of granite and slate, and with farm and dairy products. It has flour and lumber mills and hosiery and woolen factories. It is the seat of the Norwich University, established in 1819 and opened in 1834. The village owns and operates the electric-light plant. Pop. 1,916.

NORTHFIELD CONFERENCES AND SUMMER SCHOOLS, a series of meetings for Christian workers established at East Northfield, Mass., in 1882, by the evangelist, Dwight L. Moody (1837-99), a native of that town. The first meeting was a student conference in 1886. This conference has assembled once a year ever since that date. The object is to interest students from various colleges in activities of religious endeavor, particularly missions. The General Conference of Christian Workers has met here annually ever since 1888. Other annual gatherings include the Sunday School Workers Conference, the Young Women's Conference, the Home Mission School and the Foreign Missionary School. Associated with the work is the Mount Hermon School which gives courses in Bible study during the summer.

NORTHINGTON, nôr'thing-tôn, **Robert Henley**, 1st EARL OF, English statesman; b. about 1708; d. Grange, England, 14 Jan. 1772. He was educated at Oxford; in 1733 was called to the bar and in 1747-57 sat in Parliament for Bath. In 1756 he was appointed Attorney-General and in the next year became Lord Keeper of the Great Seal (the last to hold that office) and took his seat as speaker of the House of Lords, over which he presided for three years. In 1761 he was made Lord Chancellor and owing to ill-health resigned in 1767. First attached to the Leicester House party, he became one of the "King's friends."

NORTHMEN. See NORMANS.

NORTHROP, nôr'thrŭp, **Birdsey Grant**, American educator and clergyman; b. Kent, Conn., 18 July 1817; d. Clinton, Conn., 28 April 1898. He was graduated at Yale in 1841; and from its divinity school in 1845; and was subsequently a pastor of a Congregational church at Saxonsville, Mass., for 10 years. He was agent of the Massachusetts State Board of Education and secretary of the Board of Education of Connecticut 1857-67 and in the latter office was partly instrumental in the introduction of free and compulsory education. He introduced the observance of Arbor Day in schools and was considered as the "father of Village Improvement Societies." In 1872 he was invited by the Japanese government to establish a system of public education in Japan. Although he declined the honor, he rendered such valuable service to that country that he was received as the guest of the Japanese nation.

NORTHROP, **Cyrus**, American educator; b. Ridgefield, Conn., 30 Sept. 1834. He was graduated at Yale in 1857, from its law school in 1859 and was admitted to the bar in 1860. He was clerk of the Connecticut house of representatives in 1862 and of its senate in 1863. He became editor of the New Haven *Palladium* in 1863 and in 1863-84 was professor of rhetoric and English literature at Yale. From 1869-81 he was collector of the port of New Haven;

president University of Minnesota 1884-1911, thereafter president emeritus. Died 3 April 1922.

NORTHROP, Harry Pinckney, American Roman Catholic bishop: b. Charleston, S. C., 5 May 1842; d. 7 June 1916. He was graduated at Mount Saint Mary's College, Emmitsburg, Md., in 1860, studied four years in the theological seminary there and at the American College in Rome, and was ordained to the priesthood in 1865. He held several pastorates in his native city and elsewhere, and was consecrated in 1882 as vicar apostolic of North Carolina. In 1883 he was transferred by papal brief to the see of Charleston.

NORTHUMBERLAND, nôr-thûm'bér-land, **John Dudley**, DUKE OF, English statesman: b. England, 1502; d. London, 22 Aug. 1553. During the war with France 1544-45 he commanded the English squadron, accompanied Hertford in his invasion of Scotland and later was one of the executors of the will of Henry VIII. In 1547 he took a decisive part in the battle of Pinkie and suppressed Ket's rebellion in 1549. He schemed against Somerset, the Protector, and in 1550 was the dominant influence in the council and the chief instrument in his condemnation and execution. The next year he was created Duke of Northumberland, lord high steward and earl marshal. Then ambition overleaped itself. His fourth son, Lord Guilford Dudley, married Lady Jane Grey in May 1553 and the duke persuaded Edward VI to name her as his successor, thus setting aside the Princesses Mary and Elizabeth. Through Northumberland's influence she was placed on the throne 10 July, but the scheme miscarried and he was executed for high treason. He was the ablest general of his time, adopted the Reformation that he might pillage the religious houses and recanted on the scaffold.

NORTHUMBERLAND, Robert de Mowbray, EARL OF, English warrior: d. about 1125. He was a son of Roger de Montbri, a follower of William the Conqueror, and was made Earl of Northumberland some time not far from 1080. He was constantly engaged in feudal quarrels in the course of which he burned Bath and ravaged Wiltshire; and when Malcom, king of Scots, invaded England for a second time in 1093 he was met and slain by Mowbray at Alnwick. He raised an insurrection in 1095 and endeavored to wrest from the Conqueror's sons the crown and give it to their cousin, Count Stephen of Aumâle. At first successful, he was finally forced to retreat to his great castle of Bamborough, where, after a stout resistance, he was finally taken, and though reports conflict, it is reasonably certain that the remaining 30 or more years of his life were spent in prison. He founded the priory at Tyne-mouth.

NORTHUMBERLAND, Earls of. See PERCY.

NORTHUMBERLAND, 7TH DUKE OF, Henry George Percy: b. 1846; d. 14 May 1918. He was educated at Oxford University, served in the army (volunteers) and sat in the House of Commons for 17 years before he succeeded to the dukedom in 1899. Of great wealth and numerous titles, he filled a number of public offices—as a magistrate, a Fellow of the Royal Society and president of the Royal Institution;

a trustee of the British Museum and treasurer of Queen Victoria's household. As lord high steward he carried Saint Edward's crown at the coronation of King George in 1911. His sons won high distinctions in the army during the Egyptian, South African and European wars.

NORTHUMBERLAND, England, a maritime county bordering on Scotland and on the North Sea; fifth in size of English counties; area, 2,018 square miles. The county-seat is Newcastle-upon-Tyne, and other large towns are Wallsend and Tynemouth. The surface is diversified with hill, moorland and valley, gradually rising from the coast to the Cheviot range, and its principal river is the Tyne. Beans, wheat and barley are the principal crops; shorthorns and Cheviot sheep are largely raised. Coal and iron mining and their supplemental industries place Northumberland high among the most productive counties of England. It is celebrated for its archaeological remains, Hadrian's Wall crossing the county in the direction of Solway. Consult histories by Bates (1895); Hodgson (1820-40: a recognized authority); and that published in 10 volumes by Reid of Newcastle (1893-1914); Gibson, 'Renowned Castles, Churches and Antiquities' (1848-54); and Bruce, 'The Roman Wall' (1874).

NORTHUMBERLAND, Pa., town in Northumberland County, 54 miles north of Harrisburg, on the Susquehanna River and on the Pennsylvania, the Philadelphia and Reading and the Delaware, Lackawanna and Western railroads. The town is beautifully situated in picturesque mountain scenery and is a popular summer resort. Two large bridges span the river at this point. In the vicinity are mineral springs and large deposits of iron ore and limestone. The town manufactures nails, hats and caps, coffins and silk, and has flour mills, planing mills, iron works, forge works and extensive freight yards with machine shops and other buildings constructed by the Pennsylvania Railroad Company. Pop. 3,517.

NORTHUMBRIA, England, an ancient Anglo-Saxon kingdom, one of the Heptarchy, which extended from the Humber to the Forth and included Lancaster and Cumberland, and was bounded on the west by the kingdoms of Strathclyde and Cumbria. The kingdom was founded by Ida, an Anglican chief, who invaded the country in 547. On the death of Ida in 560 part of it was incorporated in the kingdom of Deira, which occupied also what is now Yorkshire. Bernicia and Deira were united under Ethelfrith in 593. It was Christianized under Edwin (617-33) and his successor, Saint Oswald (d. 642). In 792 it was ravaged by the Danes. While it became subordinate to Wessex in 827, under King Egbert, it was not until after the Norman Conquest that the kingdom really became an integral part of England.

NORTHWEST BOUNDARY. See BOUNDARIES OF THE UNITED STATES.

NORTHWEST BOUNDARY DISPUTE, the disagreement between the United States and Great Britain from 1814 to 1846, respecting the northwest frontier. The territory bounded north by lat. 54° 40', east by the Rocky Mountains, south by lat. 42°, and west by the Pacific Ocean, had been claimed

at various times and to various extents by Russia, Spain, Great Britain and the United States. The Russian claim, which rested mainly upon occupation by fur traders, was settled by a treaty 11 Jan. 1825. Under this treaty the United States were to make no settlements north of lat. $54^{\circ} 40'$, and Russia none south of that latitude. Great Britain and Russia agreed upon the same terms. The Spanish claims were confined south of lat. 42° by the treaty which ceded Florida in 1819. Great Britain had little or no claim by discovery. The United States claim rested upon the voyage of Gray up the Columbia River in 1792 and the explorations of Lewis and Clark through the Rocky Mountains and through the Oregon country in 1805-06, under the orders of Jefferson. By the treaty of 20 Oct. 1818 the whole territory west of the Rocky Mountains was to be opened to both countries for 10 years and, in 1827, the joint occupation for an indefinite period was agreed upon. Later this produced dissatisfaction and, after considerable negotiation, Great Britain was induced in 1846 to accept lat. 49° as the boundary from the Rocky Mountains to the channel between Vancouver Island and the mainland. See **BOUNDARIES OF THE UNITED STATES; ALASKAN BOUNDARY COMMISSION.**

NORTHWEST COMPANY, The. An organization, chiefly of Scottish-Canadian traders, formed in 1783 as a rival in the fur trade of the Hudson's Bay Company, which since 1670 had enjoyed by charter a monopoly of trade in Prince Rupert's Land. This company absorbed one of its rivals, the X-Y Company, in 1795; performed a great work in the exploration of the Pacific slope; decided in 1805 to extend its posts to the mouth of the Columbia, and built several forts south of lat. 49° but was forestalled at the mouth of the Columbia by the founding of Astoria in 1811 by the Pacific Fur Company, established by John Jacob Astor, which company it absorbed in 1813. It strongly opposed the Selkirk settlement on the Red River—an opposition which culminated in the Seven Oaks affray in 1816; and in 1821 it was incorporated by the Hudson's Bay Company.

NORTHWEST FRONTIER PROVINCE, India. A political and administrative province of British India, constituted in 1901, out of part of the province of the Punjab. It is bounded on the north by the Hindu Kush, on the south by Baluchistan, on the east by Kashmir and the Punjab and on the west by Afghanistan. It has an area of 38,665 square miles; but only 13,193 square miles are British territory, the remainder being inhabited by tribes under the political control of the agent to the governor-general of India. These mountain regions came under the suzerainty of the British government during the latest Afghan War; and it was the attempt, on the part of the conservative administration of Great Britain, to separate these tribes from the quasi-authority of the Amir of Kabul, and to bring them under the power of Great Britain, which led to the Afghan War of 1878.

Pathans from the greater part of the population and are the dominant class. About 92 per cent of the people are Mohammedans of the Sunni sect; 65 per cent are engaged in agriculture and 14 per cent in industry.

The capital of the province is the ancient city of Peshawar (q.v.), the residence of the chief commissioner. There are deputy commissioners at Peshawar, Abbotabad, Kohat and Dera Ismail Khan. Outside the native city of Peshawar there is a large military cantonment and there are outlying stations of English and native troops. There is railway communication from India to Peshawar, crossing the river Indus at Attok, and running to the entrance of the Khyber Pass. There is also a railroad to Kohat, and to Dera Ismail Khan.

The Peshawar Valley is watered by the Kabul River, which empties itself into the Indus at Attok; and the Derajat Valley is drained by the Kuram and the Gambila rivers. On the left bank of the Kabul River is the district of Yusufzai, inhabited by an Afghan people speaking the Afghan language. Nearly all the invading armies of northern India have passed through the Peshawar Valley. In this valley there are interesting and important Buddhist remains. The most notable of these are at Takh-i-Bhai, a short distance from Murdan, and the Gurdhatra in the centre of the city of Peshawar. The valley is said to have been frequently visited by Gautama, the founder of Buddhism. It is notoriously unhealthy and is designated by the British soldier "the valley of death." The temperature ranges from a minimum of 17° in February to a maximum of 137° in July. The rainfall varies from 17 to 25 inches. There are two rainy seasons, the monsoon and winter; two harvest seasons, spring and autumn, wheat being the chief product of the spring and millet of the autumn harvest. The principal agricultural products of the province are wheat, millet, jawar, cotton, rice and indigo. The Peshawar Valley is especially celebrated for its rice. The poppy plant is extensively grown in the Darajat. The cultivation of the land mainly depends upon artificial irrigation. Rock salt is the principal mineral product. Pop. of British territory 2,196,933.

NORTHWEST PASSAGE. See **ARCTIC REGIONS; POLAR RESEARCH.**

NORTHWEST PROVINCES, India, until 1901 the designation of a political division now the UNITED PROVINCES OF AGRA AND OUDH (q.v.).

NORTHWEST TERRITORIES, Canada, the general name first given to the great areas of British North America lying northwest of the watershed of the Saint Lawrence River. The boundaries have been gradually circumscribed by the creation of the provinces of Manitoba, Saskatchewan and Alberta and the Yukon territory and by successive extensions of the provincial boundaries. The most recent boundary extension act, that of 1912, enlarged the provinces of Manitoba, Ontario and Quebec by areas formerly included in the territories. Manitoba received an accession of 178,100 square miles, Ontario 146,000 square miles, and by the addition of Ungava and that part of Labrador which is included in the Dominion of Canada, Quebec acquired 354,961 square miles of additional territory. The Northwest Territories now comprise the old provisional districts of Mackenzie, Franklin and Keewatin, lying north of the provinces of Alberta, Saskatchewan and Manitoba, extending to the Arctic Ocean and including the islands

therein as far north as land has been discovered. The area is estimated at 1,242,224 square miles, of which 34,298 square miles are water; and the population of this vast area, which is decreasing, is about 10,500, of which 5,100 are Indians, 2,600 Eskimos and the remainder chiefly half-breeds. The territories form mainly an undulating plain or tableland, and all the shores overlook tidal waters. The principal lakes are the Great Bear and Great Slave lakes, respectively, 11,800 and 11,700 square miles in area. The Mackenzie River has a total length of 2,525 miles, and with its tributaries drains an area of 682,000 square miles; the second river, the Dubawnt, is 875 miles in length. The climate varies greatly according to location from temperate to arctic. In the western part the vegetation is similar to that of the Prairie provinces; but north and northeast the vegetation becomes stunted, and about half the total area of the territories is composed of great treeless plains known as the Barren Lands. In the Mackenzie Valley garden vegetables are successfully raised, and the soil is well adapted for oats and barley. Animal life varies as it passes from the Canadian through the Hudsonian to the Arctic Zone, and includes moose, beavers, bears, caribou, white wolf and seals. Fish, which are very abundant, form the staple food of the inhabitants, and include whitefish, the most valuable fish food of the north. Gold was first attempted to be worked by Sir Martin Frobisher in 1576, and it is known that veins exist; copper is abundant, and coal occurs in large quantity in the southwestern part of the territories. The seat of government is Ottawa, and it is under the jurisdiction of the commissioner of the Royal Northwest Mounted Police. Consult Tyrrell, J. B., 'The Northwest Territories' (in 'Canada and Its Provinces,' Vol. XXII, 1914).

NORTHWEST TERRITORY, United States, the name given by the Continental Congress of America, in 1787, to a region east of the Mississippi, north of the Ohio, south and west of the Great Lakes and west of Pennsylvania. The greater part of this territory belonged to France prior to 1763, when, by treaty, Great Britain became possessor of all the domain east of the Mississippi, in North America, which had been claimed by France. The territory west of the Alleghany Mountains and north of the Ohio River was, in 1774, annexed to the province of Quebec. By the treaty of peace with Great Britain, at the close of the Revolutionary War, in 1783, this region was ceded to the United States. Its area was about 265,878 square miles and it bordered on all the great interior waterways of North America which had been explored; the Saint Lawrence River, because a part of the Great Lakes, not excluded. The exact status of this territory was a subject of dispute for several years, on account of the conflicting claims of ownership of New York, Virginia, Connecticut and Massachusetts. The States mentioned cited in support of their claims various early grants from the Crown and conquests of Indian tribes. The original Colonial charter usually gave definite north, east and south boundaries but that of the west was often the sea, the South Sea, the ocean, etc., which was interpreted as Pacific Ocean. The other States of the Union refused to recog-

nize the claims based on charters and acts as cited, but held that the lands in question should belong to the whole Union and should be administered for the common good. Congress in session, in 1780, gave a pledge to the Union that if the States claiming this western territory should cede it to the Confederation it should be used for the good of all the States, and should, in due time and under proper conditions, be admitted as States of the Union, with equal rights and privileges with the original States. New York was the first to cede her claims, in 1781; three years later Virginia ceded her claims, except a section north of the Ohio River (now the southern part of the State of Ohio) called for some time the "Virginia Military District." In 1785 Massachusetts gave up her claims, and in 1786 Connecticut ceded all except a strip extending from the Pennsylvania boundary westward 120 miles, comprising about 6,000 square miles and called the "Western Reserve" (q.v.). Connecticut retained jurisdiction over this territory until 1800. A tract of 500,000 acres, in the western part of the "Western Reserve," was donated by Connecticut as "Fire Lands" to be divided as directed among such of its citizens as had been damaged by incursions of the British troops during the Revolutionary War. On 13 July 1787 the "Northwest Territory" was established by the Continental Congress. The ordinance was prepared by the chairman of the committee, Nathan Dane of Massachusetts. This ordinance provided for the enactment of certain rules deemed necessary for the public good, the chief provisions of which were (1) that not less than three nor more than five States should be formed out of the "Northwest Territory"; (2) that slavery should be prohibited forever within its borders; (3) that religious freedom should be wholly and entirely established and maintained; (4) that schools and means of education should be forever encouraged; (5) that the writ of habeas corpus and trial by jury should be guaranteed to all its inhabitants. A form of government was provided for and the territory was divided. It was further provided that when any one of the divisions had a population of 60,000 it might be admitted into the Union as a State. Certain conditions of admission were exacted in accordance with the Ordinance of 1787. The Continental Congress which established the "Northwest Territory" and so wisely provided for its admission into the Union had its last roll-call 10 Oct. 1788.

The new Congress confirmed the ordinance relating to this Territory. At first the government was administered by means of a governor, secretary and three judges appointed by Congress, who governed the whole as one district. The governor and judges sitting together had power to make and execute such laws as they deemed needful for the district, subject to the approval of Congress, until such time as the Territory would have a legislature of its own. Provision was made for a legislature when there were in the Territory 5,000 free male inhabitants of full age to be voters. This legislature was to consist of a legislative council of five members, chosen by Congress, and a house of representatives chosen by male inhabitants who were freeholders. The first governor of the Northwest Territory, Arthur St. Clair, was

appointed October 1787. He arrived at Marietta, the capital, July 1788. His first official act was the founding of Washington County. He appointed magistrates, established courts, arranged for defense against the Indians and in every way sought to promote the advancement of the country. The first legislature of the Territory met 24 Sept. 1799. The house of representatives had 22 members, representatives of the nine counties of the whole Territory. In May 1800, upon petition, Congress divided the Northwest Territory into two territorial governments, the boundary between which was a line extending from the mouth of the Kentucky River north to Canada. The portion east of this line was called "Territory Northwest of the River Ohio," and its capital was Chillicothe. The portion west of this line was called "Indiana Territory," and the capital was Vincennes. William Henry Harrison was first governor of the "Indiana Territory." Virginia completed her articles of cession 1 March 1784. On that same day Jefferson, as chairman of a committee, proposed a plan which was adopted by Congress 23 April 1784. The territory was to be divided into States, each State two degrees wide and the lines to be intersected by two meridians, one passing through the falls of the Ohio and the other through the mouth of Kanawha River. The States were to be named Chersonesus, Assenisipia, Sylvania, Pelisipia, Illinoia, Polyptoamia, Washington, Mesopotamia and Michigania. Slavery or involuntary servitude were to be allowed only as a punishment for crime. The plan never went into effect and was superseded by the Ordinance of 1787, whereby the Northwest Territory was established as mentioned. In 1785, the year Massachusetts yielded her claims, Congress provided for a survey of the lands in dispute. Ohio, the first State formed out of the Northwest Territory, was admitted in 1803 and was the 17th State of the Union. Michigan Territory was created January 1805 and William Hull was first governor. It was admitted as a State in 1837. Illinois Territory was organized in 1809; Kaskaskia was the capital. It was admitted as a State on 3 Dec. 1818. Indiana was admitted as a State in 1816. A part of Michigan Territory was in 1836 organized as the Territory of Wisconsin. It became a State in 1837. A part of the Territory of Wisconsin is now the eastern part of Minnesota.

Consult Hinsdale, B. A., 'The Old Northwest' (2d ed., New York 1889); McCarthy, D. G., 'Territorial Governors of the Old Northwest' (Iowa City 1910); Merriam, J. M., on the 'Legislative History of the Northwest Ordinance' (in 'Proceedings' of American Antiquarian Society, April 1888); Moore, C., 'The Northwest under Three Flags' (New York 1900).

NORTHWESTERN COLLEGE, a co-educational institution in Naperville, Ill., founded by the Evangelical Association in 1861. Its faculty comprises 42 professors and instructors and there are nearly 600 students. The library contained about 15,000 volumes; the grounds, buildings and other property in 1922 were valued at \$626,789.73 and its income for the year was given as \$167,782.45. The number of graduates is more than 700.

NORTHWESTERN UNIVERSITY, Ill., chartered under the auspices of the Methodist Episcopal Church, in 1851, and first opened in 1855. The first department organized was the collegiate department; the present organization includes (1) the College of Liberal Arts; (2) the Medical School; (3) the Law School; (4) the School of Pharmacy; (5) the Dental School; and (6) the School of Music; the college and the School of Music are at Evanston, Ill., and the professional schools in the city of Chicago. The university also maintains three secondary schools, namely, the academy at Evanston, Grand Prairie Seminary at Onarga, Ill., and Elgin Academy at Elgin, Ill. The Garrett Biblical Institute, a theological school under separate management, is located on the college campus, and is in close co-operation with the university; the Norwegian-Danish Theological School and the Swedish Theological Seminary are affiliated with the institute. The work of the College of Liberal Arts is mainly elective, the courses being arranged for major work in one department and minor work in another; the degrees of A.B. and B.S. are conferred; the corresponding master's degrees and the degree of doctor of philosophy are conferred for graduate work. The government is by a board of 36 trustees elected by the board, to which are added eight chosen by Church conferences. Women are admitted, and dormitories on the campus are provided for their use. The campus contains about 75 acres of ground, on the shores of Lake Michigan; the buildings include the old college, the first building erected, University Hall, the Fayerweather Hall of Science, the gymnasium, the observatory and the library. The professional schools occupy their own buildings in Chicago, the law school, school of pharmacy, and dental school being in Northwestern University Building at the corner of Lake and Dearborn streets, and the medical school having two buildings on Dearborn street, between 24th and 25th streets. There is a large athletic field, and the athletic affairs of the university are under the management of a committee of 15, 5 from the faculty, 5 from the alumni and 5 from the students. The Students' Debating Society is affiliated with the Central Debating League, including the students' societies of the universities of Michigan, Chicago and Minnesota; and with the Northern Oratorical League, including societies from the universities of Michigan, Wisconsin, Iowa, Chicago, Minnesota and Oberlin College. The college library contains over 140,000 volumes, besides 35,000 pamphlets, and the professional schools have also special libraries. In 1922 the productive funds amounted to \$5,200,000, and all property was valued at \$13,060,000. Its income was \$2,000,000; number of students in attendance, 8,500; number of professors and instructors, about 575.

NORTHWICH, England, town in Chester, at the confluence of the Weaver and Dane, 16 miles northeast of Chester and 172 miles northwest of London, on the London and Northwestern Railway. It is noted for its salt mines and brine springs which have been worked from prehistoric times. Northwich is still the centre of the principal production of salt in Great Britain. Both rock salt and white salt obtained by evaporation from brine are exported. The white salt produced here is sent chiefly to

America. The annual product amounts to about 1,500,000 tons. The Marston Mine, 300 feet deep, is very picturesque with its vault supported by enormous salt pillars. Owing to the pumping of brine for the manufacture of salt and alkali, the town has caved in at many places. Some of the houses have sunk or stand at fantastic angles. In 1892 a portion of High street which had sunk had to be raised six feet. Boats are built here to convey salt to Liverpool down the river Weaver which is connected by a hydraulic lift a mile from the town with the Trent and Mersey Canal at a higher level. The chemical works at Northwich are among the largest in the world. Other industries include manufactures of bricks, iron, brass, leather, fur, tanneries and iron foundries. The principal buildings are the church of Saint Helen, Witton, with a finely curved roof of the 17th century and a market-house. A museum and a library were presented to the town by Sir John Brunner in 1887. In the same year Robert Verdin gave Verdin Park to Northwich. Pop. 18,151.

NORTON, nôr'tôn, **Andrews**, American Unitarian theologian: b. Hingham, Mass., 31 Dec. 1786; d. Newport, R. I., 18 Sept. 1852. He was graduated at Harvard in 1804, and after studying theology was a tutor in Bowdoin College in 1809. He returned to Harvard in 1811 as mathematical tutor there; and became in 1813 librarian of the university and lecturer on Biblical criticism and interpretation. In 1819-30 he was Dexter professor of sacred literature. He was among the most eminent exponents of Unitarianism, equally strong in his protests against Calvinism and the naturalistic theology represented by Theodore Parker. He published 'Reasons for not Believing the Doctrines of Trinitarians' (1833; new ed., with memoir by W. Newell, 1856; 11th ed., 1876); 'The Genuineness of the Gospels' (1837-44); 'The Latest Form of Infidelity' (1839). In 1833 with Charles Folsom he inaugurated the *Select Journal of Foreign Periodical Literature* (4 vols., 1833-34). For his verse consult Griswold, 'Poets and Poetry of America' (Philadelphia 1842).

NORTON, **Caroline Elizabeth Sarah Sheridan**, English poet and novelist: b. London, 1808; d. there, 15 March 1877. A granddaughter of Richard Brinsley Sheridan and a sister of Lady Dufferin, she showed her talent at 13 with 'The Dandies' Rout.' She was married to George Chapple Norton in 1827; procured for him a police magistracy by her influence with the Home Office; broke with her husband in 1836, when he accused Lord Melbourne (q.v.) of criminal intercourse with her; and was vindicated entirely of this charge in a famous suit, the basis of Dickens' *Bardell v. Pickwick*, in the 'Pickwick Papers.' Her differences with her husband were not then ended, for he claimed not only the custody of her children but the income from her writings. She wrote 'English Laws for Women in the Nineteenth Century,' a pamphlet which contributed to the change of English laws as to the status of women. Two weeks before her death Mrs. Norton was married to Sir William Stirling-Maxwell. A supposed episode in which she, Melbourne and Barnes of the *Times*

figured was made the basis of Meredith's 'Diana of the Crossways'; but the novelist in his latest editions warns his readers that the story "is to be read as fiction." Her principal works are 'The Sorrows of Rosalie' (1829), a Byronic poem; 'The Dream' (1840); 'The Lady of La Garaye' (1862), her best poem, which has much the tone of Campbell; 'A Voice from the Factories' (1836), and 'The Child of the Islands' (1845), both attacking social conditions; and the novels, partly autobiographical, 'Stuart of Dunleath' (1851), 'Lost and Saved' (1863), and 'Old Sir Douglas' (1867). Consult the 'Life,' by Jane G. Perkins (1909).

NORTON, **Charles Eliot**, American scholar: b. Cambridge, Mass., 16 Nov. 1827; d. there, 21 Oct. 1908. He was a son of Andrews Norton (q.v.) and after he was graduated from Harvard in 1840 was in the employ of a Boston establishment in the India trade. Except a voyage to India in 1849 and various trips to Europe his life was passed in the house where he was born. During the Civil War period he edited the papers of the Loyal Publication Society and with his friend, J. R. Lowell, edited the *North American Review* 1864-68. From 1875 to 1898 he was professor of the history of art at Harvard, becoming professor emeritus in the year last named. As a Harvard professor he exercised a salutary influence over successive generations of colleagues before whom he has placed the highest ideas. The young men were helped by him to quicker perception of what culture really is as well as to discriminative discernment between true and false culture—between thoughtful, intelligent citizenship, and the noisy, puppyish assertion that so often passes itself off as patriotism. Few Americans have been sterner critics than he of whatever in American life falls below an ideal standard, and as a consequence few men, not professedly politicians, have been the target for so much adverse comment as was Professor Norton. Stigmatized often as unpatriotic he rose to a much higher level of patriotism than his critics. He enjoyed the friendship of many of the foremost personages of his time and was the literary executor of such men as Lowell, Carlyle, Emerson, Curtis and Ruskin. He was the foremost of American Dante scholars and was the founder of the American Dante Society, as well as of the Archæological Institute of America, of which he was the president for many years. His published books include 'Considerations on Some Recent Social Theories' (1853); 'The New Life of Dante' (1859, a partial translation with essays, followed by a complete translation); 'Notes of Travel and Study in Italy' (1860); 'Historical Study of Church Building in the Middle Ages' (1880); 'The Divine Comedy of Dante' (1891-92), a much-prized prose translation; 'Poetry of Gray as a Naturalist' (1903); 'Longfellow' (1907); 'A History of Ancient Art,' lectures of Norton's edited by Brown and Wiggin (1891). He also edited 'The Early Letters of Thomas Carlyle' (1886); 'Letters of James Russell Lowell' (1894); 'Letters of Ruskin to C. E. Norton' (1904). Consult Emerson and Harris, 'C. E. Norton' (Boston 1912) and Norton, Sara, and De Wolfe Howe, M. A., 'Letters of Charles Eliot Norton, with Biographical Comment' (2 vols., Boston 1913).

NORTON, Frank Henry, American journalist: b. Hingham, Mass., 20 March 1836; d. Brooklyn, 19 Feb. 1921. He was connected with the Astor Library in New York (1855-65) as assistant librarian and assistant superintendent. Entering journalism in 1872, he was editor and owner of the New York *Era* 1879-81, and from 1883-91 was on the staff of the New York *Herald*. Besides such dramatic burlesques, etc., as 'Alhambra,' 'Cupid and Psyche,' he wrote 'Life of Alexander H. Stephens' (1883); 'The Malachite Cross' (1894); 'Historical Register of the Centennial Exposition' (1876), and 'Historical Register of the Paris Exposition' (1878); 'Daniel Boone' (1883). He was one of the founders and for several years served as president of the American Numismatic and Archaeological Society, etc.

NORTON, John, American colonial clergyman: b. Shortford, Hertfordshire, England, 6 May 1606; d. Boston, Mass., 5 April 1663. He was educated at Cambridge University, entered the ministry and in 1635 left England and came to Boston. He was pastor at Ipswich in 1636-52; then he succeeded John Cotton as colleague of John Wilson in the pastorate of the First Church of Boston. In this charge his influence steadily increased and his opinions came to be sought by officials of both church and state. He was still in this position when the colonies decided to send their petition to Charles II in 1662, and was selected to accompany General Bradstreet; though the petition was nominally granted and Norton had without doubt performed his delicate task with fidelity, the colonies were dissatisfied with the results and henceforward his popularity waned. This change in public feeling was without doubt the cause of his death in the following year. He wrote 'Responsio ad Totam Questionum Syllogen'; 'The Orthodox Evangelist' (1654); 'The Heart of New England Rent by the Blasphemies of the Present Generation' (1660), etc.

NORTON, Lillian. See NORDICA, LILLIAN.

NORTON, Richard, American archaeologist and educator: b. Dresden, Germany, 9 Feb. 1872. He is the son of Charles Eliot Norton and was graduated from Harvard in 1892, after which he studied in Germany and at the American School of Classical Studies in Athens, Greece. From 1899 to 1907 he was director of the American School of Classical Studies in Rome. In 1903 he visited central Asia in pursuit of archaeological study, and in 1910-11 he was director of the excavations made at Cyrene under the auspices of the Archaeological Institute of America and the Boston Museum of Fine Arts. In 1914 he organized and became commander of the American Volunteer Ambulance Corps and served with the French army. He is the author of 'Bernini and Other Studies in the History of Art' (New York 1914).

NORTON, Sidney Augustus, American chemist: b. Bloomfield, Ohio, 11 Jan. 1835; d. 30 Aug. 1918. He was graduated from Union College, Schenectady, N. Y., in 1856 and from Miami Medical College in Cincinnati 1867, in which latter institution he was professor of chemistry 1867-72. In 1873 he became professor of chemistry and from 1899 was professor emeritus at the Ohio State University. He published 'Elements of Natural Philosophy'

(1870); 'Essays and Notes' (1874); 'Elements of Physics' (1875); 'Elements of Inorganic Chemistry' (1878); 'Organic Chemistry' (1884), etc.

NORTON, Thomas, English dramatist and lawyer: b. Bedfordshire, England, 1532; d. England, 1584. He became private secretary to Somerset, was afterward counsel for the Stationers' Company and the Merchant Tailors' Company. He was elected to Parliament in 1558 where his eloquence soon gave him a commanding position in debate. He was a persecutor of the Catholics. His views on the episcopacy brought him into trouble and he was imprisoned in the Tower for treason. He collaborated with Sackville in writing 'The Tragedie of Gorboduc' (1560-61) which was the first English blank-verse tragedy.

NORTON, Thomas Herbert, American chemist and consular officer: b. Rushford, N. Y., 30 June 1851. He was graduated from Hamilton College, Clinton, N. Y., in 1873 and afterward studied at Heidelberg. From 1878 to 1883 he was manager of important chemical works in Paris, France, and was professor of chemistry in the University of Cincinnati 1883-1900. In May 1900 he was appointed to establish the United States consulate at Kharput, Turkey, was made consul at Smyrna in 1905 and at Chemnitz, Saxony, in the following year, remaining until 1914. He compiled for the Department of Commerce important reports on the chemical industries of Europe. Since 1915 he has been detailed as special agent to investigate the chemical industries, especially dyestuffs, for the Department of Commerce. He has published 'Dyestuffs for American Textile and Other Industries' (1915); 'Dyestuff Situation in the United States' (1915); 'Potash from Kelp' (1915).

NORTON, Mass., town in Bristol County, 30 miles south of Boston and eight miles northwest of Taunton, on the New York, New Haven and Hartford Railroad. The Wheaton Female Seminary is situated here, and a public library is maintained. The town manufactures paper and wooden boxes and jewelry and has bleaching-works and a wool-combing plant. Pop. 2,544.

NORTON SOUND, an arm of Bering Sea indenting the west shore of Alaska. It is about 200 miles long and 175 miles wide from Cape Nome to Cape Dyer. The Yukon is the largest river flowing into the sound; a number of short streams enter from the north. The coast is irregular; the largest indentations are Golofnin and Norton bays and Golofnin Sound. A number of islands are along the coast; the largest are in the eastern part of the sound. Nome (q.v.) is the most important city on the coast. Captain Cook discovered Norton Sound in 1778.

NORUMBEGA, nō-rūm-bē'gā, a name given by the early explorers to various parts of the eastern coast of North America, also to a river and to a mythical Indian city. In 1539 the name was applied to the whole coast from Cape Breton to Florida, but this seems to have been on the authority of an anonymous narrative called 'Dieppe Captain.' The map of Verrazano's voyage, published in 1529, locates Aranbega on the coast of New England; Mercator's map, published in 1541, locates Anorum-

bega near the Hudson River; Gastaldi's map, 1556, locates Norumbega near Cape Breton. Other accounts mention Norumbega as a large river, brackish near the mouth; and still others picture it as a city with high towers and substantial houses. The rivers mentioned are supposed to have been Penobscot, Connecticut or Hudson. Champlain, in 1605, applied the name to Maine, and also to the Penobscot River. Humphrey Gilbert (q.v.) in 1583 began an exploration of the beautiful country of Norumbega, and so convinced was he of its existence that he took with him a poet to sing its praises. A map of 1582 makes Penobscot River a strait connecting the Saint Lawrence with the ocean at the mouth of the Penobscot. The country between was called Norumbega. The origin of the word has been attributed to many languages; as an Indian word meaning "still waters"; a Spanish word meaning "fields"; a Norse word, *Norvegr*, meaning Norway, etc. In 1889 Professor Horsford caused the erection of a memorial tower at the confluence of the Charles River and Stony Brook, near Watertown, Mass., in memory of Norumbega, a Norse city which once existed here. Considerable research has been given to the matter, and some historians claim to have reasonable proof of the origin and location of what by many is considered a mythical city or a name applied by different explorers to different rivers and locations on the coast between Cape Breton and Florida. Consult Fiske, John, 'Dutch and Quaker Colonies in America' (Boston 1899); Horsford, E. B., 'Defenses of Norumbega' (ib. 1891); and 'Discovery of Ancient City of Norumbega'; Beauvois, 'La Norambègue' (Brussels 1880); Winsor, Justin, 'Narrative and Critical History of America' (Boston 1884); De Roo, P., 'History of America before Columbus' (2 vols., New York 1900).

NORVAL, nôr'val, Young, son of Lady Randolph and her first husband, Sir Malcolm Douglas, in Homes' tragedy, 'Douglas' (1757). He is reared in obscurity and his identity is revealed to Lady Randolph only after he has saved the life of his stepfather. Glenalvon, the latter's heir, jealous of Norval, incites Lord Randolph's jealousy against him and a duel ensues in which Glenalvon is killed and Norval dies immediately after, whereupon Lady Randolph flings herself from a precipice. The part was much favored by both Kemble and Macready.

NORWALK, Conn., city, Fairfield County, on Long Island Sound, and on the New York, New Haven and Hartford Railroad, about 40 miles northeast of New York; area, 25 square miles. Norwalk was consolidated by a majority vote of the people in 1913, under one city, which includes South Norwalk, East Norwalk, West Norwalk, Rowayton, Broad River, Silvermine and Winnipauk. It has nine banks, four national banks, two trust companies, each with a savings department, and three savings banks; the annual weekly payroll to industrial workers alone is \$105,000 (1915). The chief industrial establishments are hat factories, corset, paper, shoe, silk, shirt, underwear, automobile, rubber factories, ladies' waists, air compressors, builders' hardware, etc. Oyster culture is extensively carried on, the Norwalk oyster being famous the world over. It is a fine residential

city, excellent schools. Norwalk was settled in 1649 and received a town charter in 1651. During the Revolutionary War, on 11 Nov. 1779, it was burned by British and Hessians. Pop. 27,743. Consult Selleck, C. M., 'Norwalk' (Norwalk 1896).

NORWALK, Ohio, city, county-seat of Huron County, on the Wheeling and Lake Erie (main line, and also Huron branch), New York Central Railway and Cleveland and South Western Electric railroads and the Lake Shore Electric, about 56 miles west by south of Cleveland and 14 miles south of Lake Erie. Huron County is one of the 10 counties which composed the "Western Reserve" or the "Connecticut Reserve." Historically the "Fireland" as the lands, having been purchased from the Indians and evidenced by deed were divided into parcels and given to Connecticut people whose property had been destroyed by the British. The townships in Huron County named after the Connecticut towns destroyed are Fairfield, Norwalk, Ridgefield, Norwich, Lyme, Greenwich, New London, New Haven. (See WESTERN RESERVE). The city is connected with a number of villages and cities by electric railroad. It was settled in 1816 by Platt Benedict, Elisha Whittlesey and others; incorporated in 1828 and chartered in 1840. It is in a productive agricultural region, and has extensive manufacturing interests. The steel and iron works have 200 employees; piano factory, 150 employees; printing works, 100; pyrography works, 150; canneries, 50. There are a number of smaller industrial establishments each having from 5 to 50 employees. Norwalk has a large trade in its own manufactures and in farm and dairy products, fruit and livestock. It has a fine courthouse, several wellbuilt business blocks and a number of handsome residences. Has 16 miles of paved streets and a sewerage system of about 25 miles. The educational institutions are one central and four ward public schools, two parish schools (R.C.), and a Carnegie library. There are 10 churches. The four banks have a combined capital of \$250,000, with deposits amounting to more than \$3,000,000. The government is vested in a mayor, who holds office two years, and a council of seven members chosen by popular vote. Norwalk has a very complete municipally-owned waterworks system and a newly installed municipal electrical lighting and power-plant. The Firelands Historical Society has one of the most valuable museums in the State. About three-fourths of the population are native born and the others are Germans and Irish. Pop. 7,858.

NORWAY (Norwegian NORGE; Swedish NORRIDGE or NORRIKE, signifying North Kingdom), the western kingdom of the Scandinavian Peninsula in the north of Europe. Norway is bounded on the northeast by Russian Lapland, east by Sweden, and on all other sides by the sea, the Arctic Ocean being on the north, the Atlantic and the North Sea on the northwest and west and the Skager-Rack on the south. From the Naze on the south, to a point adjoining the North Cape, the length southwest to northeast is about 1,080 miles; greatest breadth, measured nearly in the parallel of 60°, about 275 miles; area, 124,130 square miles. For administrative purposes Norway is divided into



six provinces corresponding with the stifts, or dioceses, and subdivided into 20 bailiwicks (*amter*). The stifts are Christiania, Hamar, Christiansand, Bergen, Trondhjem and Tromsø. Christiania is the capital.

Topography.—The coast consists for the most part of bold precipitous cliffs, and is remarkable for the vast number of islands by which it is lined, and the bays or fjords which narrow, deep and winding, cut into it in all directions, providing an almost uninterrupted series of excellent natural harbors of refuge. Many of these fjords are deeper than the sea outside which averages 200 fathoms; Sogne Fjord, for instance, is 2,820 feet deeper; Hardanger Fjord 930 feet; and Vest and Nord fjords 840 feet. Some of these fjords penetrate great distances inland and send off numerous branching arms. The Sogne Fjord cuts its way to the foot of the Jotun Fjeld, 106 miles from the ocean, and Hardanger Fjord encircling the Folgefond is 68 miles long; the Justedal lies between the Nord and Sogne fjords. These three are the most characteristic of the fjords and offer some of the most sublime and accessible scenery in Norway. The surface generally is mountainous, particularly in the west and north, the mountain masses, however, assuming the form of great plateaus or tablelands called fjelds, fields or fells, as the Hardanger Fjeld, Dovre Fjeld, etc. The main range, the Kjölen or Kell Mountains from 3,000 to 6,000 feet high, runs parallel to the coast from the plateau of Finmark in the north to 63° in the south and then divides, as the backbone of the peninsula forming the boundary with Sweden. The highest summits belong to the Sogne Fjeld, a congeries of elevated masses, glaciers and snow fields in the centre of the south division of the kingdom, where rise Galdhøppingen 8,400 feet, the Glitretind 8,384 feet and Skagastölstind 7,879 feet. The line of perpetual snow ranges from 5,000 feet in the south to 3,000 feet in the north. In general the valleys are short and abrupt; and the streams, dashing down impetuously through rocky gorges, form numerous cascades. The leveler portions of plateau regions consist of dreary moors, covered in winter with snow and in summer with coarse grass and heather, studded with numerous tarns and forest belts of conifers, birches, willows, etc. The grass affords pasturage to the sheep and cattle of the dalesmen. The *sætre* or huts of the herd-girls and the wood-cutters are the only habitations in the mountain solitudes.

Hydrography.—The short distance from the western slope to the western coast gives rise to a great number of minor streams, which proceed directly to the shore or the fjords. On the eastern slope the streams do not properly assume the character of rivers till they have run a considerable part of their course in Sweden. The few important rivers of Norway have a southerly direction in accordance with the general slope already referred to, and discharge themselves into the Skager-Rack; of these the longest are the Glommen 350 miles, Drammen 163 miles, with its tributary the Hallingdal 113 miles, Nummedal Laagen 143 miles, and Otteren 140 miles. Some of these streams in their lower courses expand into long narrow lakes of considerable size: Lake Mjøsen is 60 miles long, and its bottom is 1,080 feet below

the level of the sea; others are Randsfjord (43 miles long), Tyrifjord (19 miles), and Fæmünd (35 miles long and 2,300 feet above sea-level). The most important rivers in the north are the Tana, which forms part of the boundary between Russia and Norway, and falls into the Arctic Ocean; and the Namsen, which falls into the Atlantic.

Geology and Mineral Resources.—The prevailing rocks of Norway are gneiss and mica-slate, of which all the loftier mountains are composed. Granite is of comparatively rare occurrence. On some of the plateaus blocks of conglomerate occupy a large part of the surface. Porphyry, argillaceous schist and limestone occur, but in very limited quantities, and rocks of volcanic formation are rare. Almost all parts of the country bear traces of the grinding action to which the structural rocks were subjected during the Glacial period. The minerals are numerous and abundant; the most important are iron, copper, silver and cobalt; others are nickel, feldspar and marble. For a century down to about 1870 the copper and iron mines of Röros and the silver mines of Kongsberg yielded considerable outputs; but have since declined. The principal mine is at Vignæs on Karmö, at the entrance to Bukken Fjord, which yields \$300,000 worth of pyrites in the year. The total mineral output of Norway, iron pyrites, silver, copper, apatite, nickel, was valued at \$10,736,180 in 1915, showing an increase over preceding years. The silver mined was valued at \$270,000; copper at \$2,039,440; iron pyrites at \$4,672,200. Over 8,700 work people are employed in this occupation.

Climate.—Known as "The Land of the Midnight Sun," one-third of Norway lies within the frozen zone and the greater part between the same degrees of latitude as Greenland. It would in all probability be still covered with a similar ice-cap to Greenland, as it was in the end of the Tertiary period, were its shores, west and north, not washed by the Gulf Stream. It is mainly owing to this warm oceanic artery that Norway is habitable; its influence, together with the direction of the parallel mountain rampart, the distribution of the atmospheric pressure and the presence of deep-sea banks off the coast, determines the predominant climatological features of the country. The isotherms do not run from west to east, but parallel to the coast. The harbors on the west are never blocked with ice; while in places more inland, though much farther south, as at Christiania, this regularly happens. Hammerfest, for instance, on the north coast, in lat. 70° 40' N., has a winter mean of 22-6° F., 3° higher than Christiania, which has virtually an inland site, in lat. 59° 55' N. In winter the west coast districts are the warmest, and the cold increases in intensity according to the distance inland; whereas in summer the reverse is the case, though altitude is then a more potent influencing factor than in winter. The places that have the lowest winter mean (11.8°) are all inland, as Elverum and Röros (Röraas), near the Swedish frontier, Kautokeino (in southern Finmark), and Nyborg (at the head of Varanger Fjord); at all these places the mercury has been known to freeze (—40° F.). The places which have the highest summer temperature are Christiania, the southwest extremity of the country, the heads of the western fjords and

the interior of Finmark. The prevalent southwest winds bring considerable rainfall, 40 to 70 inches in the year, to the west coast of southern Norway. In the interior only 12 to 16 inches fall during the year.

Flora and Fauna.—In general the mountain slopes up to a certain height are clothed with magnificent pine forests, and at lower elevations the oak and the beech are by no means uncommon. In the loftier altitudes, below the snow line, willows, lichens and numerous wild berries—cranberries, raspberries, bilberries and cloudbberries—are found in summer. Among wild animals are the bear, wolf, lynx, fox, wild reindeer and lemming; buzzards, kestrels and owls prey on the smaller animals and birds; snipe, loom and teal abound in the lakes; lapwings and plovers breed in the tarns; in winter the ptarmigan is plentiful, and the eagle, sparrowhawk, woodcock, raven and crow are common throughout the kingdom.

Forestry.—The forests cover about 26,300 square miles, of which 73 per cent are pine trees; 4,000 square miles are under state control. The area of late years has greatly diminished, but trees are being systematically planted in several parts, especially in the southern and eastern parts of the country. The trees are cut down principally in winter and floated down the streams in early spring to the saw mills at their mouths. The saw mills, wood pulp and cellulose factories, give employment to about 12,000 people. The export of manufactured lumber in 1915 amounted to over \$14,328,990, and of wood pulp over \$16,457,064.

Fisheries.—The fisheries are of great value, and contribute mainly to the support of the inhabitants along the seaboard, from the Naze to the entrance of the White Sea. The fisheries are divided into three chief divisions—Lofoden, Romsdal and Finmark. They include cod, herring, mackerel, salmon, shark, walrus, seal and lobster fisheries, the cod and herring fisheries being by far the most important. Over 100,000 persons are employed in the fisheries, and the annual total value of the products of the fisheries in 1916 exceeded \$46,800,000, more than two-thirds of which was cod. The rivers and lakes abound with salmon and salmon-trout, and make Norway one of the best angling countries in the world.

Land Tenure, Agriculture, etc.—The farms are generally the property of those who cultivate them, small proprietors being common in Norway. They often include a large stretch of mountain-pasture, perhaps 40 or 50 miles from the homestead, to which the cattle are sent for several months in summer. Among the crops cultivated for food the principal is barley, which ripens at 70° of latitude; rye is successfully cultivated up to 69°; oats to 68°; but wheat not beyond 64°, and that only in the most favorable seasons. Another most valuable crop is potatoes, grown with success even in Finmark. Some hemp and flax are also produced, and in the southern part of the country some tobacco is grown. Fruit, too, particularly the apple, pear and cherry, is raised generally in all the lower localities of the south and the centre. The grain raised falls far short of the consumption. One of the most extensive and profitable branches of rural economy is the rearing of cattle, for which many parts of the country are well adapted. The breeds, however,

are inferior, but the milk of the cows is good and enters largely into the food of the inhabitants; and butter is produced in such quantities that there is a considerable export trade of that commodity. Sheep are less numerous than goats, and yield a coarse though abundant and warm wool; swine are not viewed with much favor. The horses are vigorous and sure-footed, but of diminutive size; the ponies are among the best of their kind, and are often exported. Another domestic animal of great value is the reindeer, which forms the principal stock of the northern provinces.

Commerce.—The export trade is chiefly confined to raw produce. The principal items are timber, with wood-pulp and cellulose; fish, smoked and dry, with ice, fish-oil, etc.; also copper ore, iron pyrites, lucifer matches, paper, etc. The chief imports are grain, bacon and other provisions, coals, textiles, wool, cotton, hemp, salt, sugar, coffee, tobacco, wine, brandy, etc. This trade is chiefly concentrated in the towns of Bergen, Christiania and Trondhjem, though Drammen, Stavanger, Christiansand and Arendal likewise have a considerable share in the commerce of the country. During the latter half of the 19th century the foreign commerce of Norway more than quadrupled; in 1916 the exports amounted to over \$256,966,580 and the imports to over \$351,952,874.

Manufactures.—These have increased since the protective system adopted by the non-renewal of the customs treaty with Sweden in 1897. The purely industrial establishments are grouped mainly around Christiania. They number 6,958 and employ 152,725 work people. Besides those already mentioned, the more important are textile manufactures, machine shops, chemical factories, iron and metal works, brick-works, flour mills, tobacco factories, breweries and in a minor degree tanneries, distilleries and factories for matches, glass, oil (fish and vegetable) and paper.

Shipping and Navigation.—Norway's mercantile navy amounted in 1918 to 3,424 vessels (of which 2,761 were steamships), with an aggregate tonnage of 1,508,758. The Norwegians are among the busiest sea-carriers of the world. Shipbuilding and supplemental industries are carried on chiefly at Christiania in about 150 establishments employing over 3,000 men. The Norwegian ports were entered in 1916 by 9,430 vessels of 4,700,000 tons and cleared by 9,387 vessels of 4,734,208 tons.

Railways, Communications, etc.—In 1918 there were 2,007 miles of railroad, of which 1,719 miles were controlled by the state and the rest operated by private companies; there were also 14,688 miles of telegraph and telephone lines, most of which also belong to the state, with 66,253 miles of wire. The national and communal roads had an aggregate length of over 15,000 miles; the principal means of communication, however, are steamboats.

Weights, Measures and Money.—The metric system (q.v.) of weights and measures was introduced in 1879 and became obligatory 1 July 1882. The unit of value is the krone, equal to 100 öre, comparative value 27 cents; the 20 kroner gold piece weighing 8.96 grams contains 8.0645 grams of fine gold, and the silver krone weighing 7.5 grams contains 6 grams of fine silver.

NORWAY



North Cape

NORWAY



Vehlungnes and Romsdals Horn

Banking.—There are two state banks, the Bank of Norway—"Norges Bank" and the "Kongeriget Norges Hypothekbank" or Mortgage Bank of the Kingdom of Norway. The Bank of Norway, although a joint-stock bank, is largely owned by the state, is governed by state laws and administered by directors elected by the Parliament, excepting the president, who is appointed by the king. It is the only bank authorized to issue bank notes, and besides state business is a general deposit, discount, circulation and loan institution. Its assets in 1916 amounted to nearly \$75,465,749; its balance to about \$13,379,049. The Kongeriget Norges Hypothekbank, established by the state in 1852 to issue loans on mortgage, had in 1916 capital of over \$7,280,000. The loans on mortgage amounted to more than \$63,199,490, and the bonds issued aggregated as much again. Private banking was represented by 138 joint-stock banks with a paid-up capital of \$45,133,636, and there were 537 chartered savings banks, controlled by the Minister of Finance, with over \$247,609,331 on deposit and 1,305,013 depositors.

Government, etc.—Norway is a constitutional and hereditary monarchy, the royal succession being in the direct male line in the order of primogeniture. If there is no male heir to the throne, the king may propose a successor to the Storting (or Legislative Assembly), the assembly reserving the right to nominate another if it does not approve the king's choice. On 7 June 1905, Norway declared its union with Sweden dissolved, and an agreement to this effect was signed 26 Oct. 1905. Prince Charles of Denmark was elected king 18 November, and accepted the crown as King Haakon VII 20 Nov. 1905. His wife, whom he married 22 July 1896, was Princess Maud, the third daughter of the late Edward VII of England. Their son, Prince Olav, Crown Prince, was born 2 July 1903.

The Constitution, or Grundlov, bearing originally date of 17 May 1814, and many times amended, vests the legislative power in the Storting which represented the sovereign power of the people. The king has the veto power, which may be twice exercised on a measure; but if the same bill passes three Stornings which have been assembled by separate and subsequent elections, it becomes law without the royal approval. The king commands the army and navy, and makes all appointments, but, except in a few cases, is not allowed to nominate any but Norwegians to public offices under the Crown. He exercises his authority through a Council of State, composed of one Minister of State and at least seven Councillors, who may be present in the Storting and take part in public discussions without voting. Local government is exercised by a chief executive functionary called the Amtmaend in each of the 20 districts into which the country is divided.

The ordinary revenues of the Crown, as shown by the budget for the year ending 30 June 1918, were \$64,844,000; extraordinary revenues, \$49,881,520; total revenue, \$114,725,520. The prospective expenditure, as listed in the budget of that time, including state railways, army, navy, post, telegraph, etc., church, arts and education, interest and redemption of public debts, etc., ordinary expenditures, \$64,844,-

000; extraordinary expenditures, largely defense and scarcity measures, \$69,881,520. For 1918-19 the budget provided for ordinary expenditure, \$83,850,000; extraordinary, \$15,537,374.

The most important fortresses of Norway are Oscarsborg and the new fortresses by Agdenes, Bergen, Tönsberg and Christiansand. The army of Norway is a national militia, somewhat resembling that of Switzerland. The navy consists of 4 war ships, 12 gunboats, 5 destroyers, 41 torpedo boats, some submarines and mine layers.

Ethnology.—The Norwegians are almost entirely of Scandinavian origin. They are about the middle height, light-haired and blue-eyed, sober and thrifty, honest and industrious, and where not devoted to a rural life have a strong passion for the sea, and make excellent sailors. The Finns or Lapons dwelling in Nordland, and more specially in Finmark, bear little resemblance to the Norwegians proper. The Qvaens, though dwelling in the same localities with the Finns, are very easily distinguished from them both by physical features and habits.

Population.—In 1910 the population was 2,391,782; males, 1,555,673; females, 1,236,109. Illegitimacy is somewhat high, averaging 8.5 per cent of the births. The Laps numbered 18,590, and Finns 7,172. The population is more rural than urban, only about one-sixth living in the towns. Emigration has decreased compared to former years, the number in 1916 being 5,212, of whom 4,865 came to the United States. From 1900 to 1910 the population of Norway increased by 151,750.

Education.—Primary education is compulsory, and is conducted on a national system, according to which gratuitous elementary instruction is placed within the reach of all. The schools, designated by the name of *almue skoler*, or people's schools, are stationed in all towns and parishes. In the country the instruction is only elementary; in the schools themselves an important distinction is made, some being what is called *fast skoler*, or stationary schools, and others *omgangs skoler*, or ambulatory schools. The latter, as their name implies, shift about at certain periods of the year, from place to place in the more thinly-peopled districts; and thus have the effect of bringing education to those who, but for this arrangement, would be doomed to live without it. Towns possess, in addition to these people's schools, what are called middle schools, middle and royal schools, burgher schools, Latin or learned schools, in all of which superior instruction is given; there are also four cathedral schools, one each in the towns of Christiania, Bergen, Trondhjem and Christiansand. At the head of all the educational establishments is the Royal Frederick University of Christiania, with five faculties, 63 professors and an average annual attendance of 1,550 students.

Religion.—The great body of the people are Protestants of the Lutheran confession. Though no express law prohibited other religious bodies from meeting for public worship, the popular feeling was for long so decidedly opposed to it that a law, permitting them so to meet, and form regular congregations under their own pastors, was passed for the first time in 1845. Recently there were 62,553 dissenters, including 10,986 Methodists, 7,659 Baptists,

2,046 Roman Catholics. The country is divided into six bishoprics (stifts), corresponding in name and extent with the administrative provinces, and into 902 parishes. With exception of the cathedral of Trondhjem, founded 1180 or 1183 A.D., and a few other churches which are stone edifices, the churches in Norway are generally built of wood. Many of them are very ancient structures, dating as far back as the 11th and 12th centuries.

Judiciary.—Norway is divided into 107 districts for the administration of civil justice. Of these districts each with an inferior court, 26 are urban, and the rest rural courts, each with one chief, and two other judges, and a *Höiesteret*, or Supreme Court for the whole kingdom, consisting of a president and a minimum of six other judges. In each town and district there is a *Forligelseskommission*, or court of mediation, consisting of two men chosen by the electors, before which civil cases are generally first brought.

History.—In the earliest times Norway was divided among petty kings or chiefs (jarls), and its people were notorious for their piratical habits (see NORMANS). Harold Fair Hair, who ruled from 863 to 933, succeeded in bringing the whole country under his sway, and was succeeded by his son Erick. He was ultimately driven from the throne, which was seized in 938 by his brother, Hako I, who had embraced Christianity in England. Magnus the Good, the son of Saint Olaf and Alfhiild, an English lady of noble birth, was called to the throne in 1036; and having in 1042 succeeded also to the throne of Denmark, united both under one monarchy. (See DENMARK). After his death the crowns of Norway and Denmark again passed to different individuals. In 1319 the crown of Norway and Sweden became for a short time united in the person of Magnus V. Erick of Pomerania succeeded, by separate titles, to Norway, Sweden and Denmark; and in 1397 was crowned king of the three kingdoms. Sweden then for a time became a separate kingdom; but the union between Denmark and Norway was drawn closer and closer, and very much to the disadvantage of the latter. The subsequent history of Norway becomes for a long period a part of that of Denmark. After the defeat of Napoleon by the allies in 1813 it was arranged by the Treaty of Vienna in 1814 that Denmark must cede Norway to Sweden, and the result was the union of the two countries under the Swedish Crown. The union has been accompanied with a certain amount of friction, partly owing to the entirely democratic character of the Constitution of Norway, in which country titles of nobility were abolished early in the 19th century. The right claimed by the king to veto absolutely bills passed by elected representatives met with an overwhelming protest by the people, the struggle lasting till 1884. In 1905 a grave constitutional struggle arose between the two countries, from the demand for greater independence for Norway in her foreign policy. The situation developed an acute crisis over the refusal of King Oscar to grant separate consular service to Norway. On 7 June the Storting passed a resolution for dissolving the union of the two countries, and after a period of strained relations and warlike preparations a treaty was drawn up at Karlstad, the Swedish Riksdag officially adopting it on

16 October, thus recognizing Norway's independence. On 20 Nov. 1905 Prince Charles of Denmark accepted the throne, taking the title of Haakon VII. In 1907 a treaty guaranteeing the integrity of Norwegian territory was signed by Great Britain, France, Russia and Germany, which was approved by Norway in 1908. In 1907 woman suffrage was adopted. During the European War 1914-18, strong feeling arose in Norway against Germany's ruthless submarine warfare entailing severe losses of Norwegian shipping and lives. On 29 Nov. 1917 a conference of the Scandinavian powers at Christiania was interpreted as the result of Norway's efforts to co-operate with Denmark and Sweden in the event of a declaration of war against Germany. See WAR, EUROPEAN; NEUTRALS AND THE WORLD WAR.

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NORWAY, Me., town in Oxford County, 49 miles north of Portland and 17 miles northwest of Auburn, on the Grand Trunk Railroad. It was settled in 1786. Being in an agricultural and lumbering region, dairy-farming, livestock and fruit-growing and lumber products form the chief interests. There are also manufactures of shoes and hosiery. Pop. (1920) 2,208.

NORWAY, Mich., city in Dickinson County, on the Menominee River, 50 miles northwest of Menominee, and on the Chicago Northwestern and the Wisconsin and Michigan railroads. The city is a centre for iron-mining. The chief mines, with their valuable ore deposits, are the Argon and the Vulcan Iron Mountain, nine miles distant. The manufactories include repair shops and pulp mills. The falls in the river are utilized for power. The city has waterworks and an electric-light plant. Pop. (1920) 4,533.

NORWEGIAN LANGUAGE. The original Old Norse tongue which seems to have been spoken quite uniformly all over the North underwent, during the Viking Age (700-1100 A.D.), a process of gradual differentiation resulting in three distinct dialects: Old Norwegian, Old Swedish and Old Danish, to which after the settlement of Iceland has to be added Old Icelandic as a fourth. Old Norwegian and Old Icelandic stand very close to each other and are called West Norse in distinction from the other two East Norse dialects. West Norse shows tendencies toward assimilation of consonants (kk, pp, tt, where East Norse has nk, mp, nt), furthermore Umlaut where it does not appear in East Norse, the Medio-Passive ending -sk as compared with -s. As to the differences between Icelandic and Norwegian

the reader of Old Norse texts will notice that Old Norwegian prefers -i, -u in endings where Icelandic has -e, -o (though in later texts replaced by -i, -u). Initial h before l, n, r, is lost in Old Norwegian but retained in Icelandic (ringr vs. hringr—"ring"). The eastern dialects of Old Norwegian showed quite early Swedish characteristics, whereas the southwest was colored by Danish. These influences become more pronounced after Norway lost her independence, and from 1500 on Norwegian ceased to exist as a literary language, but survived in the country districts and in popular traditions. Our knowledge of the oldest type of Norwegian is based to some extent on loanwords which were taken over by the Lapps and Finns and are even to our day preserved in their original forms. Thus Finnish *kuningas* shows the primitive Norse form of Old Norwegian *konungr* (king). Next in importance are Runic inscriptions on stones, walls, coins and ornaments. The oldest Norwegian inscriptions are those of Einang and Steinstad (5th century). The oldest manuscripts date from the end of the 12th century and contain law codes, homilies, legends, etc. After the definite union with Denmark the official and literary language of Norway became Danish and remained so until the beginning of the 19th century. The older dialects were, however, spoken everywhere in the country districts and tended to modify the language of the educated classes, the so-called Dano Norwegian, in more than one respect. The pronunciation differed considerably from Copenhagen Danish, especially with regard to consonants and musical accent, and the vocabulary took over many words and phrases from the dialects, a process which continued throughout the 19th century and is part of the whole movement toward nationalization of Norway. Dano Norwegian in this form is the language of the great classics of modern Norwegian literature, like Ibsen, Björnson and Kielland. Others, like Lie, draw more from Nordland dialects.

Landsmaal Movement.—The natural development of Dano Norwegian seemed far too slow and inadequate to the more rabid patriots and nationalists. They had been investigating the peasant dialects especially of the Western districts and wondered whether it might not be possible to construct with the help of this linguistic material a distinctly Norwegian vernacular, entirely indigenous to the soil and relatively free from Danish elements. This unique idea soon found followers and resulted in a linguistic synthesis, as it were, which is now known as "Landsmaal" in distinction from the Dano Norwegian type of "Riksmåal." The movement was first started by the philologist, Ivar Aasen, about 1850 and supported by the journalist Vinje and the poet C. Janson. It entered upon a new phase about 1870, when several scholars like Fjörtoft and Höyem demanded that Landsmaal should be based on Eastern and Northern dialects as well as on Western and that it should not be archaic, but modern and practical in its whole character. This modified "Landsmaal" was adopted by Arne Garborg and a few other writers, and has since then, in spite of violent opposition, gained steadily ground in private life and public institutions. Its chief opponents are the adherents of Dano Norwegian who under the

leadership of Knud Knudsen insist that the language of a country ought to be the product of natural growth and not of enforced legislation. Whether "Landsmaal or New Norse" will ultimately become the national language of the whole of Norway seems as yet very doubtful. Out of 600 or more newspapers and periodicals only some 20 employed "Landsmaal" in 1917 and of a population of two million and a half hardly 300,000 live in districts where it has been introduced into public schools. Parliamentary proceedings are published both in "Landsmaal" and "Riksmåal," but the Chambers of Commerce declared in 1911 that they considered "Landsmaal" worthless for practical business purposes.

Accent.—Wordstress shows the same general characteristics as in other Germanic languages, but the musical accent or inflection follows peculiar laws and has no analogy except in Swedish. The sentence inflection or "tonefald" is rather monotonous in the east, but very animated and elastic in the west, notably in Bergen. The main accent in a sentence is rather lowpitched. As to word inflection or "tonelag" it shares with Swedish the peculiarity of being either simple or compound and of serving to differentiate between words which otherwise seem identical. Simple inflection corresponds to rising tone in English but shows more marked intervals varying from a musical second to a fourth. Compound inflection begins on the natural level, glides down a third in the first syllable and rises a fourth in the second. The details of stress and accent present perhaps the chief difficulty in learning the language.

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NORWEGIAN LITERATURE. The literary life of Norway during the Middle Ages is closely bound up with that of Iceland, since many skalds or poets who were born in Iceland, including Sighvatr Thordarson, Hall-

fredr Ottarson and others, spent part of their lives at Norwegian courts. If we eliminate from the entire mass of Old Norse literature everything that is of Icelandic origin, few writers remain who deserve a place in the annals of Norwegian literature. It must be admitted, however, that large portions of the famous collection of heroic ballads and lays which goes under the name of the Older Edda, probably originated in Norway, as the tale of 'Smith Volund,' parts of the 'Havamal' and some of the 'Sigurd Songs.' The first historical name is that of Bragi (about 800) who in the 'Ragnarsdrapa' describes the mythical characters engraved on the shield which was given to him by King Ragnar of Denmark. Bragi was the first of the official skalds who held the position of a poet laureate at the courts of the Norwegian kings. Other court poets were Thornbjörn Hornklofi and Thjodolf of Hvin, both unusually gifted, but unfortunately their best works 'Glymdrapa' and 'Haustlög' have only come to us in fragments. One of the most famous skalds was Eyvindr Finnsson whose splendid 'Hakonarmal' was included by Herder in his collection of world poetry, 'Stimmen der Völker.' After the death of King Harald Sigurdarson (1066), who was himself gifted as a poet, the art of the skalds degenerated more and more into empty formalism. The rich prose saga literature of the North is almost entirely of Icelandic origin. There seems to have been, however, considerable activity in Norway during the first half of the 13th century in the field of translations and adaptations of chivalrous epics and romances. This kind of imitative literature flourished particularly under King Sverre and King Hakon the Old (d. 1263). Such adaptations are the 'Thidreksor Vilkinasaga' (very valuable as a source for the Theodoric-and Nibelungen legend), furthermore the 'Karlsmagnussaga,' the romances of 'Flores ok Blankiflur,' of 'Tristram ok Isold,' the legend of 'Barlaam ok Josofat' and many other treatments of material imported from the South. Of special importance for our knowledge of customs and manners of mediæval Norway is the 'Speculum regale' or 'King's mirror' in which a father gives his son instructions in matters of conduct and good taste,—a curious forerunner of the Cortigiano and Lord Chesterfield's letters. The extensive ballad literature which flourished especially in Denmark and Sweden during the 14th and 15th centuries found less response in Norway and least of all in Iceland, whereas a later type of folksong built on the stanza of four short lines, the so-called *stev*, remained popular in Norway into our days, collected by S. Bugge, 'Gamle norske folkeviser' (Christiania 1858).

The constant dissensions and feuds of pretenders and other disasters like the ravages of the Black Death may account for the decline of national ambition and racial vitality in the later Middle Ages. In 1397 the three Scandinavian realms were bound together by the Union of Calmar, and while Sweden very soon regained her independence, Norway was gradually reduced to the status of a Danish province. Language and literature became Danish and whatever there was left of literary ambition gravitated in the direction of Copenhagen. Many prominent writers who figure now in the

annals of Danish literature were born in Norway, above all Ludvig Holberg, the great dramatist and philosopher. Among those who remained loyal to the Norwegian soil was Peder Dass (d. 1708), the most popular figure of his age, author of various descriptive poems like the famous 'Nordlands Trompet' and the 'Norske Daleviser,' anticipating the style of Thomson and Brockes. The influence of Pope and Thomson is still more noticeable in the works of Chr. Tullin (d. 1763), author of didactic poems and praised by Lessing on account of his wedding poem, 'Maidagen.' He is usually classed as a Danish poet. E. Storm (d. 1794) was the first to strike a national note in his ballads and fables which were written in a Norwegian peasant dialect. The most important event in the direction of a national rebirth was the founding of the Norwegian Society in Copenhagen in 1772 for the purpose of encouraging and stimulating national Norwegian literature and life. Johan Wessel, although now classed as a Danish writer, was one of the leaders of this movement. Other prominent members were the brothers Claus and Peder Frimann, very popular on account of their poetic descriptions of the life of the sailor, 'den syngende sømand.' J. N. Brun (d. 1816) was the author of the classic tragedy 'Zarine,' remembered now chiefly because it gave rise to Wessel's famous parody, 'Love without stockings.' Brun wrote many patriotic and religious songs, and as a preacher stimulated greatly the awakening of national consciousness. Claus Fasting was active as critic and epigrammatist. J. Zetlitz cultivated the Anacreontic style and Enevold Falsen held the stage for quite a while with his comedy 'Dragedukken' (1797).

Modern Norway, both as a political and intellectual power, dates from the year 1814, the year of the separation from Denmark. All the latent energy and vitality which had been stored up for centuries seemed to awaken suddenly and to demand an outlet. The building up of a genuine Norwegian type of civilization was the aim and ideal of the progressive minds of the country. First among them stands Henrik Wergeland (1800-45), a strange mixture of enthusiasm and awkwardness, of idealism and lack of good sense. His most ambitious work, 'Creation, Man and Messiah,' is on the whole less attractive than some of his short poems like 'The English Pilot,' 'The Jew' and 'Jan van Huysum's Blomstestykke.' Wergeland's radical nationalism caused a literary feud somewhat similar to that of the Phosphorists and Gothicists in Sweden, but it was even more intense. Wergeland's chief adversary was Joh. Welhaven (1807-73), a poet of broad culture and æsthetic refinement, who believed rather in a gradual evolution of national ideals and who wished to maintain closer relations with Denmark and the larger European currents of thought. In a series of sonnets, 'Norges Daemring' (1834), he attacked the narrow provincialism and unbridled pathos of the Wergeland party most vigorously. Welhaven's influence upon the whole intellectual development of his country reached far into the century, whereas Wergeland was hailed by the political radicals and young enthusiasts as their inspiring genius. The antagonism between these two parties is reflected to some extent, in the relation between the cosmopolitan, intellectual Ibsen

and the more impulsive nationalistic Björnson. Welhaven's æsthetic culture shaped the poetic style of Andreas Munch (1811-94), whose subjects are, however, rather in the romantic vein, as his charming epic, 'Kongedatterns Brude-fart.' Two scholars whose activity corresponds in many respects to that of the brothers Grimm in Germany were P. Asbjørnsen and Jörgen Moe, editors of a valuable collection of fairy tales, 'Norske Folkeeventyr' (1842). Few literatures can boast of such an inexhaustible supply of mythological characters, elemental spirits and grotesque inventions in which a vivid imagination and a keen sense of humor are delightfully mingled. Another literary genre which has been very productive in Norwegian literature is that of the peasant tale and descriptions of country life. The following writers have contributed to this field: Nicolai Oestgaard, translator of some of Auerbach's village tales, but in his own sketches far more realistic; Bernhard Herre, 'Recollections of a hunter'; Harold Meltzer, 'Little pictures from the life of the people'; Magdalena Thoresen, 'Pictures from the Westcoast; the Land of the Midnight's Sun'; Jacob B. Bull, 'Pictures of Norwegian Life'; Kristian Elster, one of the most gifted writers in this field, dealt also with social problems in his novel, 'Dangerous People.' As a pathfinder in the whole question of woman's social position should not be overlooked Camilla Collett (1813-95), whose novels, 'The Bailiff's Daughters' and 'From the Camp of the Dumb,' stimulated Ibsen's treatment of this subject.

We have reached the most brilliant epoch in the literary life of modern Norway, whose four leading writers, Ibsen, Björnson, Lie and Kielland, will receive special treatment at the proper places. All four are realists, but they differ considerably in their specific aims and methods. Kielland, chiefly known through his novels 'Skipper Worse,' 'Abraham Lövdahl' and his 'Tales from Two Countries,' takes a critical or sceptical attitude toward human society; Lie appears in his best works, 'The Pilot and his Wife,' 'The Visionary,' 'Barque Future,' as a big-hearted sympathetic observer of human nature and as a poet of great imaginative power; Björnson developed from a naïve realist and storyteller into a champion of social emancipation, and, with his wide range of interest, may be regarded as the very epitome of the whole cultural development of modern Norway; Ibsen, finally, is recognized to-day as the greatest dramatist since Shakespeare, as a constructive interpreter of the relation between society and the individual and as a guide in determining our moral rights and responsibilities.

Contemporary Norwegian literature seems to incline rather toward the realistic and naturalistic interpretation of life and shows on the whole quite a sombre complexion. One of the most powerful writers is Knut Hamsun (b. 1860), who, owing to many discouraging experiences, views life without and within as a bitter struggle, from the first pangs of 'Hunger' to the resignation of 'Muted Springs.' The chief works of his earlier period, 'Hunger,' 'Mysteries,' 'Pan and Victoria,' reflect the tumultuous career of an intellectual vagabond who like his hero, Nilson Nagel, without apparent purpose or aim, speculates on the

deeper relations between life and nature, freedom and fate, and who mercilessly tears the mask from everything that does not stand the test of truth and reality. Among his plays 'Munken Vendt' stands out on account of its fine spiritual enthusiasm and its masterly form. His later novels are superior in plot and finish, but lack the primitive strength and spontaneity of his first books. Hamsun was thoroughly familiar with American conditions and introduces in many of his stories American settings. His book, 'Intellectual Life in Modern America,' contains some severe criticism. Arne Garborg (b. 1851) is another truth seeker, but less concrete and brilliant than Hamsun, more absorbed in religious and social problems. He is determined to free his people from the hardness and gloom of Pietism without sacrificing the real substance of Christianity. His book, 'Peace,' takes up the Brand problem but from a more human and practical point of view. 'The Lost Father,' one of his most searching confessions, offers in place of the lost Fatherhood of the old God the new gospel of the Brotherhood of Man. 'Wearied Souls' contains in form of introspective analysis reflections on the utter hopelessness of our whole existence and is one of the most harrowing accounts of this kind of mental bankruptcy. 'Bondestudenten' (Peasant students) tells the story of a certain type of student who after periods of doubt and struggle settles down to a life of material comfort. 'Mannfolk' gives a realistic picture of the Bohemian life of Christiania. Garborg is one of the few writers who employ 'Landsmaal.' Amalie Skram (d. 1905) is the third of the great naturalists. Her novel, 'Afkorn' (Offspring), deals with the depressing subject of transmitted curse in the modern form of inherited weakness. 'Foraadt' (Betrayed) is a story of marriage and separation, keen and forceful, but painfully disillusioning. The leading character, a strangely unresponsive and even frigid woman, occurs repeatedly in Amalie Skram's stories. 'Two friends' is a sea tale and presents in the chief character a more human variation of the Peer Gynt type. Amalie Skram was first married to a sea captain with whom she made many voyages, and later to the Danish author Erik Skram. In some respects Gabriel Finne (d. 1899) is perhaps the most consistent naturalist, author of the novel 'To Damer' (Two Ladies), in which the duel of the sexes is treated somewhat in the physiological manner of Strindberg. In his best play, 'Uglen' (Owl), he attacks the same problem more critically from the point of view of guilt and retaliation. Sigbjørn Obstfelder (d. 1900), a mystic and brooding mind, betrays Russian influence. 'The Cross,' a story of woman's suffering through passion and guilt, suggests Dostojevski's 'Krotkaja.' It is a relief to turn from the gloomy pessimism or questioning attitude of so many of these writers to a sunny temperament like that of Hans Aanrud, author of numerous stories and sketches from peasant life, and an artist in describing the subtler moods of nature.

Among contemporary novelists also occur the names of Jens Tveldt, author of 'Venheppa' and 'Brite Per,' a Westlander, who has faith in the vitality and regenerative power of his race; Theodor Madsen, a naturalist, who in 'God's Finger' describes an unhappy mar-

riage, in another novel, 'Under the Tree of Knowledge,' a modern Faust type and searching intellectualist; Thomas Krag, psychologist and connoisseur of women, 'Kobberslangen,' 'Ada Wilde,' 'Gunvor Kjeld'; Hans Jaeger, who attained notoriety through several confiscated books, especially his sketches from the Bohemian life of Christiania; Hans Kinck, equally at home in West Norway and Italy, author of numerous impressionistic tales and sketches; Johan Bojer, another naturalist, best known through his novel, 'The Power of Faith,' a story of truth and illusion; Mons Lie, son of Jonas Lie, who in his novels, 'Adam Ravn' and 'Man overboard,' broods over life's unseen forces and ultimate values; Bernt Lie, nephew of Jonas, seems to have fallen heir to his uncle's warm-hearted, sunny disposition, 'Hildir,' 'Sister Judith.' Finally, two women writers: Alvide Prydz, interested in problematic characters, 'Dream,' 'The Promised Land,' and Anna Munch, who brings the message of harmony and happiness in her novels, 'Ruler of the World' and 'Joyfulness.' Only a few lyric poets of more than average ability are to be noted. Garborg's 'Haugtussa' and 'I Helheim' are attempts to revive the old ballad spirit and heroic grandeur of the Eddic poems. The most gifted among the younger poets is Nils Collett Vogt, an enthusiastic worshipper of life, and in his style somewhat influenced by Swinburne, 'From Spring to Autumn'; 'Music and Springtime.' The æsthetic tradition of Welhaven seems to reappear in Th. Caspari's lyrics, whereas Per Sivle's impressionism reminds of Wergeland's style. The versatile genius of Vilhelm Krag won its first laurels with a volume of poems (1891) which found at once recognition on account of their exquisite form and strong individuality. V. Krag has done excellent work in many fields. In his novel 'Homesickness' he tells the story of his own inner development; he has been active as essayist, critic, stage manager and written several good plays, notably, 'Life a Play,' with a chivalrous setting. The most interesting figure on the modern Norwegian stage is Gunnar Heiberg (b. 1857), less gifted as a psychologist than as a keen observer of life, a brilliant causer and passionate temperament. In 'Kong Midas' and 'Folkeraadet' he furnishes political satires in the manner of Ibsen's 'League of Youth.' His two best plays are 'The Balcony' and 'Love's Tragedy,' both studies of romantic love and disillusionment. Two sparkling comedies are 'Jakob og Kristoffer,' by Peter Egge, and 'The Day of Reckoning,' by Nils Kjaer, one of the most popular feuilletonists of the day.

Among the writers who employ 'Landsmaal' should, in addition to Arne Garborg, be mentioned Vette Vislie, 'Solvending,' a prose poem of guilt and redemption; Ivar Mortensen, 'Varg i Veum,' a play in the declamatory sagastyle; Rasmus Løland, author of stories and sketches with rather depressing themes.

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Christensen, Hj., 'Vort litterære liv.' (Christiania 1902). For general reference: Halvorsen, 'Norsk Forfatter lexikon, 1814-1880' (6 vols., Christiania 1885 et seq.). The only English treatment is Horn's 'Scandinavian Literature' (trans. by R. Anderson, Chicago 1884; entirely inadequate for the modern period). An interesting though rather incoherent essay on modern Norwegian literature by Bjørnson in the *Forum*, Vol. 43 (1910); Gosse, 'Northern Studies' (London 1883) gives a brief introduction into Norwegian poetry since 1814. Many valuable monographs on Norwegian writers have been contributed by Georg Brandes and are found in his collected works. Important for the whole field are the *Publications of the "Society for the Advancement of Scandinavian Study"* (Urbana, Ill.). Popular articles occasionally in the *American Scandinavian Review*, published by the American-Scandinavian Foundation, New York.

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NORWEGIAN MUSIC. Norwegian music is sometimes classified with Scandinavian music but this is wrong. Norwegian music is in a class by itself. Norwegians are extremely tenacious of their national life. Foreign music and literature never had the same influence in Norway as they had in Sweden and Denmark. The opera and musical comedy never took root in Norway. The people have always clung to their simple melodies and folksongs. The consciousness of national life awoke in 1772 when the Norwegian Society, a band of patriotic Norwegians living in Copenhagen, Denmark, combined to found a university in Christiania (which was accomplished in 1811), and to recover their native independence (1814). Poets, historians, collectors of folktales and folksongs did valuable work in preserving the national inheritances that had been handed down from generation to generation by tradition. Until the end of the 18th century, therefore, the only musicians in Norway were simple unsophisticated peasants, who, like the wandering minstrels of the Middle Ages, traveled from place to place to play in such houses, or before such people, who would receive, or listen to, them. The songs they sang were of the simplest kind and the instruments they played upon to accompany the songs and dances they gave were of the most primitive pattern.

Instruments.—First should be mentioned the old Norwegian violin with four strings tuned in three peculiar ways A, D, A, E; A, E, A, E; or A, E, A, C, sharp C. This peculiar tuning for the purpose of accommodating the instrument to the tone form of three old modes—the Phrygian, the Hypodorian and the Hypolydian—the influence of which is very perceptible in early Norwegian music. There is also a little violin called the Hardangerfele, probably named after Hardanger Fjord, where it is generally played. This little violin is usually ornamented with paintings, or carvings. Sometimes it has both. The scroll is often carved in the shape of a human head, or in the form of a unicorn or a griffin. Beneath the four catgut strings lie metallic springs, or wires (sympathetic strings), that vibrate when the other strings are set in motion. The bow resembles that of an ordinary double-bass bow;

but it is of course much smaller. The Krog-harp is an antique and uncouth instrument with a sound-board and metal strings. It is capable of producing great emotional effects and is peculiarly fitted to express the weird, melancholy Norwegian melodies. It is still a favorite with the peasantry. The Langleike is an old-fashioned dulcimer and is played with a plectrum made of wood, or fish bone. The Nyckelharpe is a kind of keyed dulcimer or violin, resembling the hurdy gurdy or organistrum that was played by the wandering minstrels of all countries in the Middle Ages. The Kantele is a kind of lyre; the Lur is a wooden trumpet; and the Norwegian pipe is a simple tube with holes, made from the bark of the mountain oak.

Primitive Songs and Dances.—The melodies played upon these primitive instruments were songs, hymn-tunes and dances of the simplest nature, but very individual with regard to their rhythms and peculiar intervals. Among the songs are simple ditties descriptive of various avocations, or appropriate to the different seasons. Thus there are shepherd songs, reaping songs, angling songs, mowing songs, winter songs, descriptive of the beauties of the snow and ice and spring songs which "told of the melting frosts, the opening buds and the delicious perfume which bathes Norwegian hills when the sun and the leafage of the trees are hastening on to summer." Of the dances so characteristic of Norway the most important are the *Spring dans* (springing dance); the *Ganger* (walking dance) and the *Halling*. The *Halling* is the most characteristic dance of Norway. Its name comes from the town of Hallingdal between Christiania and Bergen. It is well described in Frederika Bremer's novel 'Strife and Peace' as follows: "Perhaps there is no dance which expresses more than the *Halling* the temper of the People who originated it. It begins with little hops, accompanied by movements of the arms. It is bear-like, clumsy, indolent, and half dreaming. But it wakes and becomes in earnest. The dancers suddenly begin to dance throwing off their indolence and clumsiness and exhibit strength and dexterity. The same person who a moment ago seemed fettered to the earth now throws himself with springs of agility into the air as though he had wings. Then after many evolutions which make the unaccustomed spectator positively dizzy, the dancer assumes his indolent clumsy character and ends the dance as he began it." Björnsterne Björnson also gave a fine description of the *Halling* in his novel 'Arne.' The *Halling* is generally danced by single dancers, or by two or three dancing in competition. The music is generally written in 2-4 time and in a major key and is usually played on the *Hardangerfele*.

Composers.—About the end of the 18th century F. C. Groth and Andreas Flintenberg began, with very little musical culture, it is true, but with praiseworthy industry, to compose cantatas. At the same time organists in towns and in the country also began to preserve the traditional tunes that had been handed down orally. One of these, L. Matthias, gathered 540 old Norwegian songs and dances which would otherwise have perished. L. M. Lindemann was another who collected the national melodies of his country. Thrane, who lived in

the beginning of the 19th century and who was educated in Paris, began to compose in a vein that might be termed national. He broke the ice, as it were, for Halvdan Kjerulf (1815-68), who strove to express, in addition to the charms of his country and its scenery, the national aspirations toward liberty that were throbbing throughout Norway. Kjerulf associated himself with Björnsterne Björnson who wrote the words for many of Kjerulf's melodies, which enjoyed enormous popularity. Kjerulf's songs have been compared to those of the German, Robert Franz. His accompaniments are well written and are often treated polyphonically. His two books of songs 'Sänger och Visor' are much admired. One song, 'My Heart and Lute' is very popular. Next to Kjerulf comes Rikard Nordraak (1842-66), who did much for the cause of national music, not the least of which was his influence upon Grieg. Nordraak composed the Norwegian national anthem. He was a cousin of Björnsterne Björnson.

To this period belongs Ole Bull (1810-80), the most famous violinist and the foremost Norwegian musician of his time. His reputation as a violin virtuoso remains undiminished, but it is not generally remembered that he founded the National Theatre at Bergen and persuaded Ibsen to become its director and infused his personal enthusiasm into the work of Grieg and other Norwegian composers. The Norwegians divide their music into four periods: (1) the *Folksong*; (2) the Old Romantic from Thrane to Kjerulf; (3) the Romantic; and (4) the New Romantic, reaching to the present time.

The great trio of modern Norwegian composers—Grieg, Svendsen and Sinding—strike their roots in all four periods, as they are pre-eminently the exponents of the Norwegian soul.

Edward Hagerup Grieg (1843-1907) returned from Leipzig to figure as a great revolutionist in the music of his country. He became intimate with Rikard Nordraak and until that composer's death in 1866 the two worked together to foster a veritable Norwegian school of music. In 1864-65 Nordraak founded the Euterpe Society in Copenhagen, the object of which was to bring forward the works of young Northern composers. In 1867 Grieg founded a musical society in Christiania which he conducted until 1874, when he was succeeded by John Svendsen. But even more as composer Grieg gave impetus to Norwegian music. His compositions breathe the poetry of his native country and express the spirit of the land and of its people. He himself wrote: "The fundamental trait of Norwegian folk-song is a deep melancholy which may suddenly change to a wild, unrestrained gaiety, mysterious gloom and indomitable wildness—these are the contrasts of Norwegian music." Of all Grieg's works his incidental music to Ibsen's 'Peer Gynt,' often played in concert halls as a suite, has perhaps made him known to the world as a fascinating and original composer. In his songs, piano pieces and orchestral music Grieg is a true representative of his country and of his race. Next to the 'Chopin of the North' as Grieg is called comes Johan Svendsen (1840-1911), son of a military bandmaster, and who after an education in Leipzig and Paris returned to Christiania and wielded great in-

fluence in the musical life there as conductor and composer. His 'Norwegian Rhapsodies' for the orchestra and 'Romance' for violin and orchestra enjoy world-wide popularity and are full of the charm and local color peculiar to Norway. His setting of 'Sigurd Slembe' (words by Björnson) carries the idea of Norwegian music still further. Christian Sinding (b. 1856) is ranked by some critics above Svendsen and by other critics below him. Sinding has written suites, concertos, serenades, trios and a very beautiful 'Suite of Antique Form.' Sinding's songs are regarded by the best critics as masterpieces of their kind as they abound in melodic ideas and respond to all phases of national thought and emotion. Next comes Johan Selmer (1844-1910), a pioneer in the New School of Norwegian music. His fondness for bold, large outlines and bizarre themes has caused him to be called the 'Berlioz of the North.'

Among the more recent Norwegian composers should be mentioned Johan Haarklou (b. 1847); Catherinus Elling (b. 1858); Gerhard Schjelderup (b. 1859), inspired by native scenery as in his 'Midsummer Night on the Fjord' and 'A Sunday Morning'; Sigurd Lie (1871-1904), famous for his 'Easter Suite'; Ole Olson (b. 1850), who has produced an oratorio, 'Nidaros' (1897), and operas, including 'Leyla' (1908); and Johan Halcorsen (b. 1864), who has written suites, violin pieces, music for several dramas and the 'Coronation Cantata' for King Haakon. Consult Finck, Henry T., 'Grieg and His Music' (New York and London 1909); Bull, Sara C., 'Ole Bull' (Boston 1883).

NORWICH, nôr'wich, Conn., city, county-seat of New London County, at the junction of the Shetucket and Yantic rivers where they form the Thames, at the head of navigation on the Thames, and on the New York, New Haven and Hartford and the Vermont Central railroads, about 14 miles from Long Island Sound, and 40 miles southeast of Hartford. It was settled in 1659 by a company of English from Saybrook, and the place was named after Norwich, England. It was incorporated as a township in 1685, and chartered as a city in 1784, and rechartered in 1871. Its surface is irregular and it is surrounded by picturesque valleys and hills. The land around is productive but its exceptional water-power advantages have contributed to the extensive development of manufacturing industries. The chief manufactures are firearms, leather, silk fabrics, cotton and woolen goods, machinery, stoves, iron and iron products, and furniture, leather and belting, and woodworking machinery. It has a large trade in its own manufactures, lumber, farm products, coal and clothing and food supplies for the interior of western Connecticut. It is the industrial and commercial centre of a large portion of New London and Windham counties. The educational institutions are public and parish schools, the Free Academy, built and endowed by public-spirited citizens, the Art Museum connected with the Academy, and the Otis Free Library, which has about 30,000 volumes. The prominent buildings are the Slater Memorial Hall, the State Armory, State Insane Hospital, the William Backus Hospital, the Y. M. C. A. building, the courthouse and Saint

Patrick's Roman Catholic Church. There are several good church buildings and a large number of handsome residences. The Indian burying ground which contains the grave of Uncas, the place where Miantonomoh fell, the ruins of colonial homes, the places where once lived the Huntingtons, and others prominent in Revolutionary times, are all of historic interest.

The revised charter of 1877 provides for a mayor, who holds office two years, and a council of 12 members, six of whom are elected each year. The city owns and operates the waterworks, gas and electric plants. Pop. 29,032. Consult Caulkins, F. W., 'History of Norwich' (Hartford 1866) and Gilman, W. C., 'Celebration of the 250th Anniversary of Settlement of the Town of Norwich' (Norwich 1912).

NORWICH, nor'ij, England, episcopal city, county and parliamentary borough, capital of Norfolk County, on the river Wensum, 108 miles northeast by north of London (114 by rail) and 19 miles west of Yarmouth. The city proper extends more than a mile and a half in length from north to south on both sides of the Wensum, and a mile and a quarter in its greatest breadth. The geological formation consists of chalk, upper drift and crag; beds of sand and gravel.

Industries.—The great Colman factory—mustard, flour and starch—represents the most important industry in Norwich, the premises on the river front extending three-quarters of a mile. Boot and shoemaking, brewing and the making of agricultural implements are prominent manufactures, and Norwich has one of the largest organ manufactories in Great Britain. The cattle market is one of the largest in England.

Public Buildings, etc.—The great Norman Castle was probably built by William Fitz Osbern, one of the Conqueror's captains, as a place of arms and to overawe the subject Saxons. The keep, which remains, is nearly square, 92 by 96 feet, and 76 feet high; it is only exceeded in England by the Norman keep at Colchester. Long used as a prison it is now a museum and art gallery, in which are valuable ornithological specimens.

The cathedral is a grand Anglo-Norman pile, 407 feet long, and 72 feet broad, the spire reaching 315 feet from the ground (the second highest in England). It contains several ancient chapels, a beautiful choir, and the cloisters are the most spacious in England except Gloucester. The Erpingham Gate and Saint Ethelbert's Gate, which give entrance to the upper close, are of considerable interest. In 1272 a great part of the church and the adjoining monastery were burned by the citizens and many of the ecclesiastics killed. The Bishop's Palace, north of the cathedral, built by various prelates, is an extensive edifice. Saint Andrew's Hall, anciently the nave of the church of the Dominicans (Blackfriars), is a noble perpendicular structure, saved from spoliation by Henry VIII through the public-spirited action of Augustine Steward, thrice mayor of Norwich. It is now one of the handsomest civic halls in England; the walls are decorated with a number of valuable portraits, especially Beechey's 'Nelson,' with others by Gainsborough, Lawrence, Opie, etc. The Guild Hall, succeeding the Tolhouse,

where the king's tolls were paid, was built in 1413. This ancient city abounds in quaint relics of the past, and is notable for its antiquities and curios. One of the show-places is Hercules and Samson House (Cubitt's), a large and very ancient mansion facing the cathedral, the portico supported by ponderous figures of Hercules and Samson. It has great historical associations; its paneled rooms are filled with a choice collection of antique furniture, old china, and curios of every kind. The Strangers' Hall, an ancient building, is a local museum containing many interesting exhibits.

The uninteresting Shire Hall contains several portraits. There are barracks, a corn exchange and agricultural hall. The Norfolk and Norwich Hospital (1771) has been greatly extended of late years. The Jenny Lind Children's Hospital was founded by the great songstress in 1853; and the new infirmary was opened in 1900. There are two good libraries: Norfolk and Norwich Subscription and the Free Library.

Churches.—Apart from the cathedral, Norwich, with its suburbs, has 40 Anglican churches. That of Saint Peter's Mancroft contains the tomb of Sir Thomas Browne, author of the 'Religio Medici.' The chief churches of the Independents, Baptists and Presbyterians, are large and well attended. Before the Black Death in 1349 Norwich city had twice as many churches as to-day, and came to be called 'the City of Churches.' A magnificent Roman Catholic church, opened 1894, was built by the munificence of the 15th Duke of Norfolk. This city had five bridges in the 13th century; there are now 11.

Educational Facilities.—Norwich grammar school occupies a chancel-house (Bishop Salmon 1325) transferred there and to adjacent buildings at the Reformation. There are also the commercial school, divided from the grammar school, and a large technical institute.

History.—The earliest mention of Norwich in any record tells of conflict between Saxon and Dane, and is the statement in the 'Saxon Chronicle' that in 1002 'Swegen came with his fleet to Northwic and wasted a burned the burh.' With the Norman Conquest came the building of the castle, and in 1101 the dedication of the cathedral by Losinga, first bishop of the diocese. The most stirring events in Norwich arose from the Laborer's Revolt in 1381, and Kett's Rebellion in 1549, both of which were rigorously suppressed. The Black Death, 1348-49, swept away a third of the inhabitants of Norwich, and the plague of 1665-66 resulted in about 3,000 deaths. This British Norwich is almost certainly the parent city of Norwich, Conn., for Miss Mary Perkins in her history of the latter (1895) says: 'The Mohegan Indian fort may have suggested castle-crowned Norwich to the brothers Huntington, who are supposed to have emigrated from Norwich, England.' The first charter was granted in 1194. The city returns two members to the House of Commons. Pop. 121,478.

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JAMES HOOPER,
Author of 'Guide to Norwich,' etc.

NORWICH, N. Y., city, county-seat of Chenango County, on the Chenango River, and on the Delaware, Lackawanna and Western and the New York, Ontario and Western railroads, about 52 miles in direct line south by west of Utica and 42 miles north by east of Binghamton. It is the industrial and commercial centre of a productive agricultural region. The chief industrial establishments are factories manufacturing hammers of all kinds, drugs, patent medicines, cosmetics, perfumery, knit underwear, interior woodwork, silos, wire baskets, condensed milk and gloves. There are also railroad shops, machine shops, foundries, creameries and stone quarries in Norwich. Norwich has a free public library, city hospital, county buildings, Old Ladies' Home, Y. M. C. A., seven up-to-date school buildings, eight churches and two national banks. Pop. 8,342.

NORWICH UNIVERSITY, situated at Northfield, Vt. It was first chartered (1819) under the name of American Literary, Scientific and Military College and was situated at Northfield, Vt., was moved to Middletown, Conn., in 1824 and in 1829 it was moved to Norwich; and the name changed to Norwich University in 1834. Fire destroyed its buildings in 1866 and the institution was removed to Northfield. The usual collegiate courses are offered; and in addition courses in civil and chemical engineering and military science; military drill is also a part of the curriculum. The chief work of the university has always been in science and engineering, and in 1898 it was made the official State military school, and receives a State appropriation. The degree of bachelor of arts and bachelor of science are conferred. Admiral Dewey was a student of Norwich. In 1922 the annual income amounted to \$152,430; the students numbered 276 and the faculty 26.

NORWICH CRESTED CANARY. See CANARY.

NORWOOD, Mass., town in Norfolk County, on the New York, New Haven and Hartford Railroad, about 12 miles southwest of Boston. It has a large printing establishment, a railroad repair shop, foundry, tanneries, leather, glue and ink factories, machine-shops and furniture factories and national and co-operative banks. The educational institutions are the Morrill Memorial Library which contains about 8,000 volumes and the public schools, high and elementary. The town owns and operates the waterworks and lighting system and has the benefits of the Norwood Civic Institution, a property valued at more than \$70,000, which is held in trust for the inhabitants. Formerly administered by annual town meeting, Norwood in 1915 was the first town in Massachusetts to adopt the commission-manager form of government. Pop. (1920) 12,627.

NORWOOD, Ohio, city in Hamilton County, on the Pennsylvania, the Baltimore and Ohio Southwestern, the Cincinnati, Lebanon and Northern and the Norfolk and Western railroads, northeast of and adjoining Cincinnati.

It was settled in 1804, incorporated as a village in 1898 and chartered as a city in 1903. It is a beautiful residential hill-suburb of Cincinnati, and also a manufacturing city of considerable importance. The chief industrial establishments are playing-card factory, the elastic book-case works, electric manufacturing works, washing-machine factories, foundry, piano factory, millwork works, tool factory, iron works, safes and vault works, enamel sign works, lithography works. Several of the manufacturing companies have buildings of considerable architectural merit. Other notable buildings are the town-hall, Enterprise Block, Knights of Pythias Hall, Carnegie library, the bank building and the eight churches. The educational institutions are five public schools (fine buildings), one parish school, and there are branch libraries of the Cincinnati public library. The government is vested in a mayor, a council of eight members and a board of public service consisting of three members, all elected by the people. The city owns the electric-lighting, sewage and water supply plants. The population is mostly native-born Americans; some are of German descent. Pop. (1920) 24,966.

NOSE, that part of the face of man and the higher animals which is included in the mechanism of respiration, containing avenues for the passage of air to the lungs, and which also contains and accommodates the organs of smell; in a broader and looser sense, the muzzle. The nose in most animals is the most prominent feature of the face—least so in monkeys and lemurs, not much prolonged in the cats, but an important part of the prolonged muzzles of other carnivora, and of the long-headed herbivorous animals generally. In several kinds of animals, otherwise widely diverse in structure and relationship, the fleshy part of the nose has been extended, through similarity of required service, into a more or less prolonged proboscis, as in the pigs, some shrews, certain seals, and most prominently the elephants. In these cases the nose performs other services than its usual functions and becomes a tool for rooting, an organ of prehension, etc.

In structure, the nose consists of a series of bones of the face (see **SKULL**), together with certain cartilages, forming a tube or tubes holding the paired olfactory surfaces and nerves. The cavities of the nose are the two anterior nares, which open externally by the nostrils (in some of the lower animals, as the cetaceans, joined into a single one, the "blow-hole"); and the posterior nares, which are within the bones of the face and open interiorly into the mouth at the top of the windpipe. These cavities are separated by a more or less continuous cartilaginous partition called the septum, which is perforated by apertures for the transmission of bloodvessels and nerves. Occasionally the two nasal fossæ or cavities communicate with each other.

The muscles which are concerned in the movements of the nasal cartilages include the triangularis (or compressor) nasi, which arises by its apex from the superior maxillary bone, and is inserted into a fibrous aponeurosis spreading over the front ridge of the nose. The fibres of the muscle of one side may unite with those of the opposite and companion muscle. The depressor alæ nasi of each side also arises from

the superior maxillary bone, and is inserted into the septum and posterior part of the alæ of the nose. The former of these two muscles appears to increase the breadth of the nose, and thus may open, dilate or expand the nostrils; the action of the latter muscle is that of a true compressor of the nostrils, each of the depressors drawing its ala or side of the nostril downward. The levator labii superioris alæque nasi lies on the side of the nose, between the inner side of the orbit and the upper lip. When in action this muscle dilates the nose, raises the upper lip and alæ of the nose; its use being well seen in the expression of a derisive smile and in the wrinkling of the skin at the angles of the nose and mouth.

The skin of the nose is of delicate and smooth character. The papillæ or minute elevations of the true skin in the neighborhood of the nose are described as being of smaller size than ordinary, while the upper skin or cuticle is of more than usually thin nature. The hairs of the skin are also of finer nature than in the other regions of the body; and the sebaceous or skin glands are very numerous, and possess short ducts, while their secretion is generally present in very abundant quantity.

There are three meati or compartments of the nose, which are formed in the outer wall or side of each of the nasal cavities by the turbinated bones. These compartments are of unequal size, and they communicate by apertures with certain spaces known as air-cells or sinuses, existing in the frontal, sphenoid, superior maxillary and ethmoid bones. The upper or superior meatus is the smallest compartment, and occupies the posterior part of the nasal wall. It communicates with air-cells known as the posterior ethmoidal and sphenoidal sinuses. The middle meatus is a little larger. It communicates anteriorly through a passage of infundibulum with the anterior ethmoidal and frontal sinuses. The inferior meatus is the largest cavity, and occupies the greater part of the outer nasal wall. Into the front portion of the inferior meatus the nasal duct opens; this canal conveying the tears or lacrymal secretion from the eye to the nose. (See **EYE**). Posteriorly to the extremity of the inferior meatus the aperture of the Eustachian tube, leading from the ear, may be seen.

The mucous membrane lining the nostrils and nasal cavities is also known as the pituitary membrane. It extends throughout the nasal sinuses, into the pharynx, into the nasal ducts and orbits and through the Eustachian tubes into the tympana and mastoid cells of the ear. (See **MUCOUS MEMBRANE**). In the upper part of the nose, corresponding to the upper and middle turbinated bones and the ethmoidal portion of the septum—and termed the olfactory region, from the distribution at this part of the olfactory nerves—the mucous membrane has a covering of epithelial cells of the columnar variety, but non-ciliated. And beneath this layer, and also between the columnar epithelial cells, nucleated or olfactory cells are found. These latter cells form the terminal points as it were of the delicate ultimate filaments of the olfactory nerves, or the nerves of smell (see **NOSE AND THROAT**); and in this way the odoriferous particles drawn into the nostrils, and brought in contact with these cells, stimulate

through them the olfactory nerves, and produce the sense or impression of smell.

The study of the comparative anatomy of the nasal organs shows us that man possesses a sense of smell greatly inferior in very many instances to that possessed by the lower animals. The distribution of the olfactory nerves in man is of a very limited nature when compared with what obtains in such animals as the dog, sheep, etc. And among these lower forms great differences are apparent in the kinds or qualities of odors most readily perceived or appreciated. The carnivorous mammals will in this way be most susceptible to the odors of other animals, and the herbivorous forms to those of plants.

NOSE AND THROAT, Disease of. The nasal cavities, the naso-pharynx, the pharynx and the larynx together form a continuous pathway, and so joined are known in medical literature as the upper respiratory tract, the same being a continuous passage which extends from the external orifice of the nose to the lungs. There are various subdivisions of these anatomical structures, the chief ones being in the nasal cavities and known as the accessory sinuses to be hereinafter described.

Rhinitis.—In earlier days, this affection both in its acute and chronic form was termed catarrh, and was so named by Galen who believed that the dropping down was the result of a secretion from the brain passing through the orifices of the ethmoidal bone into the nose, this process tending to relieve the brain of superfluous substances. Later on, this theory was successfully combated. Through later years, students of pathology have been able to give a more intelligent classification of the various intra-nasal inflammations in the general term rhinitis.

The two important subdivisions are (1) acute rhinitis and (2) chronic rhinitis. In a general way it should be understood that the entire upper respiratory tract is continually the seat of air-borne bacteria. This is true even of the more vicious types known as the streptococci, pneumococci, staphylococci, and often diphtheria and influenza bacilli. Furthermore, the naso-pharynx may harbor these microorganisms without producing the specific diseases which they represent, but in case the individual's resistance becomes lowered from any cause, the constitutional symptoms of these various diseases may suddenly appear.

Acute Rhinitis.—This is an acute inflammatory involvement of the nasal mucous membranes which usually extends to the mucous membrane of the upper respiratory tract. The majority of cases of this affection constitutes what is known by the laity as "cold in the head." The symptoms may also arise as a result of local irritants, or from infections like measles, scarlet fever, typhoid, diphtheria, grip, etc. The majority of cases result directly from sudden changes of temperature, insufficient clothing, damp feet and indirectly from low bodily resistance, physical exhaustion and dissipation. Contributing causes may also be mentioned such as deviation of the cartilaginous septum, stenosis, rheumatism, gout, chronic hypertrophy and unsuitable clothing; also irritant drugs, the inhalation of dust, clippings, etc. Unsanitary surroundings strongly predispose to this affection. Examples of this may be found among people who persistently remain in

a vitiated atmosphere where overcrowding, filth and defective diet prevail. These attacks are usually ushered in by sneezing, a sensation of nasal stuffiness and tickling or irritation in the throat. This is followed by chilliness, moderate rise of temperature and sufficient intra-nasal swelling to cause obstruction to breathing. A profuse watery discharge, which later becomes muco-purulent, is a characteristic symptom of this affection, and the sense of smell becomes temporarily impaired. In a small proportion of cases, the affection extends to the accessory sinuses and produces what is known as acute sinusitis. It is not the purpose of this article to prescribe treatment, but a few words upon the subject of prevention seems pertinent and here the author quotes from his textbook on 'Diseases of the Ear, Nose and Throat.'

"Frequent attacks of simple acute rhinitis, especially in adults, demand the inauguration of stringent preventive measures. The following remarks relating to the general care of the body are appropriate in their relation to taking cold. An ordinary draught of air in a room never should induce an attack of acute rhinitis in a person who habitually practises proper hygienic health measures, and one who fears such exposure confesses to a lack of resistance which is incompatible with good health. The efforts of all individuals, and especially those who abide in changeable climates, should be to fortify the resisting power of the body; in other words, to develop resistance rather than to attempt prevention by means of coddling habits, either during childhood or adult life. For this purpose, a morning application of cold water to the body, either in the form of a sponge, spray or plunge, is highly recommended. Most healthy individuals react readily and promptly from a sudden plunge into cold water, and in a considerable proportion the reaction takes place without rubbing with a towel. Nevertheless, much benefit arises from friction, induced by rubbing the entire body with a coarse bath towel immediately after the bath.

"The cold bath is contraindicated in persons who for any reason do not react after friction is applied to the surface. To those unaccustomed to its use and who desire to commence the daily morning bath, the temperature of the water for the first few days should be moderate and gradually lowered each morning until the proper temperature for quick reaction has been reached. Furthermore, the brisk rubbing benefits the capillary circulation.

"The morning use of cold water may safely be commenced in children as young as two years, and this procedure should become a part of the daily habit of all children who are free from constitutional affections. The tonic effects are most marked and the tendency to colds proportionately reduced as the body can accustom itself to the sudden application of cold water. One who can safely resist the shock of the cold plunge or even that of sponging may, with impunity and confidence, expect to resist ordinary draughts and exposure.

"Bodily resistance is also considerably influenced by the quantity and texture of clothing worn. The clothing should be judiciously selected to meet the requirements of the locality, occupation and the degree of exposure. The clothing of persons with indoor occupations should differ materially from that worn by

those with outdoor occupations. In this connection, it may be stated that excessive clothing may do as much harm as insufficient. Whenever the occupation requires indoor life, the undergarments should be of light weight, to be supplemented by heavy outer garments when going out of doors. It is not wise to wear heavyweight woolen undergarments in occupations unattended by undue exposure; the light wool will usually suffice. Of late, the linen-mesh underwear has obtained considerable popularity, upon the theory that bodily moisture rapidly passes through this fabric.

"Protection of the feet from dampness and cold is of great importance. Whenever the streets or sidewalks are wet or slushy, rubbers should be worn to protect the feet from dampness. Exposure to draughts does not induce colds in the same proportion as does the neglect to protect the feet from cold and dampness.

"The prolonged inhalation of vitiated air should also be avoided. All occupied rooms and particularly sleeping apartments should be sufficiently ventilated to insure the proper amount of oxygen. The air of a sleeping apartment should be fresh, and on account of warm bed covering, the temperature may safely be lowered to 50 degrees or even lower. In extreme weather the temperature of the sleeping apartment can be controlled by allowing sufficient heat to enter the room.

"Bodily exercise promotes resistance and thus tends to prevent colds. A brisk walk to or from business or at the lunch hour, accompanied by deep breathing, is of great benefit, although every individual, if possible, should at regular intervals indulge in more fatiguing and general muscular exercise. The gymnasium with its variety of implements for indoor exercise, bicycling, walking, hunting, horseback riding, golf and tennis for outdoor exercise are examples of healthful and helpful methods to be employed, always bearing in mind that free perspiration is of great benefit to the human economy. Even the gymnasium can be dispensed with by employing a few forms of muscular exercises in one's own home. No person may expect to maintain perfect health who refrains from systematic physical exercise.

"**General and Local Treatment.**—It is extremely difficult to induce persons suffering with acute rhinitis to submit to the form of treatment which mitigates its severity, lessens its duration and almost surely guarantees immunity from troublesome and even severe or serious complications. As a rule, the patients know that the disease is self-limited, that in a large proportion of cases serious complications do not occur, and they unwittingly run risks by attending to their usual duties, and only those who are prone to prolonged complications are willing to submit to the necessary restrictions and medication. Elderly persons should invariably remain indoors during the active stages of acute rhinitis."

Chronic Rhinitis.—Chronic rhinitis may be described as (1) a chronic inflammatory process involving the nose and possibly the accessory sinuses as a result of a succession of acute attacks. It also occurs, secondarily from systemic diseases such as syphilis, Bright's disease, gout, rheumatism, malaria, etc. 2. Membranous inflammation, of which there are three varieties: (a) croupous or pseudomem-

branous, an exudate without material organization and not due to specific bacteria, and which may be produced by escharotics or infectious fevers; (b) fibrinoplastic inflammation, which is characterized by the formation on the surface of the membrane of plastic material that seems to organize in layers, but is non-bacterial in origin; (c) diphtheritic inflammation, a more deep-seated exudate due to a specific germ, the Klebs-Löffler bacillus, or *Bacillus diphtheriae*.

Unlike the foregoing this false membrane when removed leaves a bleeding surface, showing that ulceration exists, which extends at least through the basement membrane.

3. Hemorrhagic inflammation, a violent inflammation of the mucous surface, characterized by interstitial hemorrhage.

4. Gangrenous inflammation, a type of inflammation which sometimes follows the acute infectious diseases in children. It may be due to burns, scalds, etc.

Specific Inflammations (Chronic Infectious Inflammations; Specific Granulomata).—

These include actinomycosis, glanders, leprosy, syphilis, tuberculosis (q.v.), and rhinoscleroma, which is characterized by excessive thickening and swelling of the skin and mucous membrane of the nose, and is supposed to be due to *Bacillus rhinoscleromatis*.

Nasal Bacteria.—Owing to the peculiar construction and functions of the nasal cavities, together with the moist condition of the membrane, bacteria to a great or less extent accumulate. The secretions of the nose and nasopharynx are supposed by most bacteriologists to possess considerable germicidal influence, as may be instanced by the fact that they are found in much larger numbers in the anterior nares than in the rhinopharynx. It may also be noted that even the more virulent types, especially the *Staphylococcus pyogenes*, *Micrococcus pneumoniae* (Frankel), *Bacillus tuberculosis*, Friedlander's pneumococcus, Klebs-Löffler bacillus (diphtheritic), and the streptococcus may be found and still not result in the development of the specific diseases of which they are supposed to be the causative factors.

It is difficult to disassociate this condition from that of chronic purulent nasal sinusitis. Indeed, in almost every case of chronic rhinitis, a purulent discharge from some of the accessory sinuses is present. In a limited proportion of cases, atrophy of the nasal mucosa is a prominent symptom and often the turbinated bones become more or less absorbed, while in the majority of cases hyperplasia or infiltration of the nasal mucosa is the prominent symptom, invariably resulting in more or less nasal obstruction. Defects in nasal conformation such as septal spurs and deflections which interfere with nasal drainage and respiration are common etiological factors. When long continued, it results secondarily in marked changes in the mucous membrane of the post-nasal and pharyngeal spaces. Accumulation of secretions induces sneezing, hawking and clearing of the throat.

Atrophic Rhinitis.—This affection may be described as a chronic inflammatory process involving the intra-nasal tissues whereby more or less absorption of the turbinal bones and destruction of the glandular structures of the mucosa is present. In the majority of cases the condition is a simple chronic catarrhal process

but the more serious ones are hereinafter described under the heading of *Ozena*. The simple form may not be attended by distinctive symptoms even though the secretions are altered. While the actual cause is not fully known, it is generally considered to result from frequent and long continued attacks of acute inflammation of the nasal mucosa. Most observers incline to the opinion that all cases of atrophy have been preceded by long continued hypertrophy of the same tissues. A marked symptom is alteration in the character of the secretion which is prone to accumulate and end in crust formations. Dryness of the pharynx and larynx is a later symptom, probably resulting from the loss of normal moisture imparted to the air in its course through the nasal cavities. Any local treatment should be antedated by careful physical examination and the discovery, if possible, of any constitutional disease or hereditary tendency like syphilis or tuberculosis. Frequent cleansing of the nasal mucosa with bland alkaline solution is helpful.

Ozena.—The term means fetid accumulation in the nose. This marks the most troublesome of all nasal affections especially from the standpoint of the patient whose intra-nasal spaces are continuously packed with highly offensive crusts and masses of secretion. Atrophy of the intra-nasal tissues is invariably present. A recent discovery has shown that almost without exception the antrum of Highmore is the seat of the disease and that by appropriate operation upon this cavity the disease may be eliminated. In any event, a long continued local treatment preferably by a rhinologist is imperative.

Nasal hydrops is an obstructive nasal condition accompanied by an excessive flow of watery fluid from the nose, probably of reflex origin.

Nasal Syphilis.—A disease also called specific catarrh, specific rhinitis and syphilitic rhinitis. It is an intra-nasal manifestation of syphilis, usually of the tertiary variety, accompanied with more or less necrosis of both soft tissues and bone. Occasionally the nasal mucous membrane may become the seat of the initial lesion. The intra-nasal lesions of the tertiary stage are severe and extensive and may involve the cartilaginous septum or the bony framework of the nose, resulting often in serious and extensive deformity. Wherever there are masses of necrosed bone the odor is exceedingly offensive, and frequently large pieces of broken down bone may be removed *en masse*.

Lupus (q.v.) is a skin-disease of which there are two distinct forms.

Furunculosis (phlegmonous rhinitis) is the formation of abscess in any part of the nasal cavities.

Ulcers.—Small ulcers may form in various portions of the nasal cavity, but are usually found upon the septum, and result from foreign bodies, picking of the nose, and from a general systemic disturbance like diabetes. Malignant growths occur in the nose and do not differ essentially from those found elsewhere in the body. Infected ulcers, when occurring in nasal cavities, are due to some specific form of disease like syphilis, glanders, diphtheria, scarle fever, smallpox, typhoid fever, or typhus fever, the type depending upon the nature of the accompanying disease.

Neurosis.—Neurosis of olfaction (smell) is a perversion of olfaction, a perception of imaginary odors frequently amounting to hallucination. Hyperosmia, overacuteness of olfaction, is supposed to be due to impairment of nerve-force. See *ANOSMIA*.

Sneezing is a forcible and audible spasmodic expulsion of air through the nose and mouth caused by inhalation of irritating substances or by irritation of the vasomotor centres. See *HAY FEVER*.

Non-Inflammatory Diseases.—Of these, one of the most common is nosebleed (q.v.). Several varieties of foreign bodies are occasionally found in the anterior nasal space. Rhinoliths are developments of hard substances in the nasal mucosa formed from the deposit of mineral salts. Various animate foreign bodies may be found in the nose, such as insects, maggots and intestinal worms. Of other foreign bodies, those placed in the nostrils by malingerers and children form the greater part, and consist chiefly of buttons, beans, peas, seeds, rags, etc.

Neoplasm of the Upper Respiratory Tract.—Non-malignant neoplasm (papilloma) is a benign wart-like growth made up of hypertrophied papillæ, appearing rarely in nasal cavities, but occasionally seen in the pharynx and larynx. Adenoma is a benign tumor made up of connective tissue enclosing large spaces filled with blood. Enchondroma in the nasal passages is a cartilaginous growth, sometimes called chondroma, and is an offshoot from the cartilaginous septum. Exostosis is a bony growth projecting outward from the surface of the intra-nasal bony framework. Myxoma (nasal polypus) is the lowest grade of adult connective-tissue tumor. It is a soft translucent growth made up of connective tissue and capillary vessels enclosed in a jelly-like matrix. They are usually pedunculated, multiple and sometimes of large size, grayish in color, translucent, and have a smooth surface. They give rise to symptoms of intra-nasal pressure and obstruction, asthma, laryngeal cough, impairment of smell, and excessive watery discharge. As a rule the growth is associated with diseases of the accessory sinuses.

Malignant Tumors.—Carcinoma and Sarcoma may originate in any part of the upper respiratory tract. It rapidly assumes grave proportions, and is amenable to operative interference only during incipency. Sarcoma, which is a highly malignant tumor, has its origin in the deep connective tissue and gradually spreads to the mucous surface. It is nodulated and fungoid in appearance and tends to ulcerate in the later stages. See *TUMOR*.

Diseases and Deformities of the Anterior Nasal Cavities.—Owing to the prominence of the nose and its peculiar anatomical conformation, the septum becomes peculiarly liable to injuries and malformations, the most common of which is deviation or deflection. A deviated or deflected septum (usually limited to the cartilaginous portion) is a permanent change from the perpendicular to varying deformities. The deformities assume various shapes, with an occasional offshoot of a cartilaginous mass heretofore described as enchondroma. These often result in severe intra-nasal obstruction and require radical operative interference for relief. A modern operation for septal deformities has

proved most effective. Synechia is a cartilaginous or fibrinous band extending from the septum to the nasal wall. A synechia may sometimes form between the turbinals. Septal ulcerations are usually due to picking the nose, the desire for which may be induced by irritants, foreign bodies and the inhaling of poisonous gases. They may also be syphilitic in origin. Septal perforations are openings through the cartilaginous septum. They are of varying sizes, and are due to extension of ulceration. Abscess of the septum is a collection of pus in the septal tissues, due to injuries or general systemic diseases. Depression of the nasal cartilage is a nasal deformity following extensive loss of septal tissue or of nasal bones, usually due to syphilis or injury.

Diseases of the Nasal Accessory Sinuses.

—The nasal accessory sinuses are a series of cavities and cells all lined with mucous membrane and having communication with the nasal cavities. They are the frontal sinuses, the anterior and posterior ethmoidal cells, the sphenoidal sinuses and the maxillary antra.

Maxillary Sinuses.—The maxillary sinus or antrum of Highmore is situated in the body of the superior-maxillary bone. It is separated from the nasal cavities by the outer nasal wall with the exception of a small opening whereby it communicates with the nasal cavities. It is lined with an extremely delicate mucous membrane and frequently becomes the seat of infection by way of the nasal cavities. In fact, all of the nasal accessory sinuses are liable to become the seat of acute purulent inflammatory processes, especially the infection accompanying attacks of grip. Exanthemata also may be mentioned as causative factors. Occasionally, the maxillary sinus becomes infected through the roots of carious teeth. The attacks are accompanied by a sensation of fullness, severe localized pain and purulent discharge. Barring the clinical symptoms, diagnosis is facilitated by transillumination, which is effected by first placing the patient in a totally dark room and then introducing into the mouth a bright electric light. A comparison of the illumination with the opposite side often furnishes important diagnostic information. A more thorough method is by means of a radiograph. A good radiograph of the nasal accessory sinuses is most valuable in aiding the rhinologist to locate diseased areas. Acute cases usually recover by local treatment, but chronic cases may require operative measures. The antrum also may become the seat of both benign and malignant growths.

Diseases of the Ethmoidal Cells.—These groups of cells, located in the ethmoid bone and communicating with the nasal cavities, are subject to both acute and chronic inflammatory and purulent diseases, the most common being the acute catarrhal inflammation occurring with general purulent rhinitis. The purulent form may occur on one or both sides, and may be associated with a suppurative condition of other accessory sinuses. When far advanced, it results in an enlargement of the middle turbinated bones, the walls of which become cystic, forming, with the broken-down tissues of the ethmoid, large cysts filled with pus or polypoid degeneration.

The sphenoidal sinuses are less frequently the seat of disease, although they may be the

seat of the same diseases heretofore described as occurring in the other sinuses.

The anatomical relation of the frontal sinuses to the nasal cavities renders them liable to the development of both acute and chronic inflammatory conditions, purulent infections and tumors.

Catarrhal inflammation, both acute and chronic, with its attendant supra-orbital pain and sense of weight and fulness in the forehead, is occasionally present in connection with the same condition in the nasal cavities. Acute suppurative inflammation (empyema) is an acute suppuration brought about by the introduction of infection from the nose through the infundibulum. When long continued, the purulent process takes on the form of chronic purulent inflammation, in which there may be more or less necrosis of the bony walls and the development of polypoid degeneration. The severest forms are usually quite curable by means of operation.

Nasopharynx.—The nasopharynx is that section of the upper respiratory tract between the posterior border of the vomer and the level of the soft palate. The nasopharynx may be the seat of the following diseases: (1) acute nasopharyngitis (acute post-nasal catarrh, acute rhinopharyngitis); (2) chronic nasopharyngitis; (3) atrophic pharyngitis (see *Atrophic Rhinitis* above); (4) hyperplastic nasopharyngitis; (5) specific inflammations (see *Pharynx* below, also PHARYNX, a separate article); (6) adenoid vegetations (see *Tonsils* below).

Acute nasopharyngitis is an acute inflammation of the mucous membrane lining the nasopharynx, usually accompanied by similar inflammations in the nose, pharynx and larynx. Chronic nasopharyngitis is a chronic catarrhal inflammation resulting usually from repeated acute attacks and with the same causal relations. It is characterized by the presence of tenacious mucus, with more or less continuous efforts on the part of the victim to "hawk" and clear the throat. In the later stages the secretion shows a tendency to become thick, forming scabs and inspissated masses. This affection may result from the inflammation of irritating gases. Hyperplastic nasopharyngitis is a chronic inflammation resulting in the development of connective tissue in the mucous membrane.

Adenoids.—The lymphatic glands which bear the name of adenoids are a series of lymph-glands which are superficially located in the mucosa of the vault and posterior wall of the naso-pharynx. These lymph-glands are normal under healthful conditions and require treatment only when they become the seat of hyper-plastic enlargement. It is an affection essentially of child life and it is more commonly observed between the ages of 3 and 12 years. Heredity seems to be an important etiological factor. Bad hygiene, vitiated air and irritating gases are supposed to be among the predisposing causes. The presence of this condition is indicated by interference with nasal respiration, resulting in mouth-breathing, especially at night, snoring, restlessness, "dead" voice, and often with considerable arrest in the progress of physical development. With these symptoms are frequently found narrowing of the nasal orifices, attacks of middle-ear suppuration and narrowing of the chest-walls. En-

largement of these glands is considered to be extremely detrimental to child-life, and complete removal by operation offers the only means of cure and should always be done.

Pharynx.—The pharynx is that portion of the upper respiratory tract bounded above by the soft palate and below by the upper borders of the larynx and œsophagus. The uvula, when normal, should be about three-eighths of an inch long. It is occasionally bifid, and when it is greatly relaxed or enlarged the condition is described as elongation of the uvula. The uvula may be subject to inflammations, ulceration, tuberculosis, syphilis and œdema. The same may be said of the soft palate, which is also subject to adhesions, in which there is an attachment or adhesion between the soft palate and the posterior wall of the pharynx. Adhesions of this character are due to the ravages of syphilis.

Tonsils.—The tonsils are a series of glands known as (1) the pharyngeal or Luschka's tonsil, also called adenoid vegetation; (2) the faucial tonsils, located on either side of the pharynx between the faucial pillars; (3) the lingual tonsils, a series of glands at the base of the tongue. Taken as a whole, they have been known as Waldeyer's ring. A visible hypertrophy or enlargement of any one of the series is usually accompanied by similar enlargement of the others. They form a part of the normal anatomical structures of the locality and, when diseased, call for operative interference.

The faucial tonsils are located between the anterior and posterior faucial pillars and normally are not visible to the eye. The lymphatic structure, however, is liable to pathological changes resulting in enlargement or hypertrophy. The enlargement may be slight, but the tonsils may become so much enlarged that they meet in the median line of the pharynx. The enlargement becomes much aggravated during the attacks of the various acute inflammations which may occur in this region. The faucial tonsils are subject to acute inflammation occurring with general pharyngitis.

Tonsilar and peritonsilar abscess (quinsy, phlegmonous tonsilitis) is a suppurative inflammation of the tonsil, accompanied by severe pain, fever and swelling in the tonsilar or peritonsilar region, resulting in formation of abscess.

Follicular tonsilitis (lacunar and cryptic tonsilitis) is an acute inflammation of the tonsil attended with small fibrinous exudates in the crypts. It is accompanied by constant pain, chills, high temperature and is supposed to be due to exposure to cold, climatic changes and lowered vitality.

The causes of hypertrophied tonsils are chronic inflammation, inherited diathesis, gouty or rheumatic conditions, climatic influences, and the infectious diseases of childhood. The condition is accompanied by interference with respiration, more or less difficulty in swallowing, involvement of the Eustachian tube, anæmia, languor and retarded physical development, all these symptoms being aggravated by the recumbent position.

More recent investigation of diseased tonsils in adult life have shown that even when these organs are not particularly enlarged, they may be the seat of chronic infective processes, particularly chronic peritonsilar abscess.

Caseous tonsilitis is a condition resulting from acute or chronic inflammation of the tonsils, in which the crypts show a tendency to fill up with various secretions. These masses show a tendency to ferment and form small foul-smelling caseous masses, which eventually squeeze out of the crypts. It has been found that muscular rheumatism and even attacks of pericarditis and appendicitis may originate from the tonsil. Modern removal of this organ is known as tonsilectomy, an operation which is usually performed under general anæsthesia. This operation means the complete removal of the organ with its sac thus opening up any blind abscesses which may lie underneath. Various methods are employed in the performance of this operation.

Mycosis of the tonsil and pharynx is an affection characterized by the development of small yellowish-white, clearly defined masses forming around the tonsilar crypts and frequently extending over the surface of the pharynx and the glands at the base of the tongue. It is supposed to be caused by *Leptothrix buccalis*.

Fish-bones, pins and other foreign bodies occasionally find lodgment in the tonsil-crypts.

Lingual tonsil is made up of a mass of adenoid tissue located between the circumvallate papillæ at the base of the tongue and the attachment of the epiglottis.

Disease of the Pharynx (acute inflammatory diseases of the pharynx, acute catarrhal pharyngitis), an inflammatory process, catarrhal in character, results from exposure to cold, and is usually attended with a like condition in the nose and larynx. It may also be due to gastric disorders and lowered vitality. There are many contributing causes, among which may be mentioned the exanthemata, bad ventilation, bad hygiene, insufficient clothing, overindulgence in alcohol and tobacco, and the inhaling of noxious gases. The disease is indicated by a certain dry painful condition of the pharyngeal walls, congested vessels, swelling and sometimes œdema. Later on the dryness gives way to a more or less profuse secretion gradually becoming more tenacious and mucopurulent.

Infective pharyngitis (hospital sore throat, phlegmonous pharyngitis) is an inflammatory condition, attended with more or less exudate, occurring in individuals who are exposed for a prolonged period to septic influences. It is frequently found in the throats of physicians and nurses who care for diphtheria and scarlet-fever patients.

Croupous or simple membranous pharyngitis is an inflammation of the pharynx or tonsils attended with the development of a false membrane without the presence of any specific germ. Clinically the disease resembles diphtheria, but is in no sense to be considered as the same. (See DIPHTHERIA). A positive diagnosis can be established only by bacteriological examination.

Ludwig's Angina.—This is a suppurative cellulitis occurring in the tissues of the neck, due to secondary infection from within the throat. Diphtheria, scarlet fever and grip may be mentioned as exciting causes.

Chronic Inflammatory Diseases.—Simple chronic pharyngitis (clergyman's sore throat) is an inflammation of the pharynx resulting either from frequent acute inflammations or

from overuse of the voice. Public speakers and singers are peculiarly liable to its development. It may also result from lesions of the liver, kidneys, lungs and heart, or from the use of stimulants. The marked symptoms are hyperæmia or congestion, with dryness, hoarseness and a feeling of throat-tire.

Follicular pharyngitis (granular pharyngitis) may be defined as an inflammation in which the granular structures of the pharynx become chiefly involved. It is accompanied by hoarseness, irritation and cough, together with the appearance on the posterior wall of small granular enlargements. The disease is supposed to result either from voice-strain or improper vocalization.

Atrophic pharyngitis (dry pharyngitis, pharyngitis sicca, atrophic pharyngitis) may be defined as a chronic inflammation resulting in pathological alterations in the structure of the mucous membrane of the pharynx and impairment of the muciparous glands. The disease is attended therefore by perverted secretion, with a burning, itching sensation in the throat, and extreme dryness. It is usually accompanied by atrophy of all the membranes of the upper respiratory tract.

Rheumatic pharyngitis (gouty sore throat, rheumatic sore throat) is an affection that may be acute or chronic, and is due to the presence of some irritant in the blood. The uric-acid diathesis may be considered an exciting cause, and the disease responds to antirheumatic or antigout treatment.

Tuberculosis of the pharynx is a rare involvement, always secondary to pulmonary tuberculosis. Its presence is indicated by the formation of small tubercles upon the soft palate or pillars of the fauces. A positive diagnosis may be made by microscopical examination of the secretions.

Syphilis.—All three forms of syphilitic lesions may appear in the pharynx. The primary lesions are occasionally found upon the tonsils or other surfaces of the pharynx in the form of chancre. The mucus-patch is usually present at some period during the history of every case. The tertiary lesion or gumma may also develop in any of the pharyngeal structures, often resulting in extensive ulceration and adhesion.

Glanders.—An infectious disease due to the *Bacillus mallei*, and communicated to man from animals, usually horses.

Retropharyngeal Abscess.—A suppurative inflammation in the posterior wall of the pharynx resulting in the development of abscess, which may burrow upward or downward, causing serious danger to life. The primary infection is usually due to inherited tuberculosis or syphilis.

Foreign Bodies in the Pharynx.—The exposed location of the pharynx, with its irregular surfaces, renders it peculiarly liable to the lodgment of foreign bodies. Among those rather frequently observed are fish-bones, pieces of other bone, shells, coins, pins, needles, sharp objects of various kinds, false teeth, etc.

The Larynx.—That section of the upper respiratory tract which occupies the space between the root of the tongue and the upper end of the trachea is called the larynx (q. v.). It is subject to a variety of diseases, among which

are malformations and deformities. Congenital deformities in the larynx are rare. Congenital stenosis is a narrowing of the calibre of the larynx due to the formation of webs or bands stretching across the interior. Acquired stenosis is due to cicatricial contraction, traumatism, or syphilis. Tubercular ulceration may also be mentioned as a cause of stenosis of the larynx.

Acute catarrhal laryngitis (spurious croup) is an acute inflammatory process involving the mucous membrane of the larynx and attended with hoarseness, dryness and slight dyspnoea. The disease is caused by cold, exposure, gastrointestinal disturbances, nasal obstruction, bad ventilation, inhalation of irritating gases and overuse of the voice. There is usually slight fever, cough and in the later stages considerable expectoration.

Acute laryngitis in children (spasmodic croup, false croup) does not differ in etiology and pathology from ordinary acute laryngitis. The symptoms, however, are much more marked. The small calibre of the larynx in childhood, together with the greater elasticity of the tissues, renders the condition more serious. The engorgement is more rapid, and the symptoms of suffocation rapidly develop. The peculiar stridulous breathing, with frantic respiratory efforts and a hoarse barking cough, gives the disease an appearance of unusual severity. The disease usually continues for three days, and is relieved by steam-inhalations, emetics, and laxatives.

For spasm of the glottis see LARYNGISMUS STRIDULUS.

Acute epiglottitis, inflammation of the epiglottis, is rarely entirely local except when due to swallowing an irritating substance. It is usually associated with inflammation of contiguous membranes. The chief symptom is a burning, smarting sensation, with a tendency to oedema.

Oedema of the larynx is an acute inflammation of the larynx accompanied by serious infiltration of the tissues, and resulting in marked interference with respiration.

Rheumatic laryngitis (laryngeal rheumatism, gouty sore throat) is an acute laryngitis directly traceable to a rheumatic or gouty diathesis.

Membranous laryngitis (true croup, membranous croup, diphtheritic croup, fibrinous croup, croupous laryngitis, laryngeal diphtheria) is an inflammation of the mucous membrane lining the larynx, manifesting the appearance of true diphtheria, but usually without the presence of Klebs-Löffler bacilli. Various forms of pathogenic bacteria are usually present. It may occur at any season of the year, and clinically it approaches so nearly to diphtheria that a positive diagnosis is most difficult. Many observers believe the condition to be exceedingly rare, and that true diphtheria is nearly always present wherever true membrane is found in the larynx.

Laryngeal diphtheria, without the presence of membrane in the pharynx or nose, sometimes occurs, the symptoms being quite similar to membranous laryngitis. The characteristic odor, however, is usually present, and the Klebs-Löffler bacilli may be found.

Hemorrhagic laryngitis may occur as a re-

sult of acute laryngitis, or from syphilis, tuberculous or malignant disease, or from rupture of a blood-vessel.

Simple chronic laryngitis (chronic catarrh of the larynx) is an inflammation involving both the superficial and deeper layers of the mucous membrane, with more or less of tissue-changes. The disease is supposed to result from repeated acute attacks. A subacute variety may be mentioned, but it cannot be clearly defined beyond stating that it is the commencement of the chronic form. Among other causes are the inhalation of irritating gases or dust, nasal obstruction and improper use of the voice. The marked symptoms of this condition are hoarseness, a tickling sensation, with a tendency to clear the voice, slight cough, with considerable secretion and occasional loss of voice.

Dry laryngitis (laryngitis sicca, atrophic laryngitis, laryngeal ozæna) is always associated with a similar condition in the nose and nasopharynx, the symptoms of which have all been described.

Anæmia of the larynx, when marked, is usually a local manifestation of general anæmia.

Singers' nodules (chorditis tuberosa, trachoma of the vocal chords) are new-growth formations appearing on the margin of the vocal chords and usually at the junction of the middle and anterior thirds. They are small oval masses, sometimes developing upon both chords. While resulting from inflammation, the exciting cause is no doubt the improper use of the vocal apparatus. There is marked interference with phonation and sometimes complete loss of voice. Treatment consists either of rest or the adoption of a system of vocal exercises which bring other series of muscles into activity. Local astringent applications have been employed.

Syphilis of the Larynx.—Both secondary and tertiary lesions of syphilis may appear in the larynx, mucous patches, however, being somewhat rare. The tertiary stage is of comparative frequency, and is manifested by the development of gummata, with destructive ulceration and subsequent cicatrization.

Tuberculosis of the Larynx.—This disease, also called consumption of the larynx, consumption of the throat, laryngeal phthisis and tubercular laryngitis, is a specific inflammation of the larynx, the direct result of the tubercle bacillus. Tuberculosis of the larynx is rarely, if ever, a primary affection, and usually occurs as a manifestation of general tuberculosis. It begins with the development of minute miliary tubercles in the larynx, which eventually result in large swellings of the arytenoid cartilages. These subsequently break down, forming large ulcerations. Great suffering results, with dysphonia, dysphagia, continuous irritation of the larynx, progressive hoarseness and irritating cough with excessive expectoration. In the late stages hemorrhage may occur. This form of tuberculosis is rapidly fatal, with but little hope of the patient's recovery.

Foreign Bodies in the Larynx.—Accidental entrance of foreign bodies into the larynx occasionally occurs. Foreign bodies usually enter during the process of swallowing, speaking or breathing. The resulting danger depends much upon the character and size of the foreign body and also upon its location.

Liquid food and even small portions of solid food are usually dislodged with little difficulty unless the entire calibre of the larynx is shut off. Foreign bodies may usually be seen by the ordinary methods resorted to for examining the interior of the larynx. They are removed by extraction by way of the mouth and larynx or by external operation. Unfortunately the masses are sometimes drawn beyond the larynx into the bronchial tubes with fatal results, unless they are removed by bronchoscopy.

Neuroses of the Larynx.—Of the various laryngeal symptoms sometimes resulting from impaired nerve-supply or from brain-lesions is spasmodic cough. This occurs more frequently in persons of neurotic type, although it may be of reflex origin. Anæsthesia, paræsthesia and hyperæsthesia of the larynx may be mentioned under this type of affections.

Hysterical aphonia is usually described as a sudden and complete loss of voice, occurring in unmarried females. The immediate existing cause is usually shock, fright, anger or some other sudden emotion. The condition may remain for some time and recovery may be sudden and unexpected and without treatment.

Laryngeal Vertigo.—This is a neurosis in which the dominant symptoms are a sudden strangling cough with vertigo and momentary loss of consciousness. It is a rare affection, and is usually associated with acute or chronic inflammation of the larynx, strongly influenced by fatigue or nervous excitement. The disease quickly responds to treatment.

Paralysis of the Vocal Chords.—Temporary interference with the nerve-supply of the various muscles controlling the larynx, especially from local causes, is not infrequent. The paralysis following diphtheria and accidental poisoning is typical. A more severe form results from pressure from aneurism, cancer, phthisis and syphilis. But lesions of the brain are by far the most destructive in results. Paralysis in this location may be either motor or sensory. Bilateral paralysis of the superior laryngeal nerve is both motor and sensory in character. The gravity of these conditions depends upon the cause. Bilateral abductor paralysis, on account of the approximations of the vocal chords without the muscular power to separate them for proper inhalation, is dangerous to life, inasmuch as a fatal attack of dyspnœa may occur at any time.

Bronchoscopy.—This is an operation devised to remove foreign bodies from the bronchial tube and larynx. Metal tubes of various sizes are employed for this purpose. These are of various sizes and are illuminated by specially devised electric lamps.

Intubation of the Larynx.—This process was devised and perfected by the American physician, Joseph O'Dwyer. It consists in placing a hollow tube within the larynx for the purpose of relieving dyspnœa. Intralaryngeal tumors sometimes tend to occlude the lumen of the larynx and intubation is resorted to for the relief of the attendant dyspnœa. Intubation also serves as a method of relief in cases of laryngeal stricture. The operation is never attempted unless the patient's life is threatened by occlusion of the larynx or sudden spasm. The most common disease giving rise to the necessity for intubation is diphtheritic laryngitis.

Suspension Laryngoscopy.—Suspension laryngoscopy is a procedure by means of which the curved road from the teeth to the vocal chords can be converted into a straight one so that through the wide open mouth a direct view of the larynx can be obtained, so that the operator is left with both hands free for manipulation and operative work. This procedure is carried out by means of an elaborate mechanical outfit and is not applicable to ordinary office work.

Tracheotomy.—An operation whereby an external opening is made into the trachea below the larynx, through which a tube known as the tracheotomy-tube is inserted. It is performed for the relief of any obstruction to breathing. The site selected for entrance into the trachea may be high or low according to the nature and location of the obstruction.

Operations on the Larynx.—Thyrotomy consists of splitting the thyroid cartilage in the median line for the purpose of opening the larynx and removing growths or foreign bodies. Laryngectomy is an operation for the complete removal of the larynx and is performed only in case of malignant growth. In cases where only part of the larynx is removed it is called partial laryngectomy. An artificial larynx is an instrument which in certain cases may be introduced after a laryngectomy and which serves to fulfil some of the functions of the larynx.

Consult Phillips, 'Diseases of the Ear, Nose and Throat'; Wright and Smith, 'Diseases of the Nose and Throat.'

WENDELL C. PHILLIPS,
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NOSEBLEED, hemorrhage from the nose; epistaxis. This is the most frequent form of bleeding from a mucous membrane. It may be caused by direct injury, as by a blow upon the nose, a scratch within the nostril, etc., or may result from ulceration or other morbid growth in the nasal cavity. It is also of frequent occurrence in gunners, caused by the severe concussion of heavy firing. It is most common in children and young adults. When an active hemorrhage, it may be preceded by a feeling of tension and heat in the nostrils, pain in the forehead, giddiness, buzzing in the ears, flushing of the face. These symptoms are seldom all present in the same case, and in many instances the flow of blood is not preceded by any apparent disorder. Nosebleed may also be of a passive character, as when due to a morbid state of the blood, for example, in typhoid fever, scarlet fever, purpura, scurvy, etc., or to obstruction of the circulation by disease of the heart and liver. In persons advanced in life it must be more cautiously interfered with than in the young. If the person so affected is plethoric, the hemorrhage is evidently of an active character, and is a natural relief. Usually it will stop by the clotting of the blood in the nostrils or upon pressure of the wing of the nostril against the nasal septum. It may, however, go to an extreme extent and require other means for checking. There are many methods of affecting this, but the application of cold water, snow, ice, etc., to the forehead, spine or other parts of the body is the most general. Raising both arms suddenly above the head has been said to stop the flow quickly; or

a small quantity of solution of alum, as strong as it can be made, may be thrown up with a syringe or a piece of linen soaked in the solution may be stuffed up the nostrils. From 10 to 15 drops of dilute sulphuric acid may be given in water at intervals, according to the nature and persistence of the attack. The application of cotton or a sponge, tannin, alum, etc., may be necessary under direction of a physician, who, in desperate cases, is needed for discovering the bleeding-point, and by whom plugging of the nostrils may be resorted to. Recently anti-pyrin has been used with very great success. It is dissolved in water, about 10 grains to the ounce. Another efficacious remedy is the extract of suprarenal glands used in strong solution. With both these remedies cold water is used to free the bleeding cavity of clots; when this has been effected about half an ounce of one of these solutions is insufflated and retained in the nose as long as possible. Consult 'Reference Handbook of the Medical Sciences' (Vol. IV, pp. 68-70, New York 1914).

NOSKOWSKI, nōs-kōf'skē, **Sigismund**, Polish composer: b. Warsaw, 1846; d. Wiesbaden, Germany, 1909. After studying at the Warsaw Musical Institute in 1864-67 he went to Berlin to study under Kiel and Oscar Raif. In 1876 he became conductor of the Bodau Society in Constance. In 1881 he returned to Warsaw as director of the Musical Society. He became professor in the Warsaw Conservatory in 1888, second kapellmeister of the Warsaw Philharmonic in 1904, and of the Warsaw opera in 1906. His opera, 'Livia,' was brought out in Lemburg in 1898. He also wrote symphonies, ballet-music, an overture, string-quartets and piano music. Noskowski also invented a musical notation for the blind.

NOSOLOGY, in medicine, that science which treats of the systematic arrangement or classification and nomenclature of diseases. Many systems of nosology have been in use at different times, some of which have been founded on the nature of the ascertained cause of disease; others on the pathological conditions which attend diseases; and still others on the differences between structural and functional diseases and so on. In fact different systems will always be required for different uses. Recent progress in bacteriology has necessitated modifications in nosological methods, and future advancements will do the same, while the methods of modern medicine lead to such classifications as best suit the requirements of scientific knowledge applied in ordinary practice. See DISEASE—CLASSIFICATION OF DISEASES.

NOSSAIRIANS, nōs-sā'ri-anz (Arabic for Nazaræans), a subdivision of the Shiites, or followers of Ali, who hold that God has incorporated himself with some of their prophets, particularly with Ali, and Mohammed ben-Hanisiah, his son. The Nossairians are charged with borrowing this doctrine from the Christians who teach the incarnation of God in Christ, hence they nickname them Nazaræans. Consult Broughton, 'History of Religions.' See MOHAMMEDANISM.

NOISSI-BÉ, nōs-sē-bā', a volcanic island off the northwest coast of Madagascar, about 14 miles long and eight miles wide; area 130

square miles. In 1840 it was ceded to France by Madagascar, and when Madagascar became a possession of France, in 1896, Nossi-Bé became a part of the territory under the governor-general of Madagascar. Portions of the island are very fertile; sugar cane, coffee and tobacco are among its products, and there are distilleries and sugar factories. Hellville, the chief city, is a port of call visited annually by a large number of ships. Pop. 11,225. See MADAGASCAR.

NOSTALGIA (Greek, "homesickness"), a feeling of depression and anxiety due to absence from home or country. The victim of this disease is possessed with the desire to return, and often filled with apprehension and despair when the desire is without early prospect of being gratified. The condition is apt to be attended by loss of sleep, loss of appetite, often by emaciation and various forms of physical malady, while the psychic disturbance sometimes leads to melancholia ending in mania and death. Nostalgia is especially liable to occur in cases of unwilling absence from home, as those of conscripts, etc. Even soldiers voluntarily serving far from home are often great sufferers from this disease, insomuch that army medical officers have come to recognize it in its extreme severity as a disability warranting furlough, or even discharge, in order to save the patient's life. This aspect of nostalgia was impressively illustrated in the United States army both in the Philippines and in Europe.

NOSTRADAMUS, nōs-trā-dā'mūs (true name MICHEL DE NOTREDAME), French physician and astrologer: b. Saint Remy, Provence, 14 Dec. 1503; d. Salon, 2 July 1566. He was of Jewish descent, studied first at Avignon, and then at the medical school of Montpellier, and after taking his degree acted for some time as a professor, but afterward settled as a medical practitioner at Agen. Finally, after traveling in Italy, he established himself at Salon, near Aix, about 1544, where he wrote his famous 'Prophéties' (Centuries) or astrological predictions written in rhymed quatrains. They obtained great success. Catherine de' Medici invited him to court to cast the horoscope of her sons, and the apparent fulfilment of his predictions led, on the accession of Charles IX, to his appointment as royal physician. In 1550 he published an almanac containing weather predictions. Consult Baresté, 'Nostradamus' (1842).

NOSTRILS. See NOSE AND THROAT; NOSE-BLEED.

NOSTRUM, a derogatory term for quack remedies and medicines and for certain patented remedies which have proved worthless or injurious.

NOTA, nō-tā, Alberto, Italian dramatic poet: b. Turin, 15 Nov. 1775; d. there, 18 April 1847. He was carefully educated, and after studying law practised for a long time as an advocate and held important appointments under government until the political circumstances of Italy obliged him to retire from public life. The comic element is weak in him, the plot usually very simple and the events taken from ordinary life. On the other hand he excels particularly in his delineations of character and most irregular natures are presented with extraordinary skill. Of his numerous dramas 'La

Fiera' (1826), a graphic and amusing description of manners, is perhaps the best. Among others may be named 'Il Filosofo celibe' (1811); 'La novella sposa' (1826); 'Il Torquato Tasso' (1826). Twelve editions of his works appeared between 1816 and 1843, the last Italian edition, 'Comedie di Alberto Nota' (8 vols.), appearing in 1842-43.

NOTABLES, Assembly of, in French history, signifies the deputies of the states who were appointed and convoked by the king. It had no legislative or executive powers, and did not, like the states-general (q.v.) set up constitutional claims. In the early history of France mention is several times made of the notables, but the first assembly of any importance was in 1554. From 1626 no such assembly was again called, till in 1786 the minister and comptroller-general, Calonne, conceived the idea of summoning the notables for the purpose of effecting several arrangements which he considered necessary, and there were accordingly assembled 7 princes of the blood, 9 dukes and peers, 8 field-marsals, 22 noblemen, 8 counsellors of state, 4 masters of requests, 11 archbishops, 37 chief justices, 12 deputies, the civil lieutenant and 25 magistrates of the different cities of the kingdom, making in all 144 persons. This assembly forms an epoch in the modern history of France. A second meeting of the notables was called in November 1788 to consult on the manner of assembling the states-general and was dismissed on 12 December.

NOTARY, or NOTARY PUBLIC (Latin *notarius*, from *nota*, mark), originally denoted, with the Romans, those slaves or freedmen who acted as stenographers (making use of certain abbreviations, signs, *notæ*), particularly in the meetings of the senate. In later times the *notarii* were the secretaries of public authorities. From the Romans the name passed over to the nations of Western Europe, and in modern times a notary is a witness, appointed as such by government, whose testimony is in some cases useful to give credibility to instruments; in other cases is required by law to give them full validity, as, for instance, in protests of bills of exchange, etc. In France the importance of the notary was, and still is, greater than anywhere else. He is not only a public witness for every one who wishes his testimony, but he is also the great witness of government. He makes all contracts, mortgages and other deeds and conveyances where the property in question amounts to more than 150 francs.

In Great Britain and the United States a notary public is a person who publicly attests deeds or writings to make them authentic in another country, but he principally acts in business relating to commerce, makes protests of bills of exchange which are not accepted or not paid; attests the statements of masters of ships in regard to the damage which their vessels have suffered, etc. In England they are appointed by the Archbishop of Canterbury, in Scotland by the Court of Session. In the majority of the States of the Union they are appointed by the governor; in others by the governor with the advice of the council and in the District of Columbia by the President, and they derive their particular powers from statute provisions. In Rhode Island they are elected annually by the general assembly. In New

York the statute which defines their powers in respect to foreign and inland bills, drafts and notes, confers upon them the further authority "to exercise such other powers and duties as by the law of nations and according to commercial usage, or by the law of any other State, government or country, may be performed by public notaries." In New Hampshire, in addition to the usual powers of the office, notaries may take depositions, and acknowledgments of deeds before them have the same validity as those made before justices of the peace. Similar provisions are found in the statutes of Connecticut and Rhode Island. In New York State women are occasionally appointed notaries by the Governor. They cannot act in cases in which they are interested.

NOTATION, Arithmetical, any mode of designating number by marks or figures. See NUMERALS; ARITHMETIC, HISTORY OF; DECIMAL FRACTION.

NOTCH, The. See CRAWFORD NOTCH.

NOTE, (1) *in law and business*. (See PROMISSORY NOTE). (2) *In music* a character which, by its place on the staff, represents a sound, and by its form determines the relative time or continuance of such sound. See MUSIC.

NOTHING TO WEAR, title of a poem, by William Allen Butler (1825-1902), a well-known New York lawyer, satirizing the frivolity and extravagance of the American women. This verse, which begins "Miss Flora McFlimsy of Madison Square," published anonymously in *Harper's Weekly* in 1857, had a wide circulation and was translated into French and German.

NOTHOSAURUS, a genus of small sauropterygian reptiles, allied to the plesiosaurs and the type of a family (*Nothosauridae*) which includes several genera confined to the Triassic period, and prevalent as fossils in the Old World, especially in the German Muschelkalk formation. Their necks were long and terminated in an elongated skull with crocodile-like jaws armed with strong teeth; the limbs were comparatively long and slender. Their height exceeded nine feet six inches. Consult Zittell-Eastman, 'Text-book of Palæontology' (Vol. II, 1902).

NOTICE, (1) information, warning, or intelligence given in any manner, as by personal service; also, the instrument itself by which notice is given. Originally notice meant knowledge, surviving in the legal phrase judicial notice, signifying the acceptance by courts of the verity of well-known events or facts without the necessity of proof. There are two kinds of notice—actual and constructive. Actual notice is reliable information directly communicated either orally or in writing to the person to be charged. Constructive notice is such knowledge as the law presumes to exist, even if never communicated to the person to be charged. Thus in the case of property deeds which have been recorded in compliance with statute, such records are held to be constructive notice to all mortgagors, purchasers, etc.

A notice of dishonor of a negotiable instrument fixes the liability of an indorser thereof, and must be given usually not later than the day following, unless, after due diligence, the

indorser cannot be found. It may be oral or in writing, and must give a description of the dishonored investment.

Notice must be given, in certain cases, by a landlord to terminate a tenancy, as one from year to year or at will. Usually this is fixed by statute.

If a person acquires land with notice of a prior equitable right, he cannot defeat that right by acquiring the legal title. On the other hand, if he acquires such land without notice of facts sufficient to put him on inquiry he will be protected.

If a creditor assigns a debt, the assignee must give the debtor notice, and if he does not do so, the debtor will be protected if he pays the assignor and not the assignee.

Notice is often required by statute in certain cases, as notice by a plaintiff to a defendant of an action to be brought, notice by advertisement instead of personal service, notice given by one person to another in a proceeding to produce written instruments in his possession or subject to his order, etc.

Notice is important in pleading, as where notice is necessary to fix a liability, it must be pleaded in the declaration or complaint of the plaintiff as having been given.

In cases of insurance on ships, a notice of abandonment is frequently necessary to enable the assured plaintiff to proceed as for a total loss when something remains to be saved, in relation to which, upon notice, the insurers might themselves take their own measures. Bouvier's Law Dict. (1914 ed.) s.v.

As a general rule, notice to the agent in the same transaction is notice to the principal, but there are exceptions to this. For example, if an agent is acting adversely to his principal, his knowledge is not held to be the knowledge of his principal, and likewise a principal cannot be held responsible for the knowledge of his agent when it is not the duty of the agent to communicate such knowledge to his principal.

NOTKER, nōt'kēr, two Swiss monks of the monastery of Saint Gall. SAINT NOTKER BALBULUS (the Stammerer): b. Thurgau, about 840; d. Saint Gall, 6 April 912; is best known for his adoption of the simple Roman or Gregorian chants, and for his words for many sequences, the most famous being 'Media vita in morte sumus.' He was canonized 1513. NOTKER LABEO (Thick Lipped; sometimes called "Teutonicus," the German); b. about 950; d. 1022; founded a great school of translators, who, working under his name, translated into German Boethius, the Psalter, etc., and thus left important documents for the study of Old High German in the 10th and the 11th centuries. The version of Labeo and his school are edited by Piper (1883-84). Consult Kelle, 'Die Sankt Gallen deutschen Schriften und Notker Labeo' (1888).

NOTO, Sicily, a city and episcopal see, three miles from the Mediterranean, and 27 miles by rail southwest of Syracuse. Its chief buildings are a fine cathedral and town hall. It has manufactures of olive oil, vegetable fibre, wine and macaroni, and quarries of limestone. Noto dates from 1703, when it replaced the ancient Netum, overthrown in 1693 by an earthquake. Pop. of commune, 31,625.

NOTOCHORD, or **CHORDA DORSALIS**, a rod of gelatinous tissue forming the main skeletal axis in the young of all Chordata (q.v.) and in some persisting as the only support of the body throughout life. It arises in development from the mid-dorsal line of the entoderm (see EMBRYOLOGY), becomes cut off from this parent layer and comes to lie as a continuous unsegmented structure between the digestive tract and the central nervous system. Around it is formed an envelope, the notochordal sheath, and in the vertebrates the bodies or centra of the vertebræ arise. In the lower vertebrates parts of the notochord persist throughout life (for example, filling the cavities in the ends of the vertebræ in fishes), but in the higher forms the notochord is almost entirely replaced by bone and the inter vertebral ligaments, the sole remnants of this structure in man being the so-called *nucleus pulposus* of these ligaments. See AMPHIOXUS; ASCIDIAN.

NOTOGÆA, nō'tō-jē'a ("south-earth"), a name derived from two Greek words *notos*, south, and *gaia*, earth. Notogæa was used to describe the great faunal region that embraces the whole Southern Hemisphere with the exception of Africa. It originated with Huxley in 1868 who thought that Australasia and South America, two remote continents peculiarly related by the fact that marsupials (kangaroos, etc.) are found in both and not elsewhere, could be described as one zoographical region. The word notogæa, therefore, connects these two continents and makes them one for purposes of study and classification of fauna. It is believed that in ancient times there was no ocean between these two continents and that the land was continuous. Notogæa is sometimes used as the equivalent of the Neotropical region — Central America and the Antilles; but is not in general use.

NOTONECTIDÆ. See FRESH-WATER INSECTS.

NOTORNIS, a genus of gigantic rail-like birds of the South Island of New Zealand without the power of flight. The genus was first known by fossil remains named *Notornis mantelli*. Subsequently living examples were found, the last of which is preserved at Dunedin; but it is supposed that none now exist. Norfolk Island formerly had another species, pure white, but it was exterminated by early white visitors to the island; the skin of one is preserved in Vienna. Consult Newton, 'Dictionary of Birds' (1896).

NOTOTHERIUM, a genus of fossil marsupials found in Upper Pliocene deposits in South Australia, allied to *Diprotodon* (q.v.) but smaller.

NOTRE DAME, Cathedral of. See PARIS.

NOTRE DAME, nō'tr dām, **University of**, a Roman Catholic institution in charge of the Fathers of the Holy Cross, at Notre Dame, Ind. It was founded in 1842 and chartered two years later. It has 13 full collegiate courses besides courses in art and music. The courses lead to the degrees of A.B., B.S., Ph.B. and B.L. The equipments for all laboratory and applied science work are exceptionally good; the science building and furnishings are valued at \$500,000. The departments of natural science received great assistance in their foundation work from the

personal attention of the scientist, Very Rev. J. A. Zahm (q.v.). The frescoes and a number of the oil paintings are by Gregori, and are of remarkable beauty and power. To encourage good works along spiritual and intellectual lines, the university presents each year a medal called the "Lætare Medal" to some Roman Catholic layman or woman who has done some special good work for the benefit of humanity. Two regular publications are issued from the university, but one, *Ave Maria*, is not a distinctively university periodical. Affiliated with the university are several schools for the brothers, novices and young priests of the Congregation of the Holy Cross, and on the grounds is the Provincial House of the Order for the United States. The university has also several preparatory schools in different parts of the United States. There are connected with the university an average of 108 professors and instructors; 1,950 students. The library contains 110,000 volumes, and 10,000 other volumes in departmental libraries. The scientific apparatus, machinery and buildings with their furniture together with the other property are valued at \$4,500,000.

NOTRE-DAME DE PARIS, by Victor Hugo (1831), is the most important historical novel of French 19th century romanticism. Written in hot haste in the course of a few weeks, it is almost bewildering in its wealth of vocabulary and flow of language. Yet the plot, placed in the 15th century, is slender and unreal. It tells the story of a gypsy girl, Esmeralda, in love with a worthless young captain, Phœbus de Châteaupers, and herself loved by the priest, Claude Frollo, and the hideous hunchback bell-ringer of Notre-Dame, Quasimodo. Esmeralda is falsely charged with the murder of Phœbus, Quasimodo kills his protector, Claude Frollo, and fights the mob, not knowing that it has come for his rescue. The novel is full of Victor Hugo's characteristic qualities and defects. It thrills by its melodramatic episodes and climaxes, but it bores at times by its long descriptions and tedious digressions. The characters are often marionettes or the mouthpiece for the author's views. It abounds in the antitheses dear to Hugo, whether between the elements of a human being's character, as the hideousness of Quasimodo and the ardor of his affection and gratitude, or between great human influences, such as are expressed in the often quoted 'Ceci tuera cela,' the printed book which destroys the spirit of mediævalism and its architecture. It is, indeed, as an emotional reconstruction of the Middle Ages that the book has its chief merit. Victor Hugo has taken the old Paris Cathedral Church of Notre-Dame as the embodiment of the spirit of the past. Not only does it seem itself, in the course of the work, to become instinct with life, but it has grouped about it the congested existence of the old 15th century town—its crowded confusion, its mystery-plays, court trials, executions, the King of France himself and the beggars and murderers of the Cour des Miracles. 'Notre-Dame de Paris' is a sort of melodramatic prose epic of tremendous power and of many blemishes.

CHARLES H. C. WRIGHT.

NOTT, Charles Cooper, judge: b. New York, 16 Sept. 1827; d. 6 March 1916. He was

graduated at Union College, of which his grandfather, the Rev. Eliphalet Nott, was president. He practised law in New York City until the Civil War began, when he was commissioned captain in the Fifth Iowa cavalry. In the second year of the war he became colonel of 176th New York Volunteers. He was captured while wounded at Brashear, La., and spent 13 months in a military prison in Texas. President Lincoln, of whom he was a close friend, appointed him a member of the United States Court of Claims and later President Cleveland appointed him chief justice of that court. He resigned in 1905.

NOTT, Eliphalet, American clergyman and educator: b. Ashford, Conn., 25 June 1773; d. Schenectady, N. Y., 29 Jan. 1866. He was left an orphan at an early age, and was brought up by his brother Samuel in Franklin, where he taught to obtain means to enter college. He was graduated from Brown University in 1795 and entered the Presbyterian ministry the same year. After holding pastorates in Cherry Valley and Albany, N. Y., he became president of Union College in 1804, where he remained till his death. This institution was then in its infancy with small funds and neither suitable buildings nor apparatus. He at once set about its rehabilitation and secured funds through a lottery permitted by act of the State legislature. He bequeathed to the university property worth \$500,000. He invented the first stove for burning anthracite coal and secured various patents on heating apparatus, through which means he amassed a large fortune. He published 'Counsels to Young Men' (1810); 'Lectures on Temperance' (1847). His funeral sermon on the death of Alexander Hamilton was widely famous. Consult 'Memoirs' by Cornelius Van Santvoord, revised by Taylor Lewis (1876).

NOTT, Josiah Clark, American ethnologist and physician: b. Columbia, S. C., 24 March 1804; d. Mobile, Ala., 31 March 1873. In 1824 he was graduated at the South Carolina College and from the medical school of the University of Pennsylvania in 1827. After further study abroad he established himself in Mobile, and in 1858 founded a medical school there, which became a branch of the State University. During the Civil War he was for a time on the staff of Confederate General Bragg. With G. R. Gliddon (q.v.) he wrote 'Types of Mankind' (1850) and 'Indigenous Races of the Earth' (1857), the purpose of which was to oppose the theory of the unity of mankind. He was sole author of 'The Connection Between the Biblical and Physical History of Man' (1849); 'The Physical History of the Jewish Race' (1850); 'Types of Mankind' (1854).

NOTTEBOHM, nôt'tè-bôm, Gustav, German composer: b. Lüdenscheid, Westphalia, Prussia, 12 Nov. 1817; d. Grätz, Germany, 1 Nov. 1882. He served in the German army at Berlin in 1838-39, but continued his musical studies, and there formed a friendship with Schumann and Mendelssohn, through the influence of the latter obtaining his discharge from the army and becoming a composer of note. Among his works are 'Ein Skizzenbuch von Beethoven' (1865); 'Studies on Beethoven' (1873); 'Mozartiana' (1880); 'Catalogue of the Published Works of Franz Schubert' (1874).

NOTTINGHAM, nôt'ing-am, Heneage Finch, 1ST EARL OF, English statesman: b. Kent, England, 23 Dec. 1621; d. London, 18 Dec. 1682. He was educated at Oxford, studied law and was admitted to the bar of the Inner Temple in 1645. At the Restoration his reputation as a lawyer raised him to the post of Solicitor-General; in 1661 he was elected member of Parliament for the University of Oxford and was made a baronet, in 1670 became Attorney-General, and in 1673 lord-keeper. He was made Lord Chancellor in December 1674, in which office he showed remarkable ability and discretion. In the same year he was made Baron Finch, and in 1681 became Earl of Nottingham. His powers as an orator were highly rated; and Dryden has given to posterity his portrait in 'Absalom and Achitophel,' under the character of Amri. From his time dates the unquestioned supremacy of the Commons over money bills; and he has been called the "father of equity." He was imbued with a persecuting spirit toward the Non-Conformists.

NOTTINGHAM, England, a city and civic county, capital of Nottinghamshire, on the Leen, near its junction with the Trent, 124 miles northwest of London by rail. It occupies a picturesque site overlooking the Vale of Trent. The castle, which crowns the summit of a rock, rising 133 feet above the level of the Leen, was originally built by William the Conqueror as a means of overawing the outlaws frequenting the recesses of Sherwood Forest. Dismantled during the Protectorate, it subsequently became the property of the Duke of Newcastle, who in 1674 erected a large mansion on part of the site. This, after being partly burned in riots connected with the reform movement in 1831, now contains the Midland Counties Art Museum, free library, etc. The church of Saint Mary is a cruciform structure in the Perpendicular style. The Roman Catholic Cathedral of Saint Barnabas was designed by Pugin. The principal educational and literary institutions are the University College and Technical School, High School for Boys, the Blue-Coat School, the School of Art, the Albert Hall and the Mechanics' Institute. An arboretum covering 18 acres is a feature of the town. The staple manufactures are cycles, hosiery and lace, the latter being a specialty. There are also manufactures of cotton, woolen and silk goods and of articles in malleable and cast iron. Nottingham was a place of importance in Anglo-Saxon times and was twice or thrice taken by the Danes. Charles I raised his standard here in 1642, and next year the town and castle were taken by the Parliamentarians. At Nottingham, Richard Arkwright first erected his spinning jenny. Serious riots, occasioned by the introduction of machinery, took place in 1811-12 and 1816-17. Nottingham is the seat of a United States consul. Pop. 259,904.

NOTTOWAY (nôt'ô-wā) INDIANS, an American tribe of the Algonquin family, formerly residing along the Nottoway River, in Virginia. They were very similar to the Tuscaroras of North Carolina. In 1785 about 400 survivors of the tribe occupied a reservation of 27,000 acres. As late as 1827 they kept up a tribal organization in Southampton County.

NOTUS, the south wind or (more exactly) southwest wind.

NOUE, François de la, frân-swâ dè lâ noo, French Huguenot captain: b. near Nantes, 1531; d. Montcontour, 4 Aug. 1591. He was a member of an old Breton family, fought in Piedmont under Brissac, became a Protestant in 1557, and was one of Coligny's bravest lieutenants. In 1570, at the siege of Fontenay-le-Comte, he was wounded in the left arm, and after its amputation wore an iron mechanism to hold the bridle, thus winning the nickname of "Bras de Fer," or "Iron Arm." He fought in Flanders with great success from 1578 to 1580, when he was captured by the Spanish. His five years of captivity were occupied with the composition of his 26 'Discours politiques et militaires' (1587). He fought under Henry of Navarre at Senlis, Arques, Ivry and Lamballe, and was mortally wounded in the last fight. Consult the biography by Hauser (1892).

NOUGUÉS, nōō'gā', Jean, French composer: b. Bordeaux, 1876. He early gave evidence of unusual talent by writing a good opera before he was 16. His father then sent him to Paris to study. His opera 'Thamyris' (1904) was successful and was followed by 'La Mort de Tintagiles' (1905); 'Chiquito' (1909), and 'Quo Vadis' (1909), which made a tour of the world. It was represented in New York, Chicago and Philadelphia in 1911. In 1911 Nougues produced 'La Vendetta'; in 1912 'La Danseuse de Pompeii' and 'L'Aiglon,' and in 1914 'L'éclaircie.' He has also composed ballets and pantomimes.

NOUMEA, noo-mā'a, Pacific Ocean, city and capital of the French colony of New Caledonia, an island in the Pacific Ocean, 700 miles east of Queensland, Australia. Noumea is situated on the southwestern coast; and, having an excellent harbor, is the chief port. Boats ply between Noumea and Sydney, Australia, and a railway runs to Bourail (90 miles). The shipping is quite large. Noumea possesses a technical school and a branch of the Banque de l'Indo Chine. Pop. 8,961.

NOÜMENON, noo'mē-nōn ("a thing known"), a philosophical term put into currency by Immanuel Kant (1724-1804), the German philosopher. According to Kant's philosophy the noumenon is exactly the opposite of phenomena. Henry Sturt writes: "The term is a relic of an early period of Kant's mental development. In his fully mature or critical position he held that the noumenal world was inaccessible to the speculative reason, and yet that we are not altogether excluded from it, since the practical reason, i.e., our capacity for acting as moral agents, assures us of the existence of a noumenal world, wherein freedom, God and immortality have a real place. The relation of noumena to phenomena in the Kantian system is a most difficult one; and in view of the fact that the acutest intellects of Europe have been engaged vainly for more than a century in reconciling the various passages on the subject, the safest conclusion is that they are irreconcilable. The course adopted by Kant's immediate successors in German idealism was to reject the whole conception of noumena, for the reason that what is essentially unknowable has no existence for our intelligence. Kant, however, protested against this development when it was propounded by Fichte, and held that he had precluded it by his "refutation of idealism." He

stood unshakably to the belief in an absolutely real world behind phenomena. Kant saw, what so many of his successors failed to see, that the world as we know it is an expression of power; and he could not imagine whence the power could come if not from a world beyond phenomenon." See KANT.

NOUN, a word or name denoting a person, place or thing. It is one of the eight "parts of speech." The word comes from the Sanskrit *nāmen* (name) and has passed with few changes into every language; for instance in Zend it is *nāmen*; Persian, *nām*; Afghan, *nām*; Armenian, *anum*; Greek, *onomar atos*; Latin, *nomen*; Anglo-Saxon, *nama*; Scandinavian, *namm*; etc.

In the childhood of the world, when people began to talk, they first tried to find sounds and words that would describe, or stand for, the persons, places and objects around them. As races advanced they tried to find names for emotions and abstract ideas. Proper names were derived from common names; in other words, a noun became a proper noun when a common name was applied to a particular person, or place, or thing. It is to the Greeks that we owe our "parts of speech." They had also the noun and pronoun (the word that stands for a noun). Nouns are, of course, subject to different rules in different languages. Here are given a few general ideas regarding the noun in our own language. The word noun denotes any object of which we speak, whether animate or inanimate, material or immaterial. Nouns are proper when they are names of individual persons (John), places (Paris), things (Onion); nouns are common when they apply to a class of objects (as book, chair, house, idea, emotion); collective, when they represent an aggregate of things or people (as fleet, army, crowd, swarm, flock); material, when they denote the names of materials or substances (as gold, snow, water); and abstract when they define the names of qualities (as beauty, virtue, grace, energy, wisdom, evil).

Some of the older grammarians included the adjective under the noun, distinguishing their types of word as noun-substantive and noun-adjective.

Nouns have person, gender, number and case. There are three persons; first, second and third: (1) person speaking; (2) person spoken to; (3) person spoken of. Gender is the distinction of sex. There are four genders: masculine, feminine, common and neuter. Masculine and feminine are self-explanatory. The common is used for such words as may be either male or female—parent, child, bird, cat, etc. The neuter gender denotes the name of objects which are neither male or female (book, chair, pencil, house). A notable exception is ship, which is of the feminine gender.

Number shows how many persons, places or things are intended. Nouns have two numbers: Singular and plural. English nouns have three cases: (1) the nominative, the doer or agent (subject of the verb); (2) the possessive, denoting possession or ownership; (3) the objective, the object of the action, or relation. The plural of English nouns is usually formed by adding s or es to the singular. There are, how-

ever, several exceptions to the rule, such as foot, plural feet; tooth, teeth; mouse, mice; goose, geese; cow, kine; man, men; woman, women; child, children; ox, oxen. Some words, sheep, deer, etc., have the same spelling for both singular and plural. In Old English the plurals of a certain number of substantives (nouns) were formed by mutation of the root vowels as fot, fet, or boc, bac. In modern English this system of inflexion has been preserved in some cases as foot, feet, and altered in other cases as book, books. Forms in er and en used earlier as plurals for nouns in English have almost entirely disappeared from the language. In Middle English, as in Modern English, oxen is the plural of ox, but even the plural for eye has disappeared.

Also in Middle English the suffix *er* existed in many words which had been originally of the neuter gender: the plural of child was *childer*, of calf *calver*, etc. The old plural of brother was *brether*.

Formation is always going on. One of the ways by which nouns grow is by the addition of a suffix. One of the commonest English suffixes used to make a diminutive is *let*, seen in the comparatively recent words like *brooklet*, *streamlet*, *playlet*. But the word is in reality a development of the older *et* (the French *ette* in *helmet*, *banneret* *cygnet*, etc.) Several of these forms, such as *islet*, *circlet*, *eaglet*, etc., were formed out of nouns which ended in *l*. A comparatively new suffix is *nist*—*tobacconist*, etc. This is an extension of the old suffix (Greek, through Latin into French) *ist*, as in *jurist*, *dentist*, etc., seemingly due to words where the *n* belongs to the root part, —*pianist*, *machinist*, etc.

Consult, Ellis, A. J., 'Early English Pronunciation' 5 vols. (London 1869–89); Helfenstein, J., 'A Comparative Grammar of the Teutonic Languages' (London 1870); Maetzner, 'An English Grammar', translated by C. J. Grece, 3 vols. (London 1874); Müller, F. Max, 'Lectures on the Science of Language' 2 vols. 8th ed. (London 1875); Peile, J., 'Introduction to Greek and Latin Etymology', 2d ed. (London 1872); Peile, J., 'Primer of Philology' (London 1877); Salverte, 'History of the Names of Men, Nations and Places', translated by Mordacque (London 1862); Sayce, A. H., 'Introduction to the Study of Language', 2 vols. (London 1880); Skeat, W. W., 'Principles of English Etymology' (Oxford 1877); French, R. C., 'English Past and Present' 9th ed. (1875); and Whitney, W. D., 'Language and the Study of Language', 2d ed. (London 1868).

NOURMAHAL, *noor-ma-häl*, 'LIGHT OF THE HAREM,' the heroine of Thomas Moore's poem, *The Light of the Harem*, in 'Lalla Rookh.' Her quarrel and reconciliation with the caliph, Harun al-Rashid form the theme of the story; afterward she is known as *Nourjehan* —'Light of the World.'

NOURSE, Edward Everett, American theologian: b. Bayfield, Wis., 24 Dec. 1863. He was educated at Lake Forest Academy and University (1883–86), at Macalester College, Saint Paul (1886–87), and was graduated at Lake Forest University in 1888, and at Hartford Theological Seminary in 1891. In 1894–95 he studied in the University of Jena. In 1895 he

returned to the United States to become pastor of the Second Congregational Church in Berlin, Conn., having been licensed to preach by the Chicago Presbytery in 1890, and ordained in the Presbyterian ministry in 1903. He remained in Berlin until 1898, when he became instructor in the Hartford Theological Seminary, holding this position until 1890, when he was made associate professor. In 1905 he became professor of biblical theology in the same institution, which he still (1919) holds. He is also lecturer on biblical theology in Mount Holyoke College. He is one of the editors of the 'Standard Dictionary of the Bible'; a contributor to *THE AMERICANA* and other encyclopedias; and the author of 'Brief Commentary on the Epistles of Saint Paul' (1911), reprinted under the title 'Selected Epistles of Paul' (1915).

NOUVELLE FRANCE, *noo-vël fräns*, or **NEW FRANCE**, the original name given to Canada (q.v.) by the early French settlers.

NOVA AQUILÆ, the name given to a new star which made its appearance 8 June 1918 in the constellation of the Eagle, in the southern stream of the Milky Way, almost on the Celestial Equator. It was first observed by Mr. W. F. Denning of Bristol, England, at 10 P.M. Greenwich mean time. Astronomers declared it to be the most brilliant temporary star that has shown in the firmament since the celebrated one of 1604, and that it was probably the product of a collision between two other stars thousands of years ago. Its brilliancy waned after a few weeks.

NOVA CÆSAREA, the Latin name for New Jersey.

NOVA CONSTELLATIO COINAGE, two silver coins proposed by Robert Morris in 1783 for national coinage, but not accepted by the Continental Congress. They were called the Mark and the Quint. See **NUMISMATICS**.

NOVA SCOTIA, *nō'vā skō'shī-a*, one of the three maritime provinces of the Dominion of Canada, comprises a long, narrow peninsula, on the eastern coast of North America, lying northeast and southwest, and the island of Cape Breton, separated from the peninsula on the northeast by the gut of Canso, 16 miles long and from ½ mile to 2 miles wide, and Chedabucto Bay. The dangerous Sable Island, surrounded by a sand bank on which many ships have been wrecked, is a dependency of Nova Scotia, from which it is distant about 90 miles in lat. 43° 59' N. at its eastern end, long. 59° 45' W. The whole province, including Cape Breton, lies between lat. 43° 25' and 47° N. and long. 59° 40' and 66° 10' W. The greatest length of the peninsula is about 280 miles and its greatest width from 50 to 100 miles. It is bounded north by the Straits of Northumberland and the Gulf of Saint Lawrence, south and southeast by the Atlantic Ocean, and northwest by the Bay of Fundy. The island of Cape Breton, whose extreme length is 100 miles, extreme width 85 miles, is almost equally divided by an inland sea, the Bras D'Or Lake. The peninsula has an area of 17,453 square miles, and Cape Breton 3,975 square miles, total, 21,428 square miles. Sable Island is 25 miles long and 1¼ wide, and consists of sand hills thrown up by the sea, on which grasses grow which

maintain many wild horses. (For map see under New Brunswick.)

Topography.—The surface of Nova Scotia proper is undulating, and the scenery varied but not grand. Three ranges of highlands, with a general direction of from southwest to northeast, their general features clearly showing them to belong to the Appalachian Range, diversify the surface. These, roughly, are the range extending along the Atlantic coast from Cape Sable to Cape Canso, which are chiefly of Lower Cambrian formation, except for a belt of intrusive granite that stretches from Cape Sable to Chebucto Head, near Halifax; the Cobequid Mountains, which rise to a height of about 1,050 feet and extend from the Bay of Fundy on the north or isthmian side of the province, through the counties of Colchester and Cumberland to the vicinity of Pictou; and a detached, narrow ridge of trap, known as the North Mountain, about 700 feet high, which extends along the Bay of Fundy, from Digby County to the steep headland of Blomidon, in Kings County, near the entrance of Cobequid Bay. The rock formation of Cape Breton is similar to that of Nova Scotia proper, but is more irregularly distributed. The chief features of the surface of Nova Scotia were left marked as at present by the great earth storm of the later Devonian period. The fertile valleys between the three ranges of hills are respectively of Upper Silurian, Devonian and Carboniferous origin. The northwest side of the peninsula is deeply indented by large arms of the sea, separated by steep promontories. The Atlantic side is penetrated everywhere by inlets of greater or less size, the most important of which are Chedabucto Bay, Halifax Harbor and Chester Basin. The north shore, on the Gulf of Saint Lawrence, is comparatively smooth and uniform in its coast line, and this is true also of the eastern coast of Cape Breton, while the other sides of this island are very irregular. The peninsula has about 400 lakes, of which Rossignol in Queen's County is the largest. The Bras D'Or Lake in Cape Breton covers an area of 500 square miles, or about one-sixth of the entire area of the island. The climate of Nova Scotia, tempered as it is by the Gulf Stream, which flows very near its southwesterly end, is comparatively mild, and especially in the sheltered Cornwallis and Annapolis valleys is favorable to comfort and health. The average temperature is 65° F. in summer, 25° F. in winter. The average rainfall for 27 years (1874–1900) was 38.1, average snowfall for the same period 75.4, total precipitation 45.6. On account of its freedom from extreme heat Nova Scotia has become a popular summer resort for United States people, especially of the Eastern and Middle States. The province contains many rivers, but few of them are over 50 miles in length. In the valleys the soil is of great richness, and Nova Scotia is noted for its vast tracts of inexhaustibly fertile diked marsh land, in earlier or later times by patient industry reclaimed from the sea. This marsh land lines the head waters of the Bay of Fundy and spreads far inland up the valleys of its river tributaries. In general, alluvial deposits are formed in river basins by materials washed down from higher levels by fresh-water floods; here the whole deposit is of tidal origin, the re-

sult of a landward rather than a seaward transportation. Every incoming tide is freighted with a finely comminuted sediment, the produce of the wearing action of the currents upon the sides and bottom of the bay. The elements of this sediment are trap and new red sandstone, the latter being the greater element. Its detritus consists of a large percentage of silica, a little clay, the iron which mainly determines the reddish color of the deposit, and the calcareous matter which served as cement in the parent rock. The great fertility of this alluvium may be seen in the fact that the Annapolis, Cornwallis, Grand Pré and Cumberland marshes have been producing annually for over two centuries from two to four tons per acre of the finest hay. After the hay has been removed the dikes are converted into autumn pastures for cattle, who fatten more rapidly on their luxuriant after-growth than on any other kind of food. The reclaiming of these dikes from the daily tides, which if permitted to rush in will destroy the grass for a year, was begun by the Acadian French and energetically pursued by their successors, the New England people who came in 1760–61. The flora of Nova Scotia is much the same as in other sections of Canada south of the Saint Lawrence. The woods are maple, elm, walnut, oak, tamarack, spruce, pine and other woods, hard and soft.

Agriculture.—The most important industries of the province are agriculture and fruit growing, fishing, mining and lumbering. Of late, however, a good deal of activity has been shown in manufacturing of various kinds. Nova Scotia has an area above tide level of 13,483,671 acres, of which 5,260,455 acres are occupied, and 1,257,449 acres are improved. Of this improved land, 40,474 acres are covered by orchards and nurseries, apple orchards of great extent occupying a great part of the fertile "Annapolis Valley," which includes the counties of Annapolis, King's and Hants. Pears, plums, cherries and peaches and small fruits, especially strawberries, are also raised in considerable quantities. In 1910, 540,589 acres of the province was hay land, 30,827 was planted with potatoes, 96,309 with oats and 12,909 with wheat. In 1900 the value of field crops was estimated at \$8,584,956; in 1910 the value was \$11,005,033. Of field crops in 1910, hay and clover were valued at \$6,532,815; potatoes at \$1,739,376; oats at \$1,466,492. In the last 30 years the apple industry has steadily increased, cold storage making possible large shipments of this fruit to the British markets. In 1890, the total yield of apples was 1,051,592 bushels; of plums 9,246 bushels; of peaches 534 bushels. In 1900 the yield was, apples 2,065,104 bushels; plums, 28,931 bushels; peaches, 3,231 bushels; pears, 14,881 bushels; cherries, 16,669 bushels. In 1910 the yield was, apples, 1,666,977 bushels; peaches, 1,043 bushels; pears, 23,506 bushels; plums, 16,984 bushels; cherries, 10,004 bushels. The total value of fruits and vegetables in 1900 was \$1,407,369; the value in 1910 was \$3,026,445; the increase in value of these products in 10 years thus being \$1,619,076, or 115.04 per cent.

Fisheries.—The fisheries of Nova Scotia have always been active, salmon, cod, shad, mackerel, lobsters and other fish abounding in the waters about the coasts, some of these being

plentiful in the rivers. The value of the total catch in 1900 was \$2,112,022, an increase of \$399,288, or nearly 23 per cent over the value in 1899. The number of men employed in fishing vessels and boats in 1900 was 25,212, of persons employed in lobster-canning factories, 6,447. The value of all fisheries for the fiscal year ending June 1903 was \$8,000,000, and the number of men employed was 29,529. In 1910 the total value of all fisheries was \$10,119,243, the number of persons employed in this industry being 26,568. Fishing receives from the Dominion government a subsidy outside of bounties of about \$400,000 a year. In many parts of the province game is plentiful, bears, foxes, deer and smaller animals being found in considerable numbers. The value of furs taken in 1910 was \$22,748. The total value of forest products in 1910 was \$3,409,528.

Minerals.—Nova Scotia is remarkably rich in minerals, its coal fields being apparently almost inexhaustible, and gold, lead, copper, manganese, gypsum and barytes being found in abundance. For the year ending 30 Sept. 1901 the sales of coal aggregated \$3,119,335, the province of Quebec being the largest consumer. The province has 11 coal mines, five of which are in the peninsula and six in Cape Breton Island. In 1902–93 these mines employed 8,062 persons. There are more than 20 districts where gold is mined, the most important mine being at Sherbrooke in Halifax County. Between 1900 and 1901 the number of tons of ore crushed was 1,358,864, and the value of the gold extracted about \$14,274,054. The value of the gypsum yield in the same year was \$119,278. The mine royalties in 1902–03 reached the large figure of \$487,948.90. The value of mineral products in 1910 was \$17,059,122. In this year, 5,889,193 tons of coal were marketed, at a value of \$13,812,887.

Manufactures.—In 1902–03 the value of manufactured products exported from Halifax reached the sum of \$766,164. Among the chief manufactures are agricultural implements, biscuits and breads, coke, drugs and chemicals, extract of hemlock bark, fertilizers, furniture, iron and steel, leather and wood pulp. The canning of fruits, milk and meat is receiving much attention. In Cape Breton and the western part of the peninsula considerable leases of Crown lands have lately been made for the development of the wood pulp industry. In various places, owing to the abundance of hemlock bark, tanning is actively carried on, and some attention has long been given to sugar refining and rope and twine making. In 1910 there were 1,480 manufacturing establishments, employing 28,795 persons, the capital invested aggregating \$79,596,341. The value of manufactured products in this year was \$52,706,184.

Transportation.—In 1901 the province had in operation 943 miles of railway; since then this has been increased to 1,360. Telegraph and telephone lines run everywhere and the province has two cable stations, one at Canso and one at Sydney, with wireless stations at Cape Sable, Pictou, North Sydney and Sable Island. At the close of 1901 Nova Scotia had in registration 1,980 vessels with a tonnage of 214,560. In that year she had registered 133 vessels with a tonnage of 14,660. The total number of ships arriving from foreign ports during the fiscal

year ending 30 June 1901 was 3,103; tonnage 419,031. This registration included the ships arriving at 85 ports. Of these Halifax headed the list, with 1,185 vessels and 899,079 tons, Sydney coming next with 361 vessels and 541,455 tons. Halifax is the third port in Canada, Victoria, British Columbia, being first and Montreal second. In 1913 Halifax entered and cleared ships to the extent of 3,182,923 tons; Sydney, 1,115,873 tons; Bridgewater, 66,687 tons; Barrington, 10,592 tons. In 1914 Nova Scotia owned, in 21 ports, 2,098 sailing ships and 416 steamships, with a total tonnage of 135,052. The vessels built in the province, 1911–14, inclusive, numbered 385, with a tonnage of 19,395. In 1912 Nova Scotia had telephones in use over the distance of 32,373 miles.

Banks.—The banks in operation are Bank of British North America; Canadian Bank of Commerce; Bank of Montreal; Merchants' Bank; Bank of Nova Scotia; Royal Bank of Canada. The amount of exchanges of the clearing house of chartered banks at Halifax, 1909–13, according to Bradstreet, was \$105,347,636. In 1900 the amount was \$77,000,000.

Finances.—The revenues of the province come chiefly from a Dominion subsidy of about \$433,000 annually; from mine royalties, which exceeds this sum; from the lease of Crown lands, which in 1901–02 amounted to \$74,735, and from succession duties and other miscellaneous sources. The total revenue from all these sources in 1902–03 was \$1,140,216. In the year ending 30 Sept. 1913 the subsidy from the Dominion government was \$636,667; the revenue from mines was \$852,954. The total revenue was \$1,920,565; the total expenditure, \$1,949,784. The expenditures were less than the revenue by about \$53,000. At the close of the fiscal year ending 30 Sept. 1902 the debt of the province was \$3,766,300. Nova Scotia supports a school for the deaf and dumb and one for the blind, an insane and a general hospital and 24 poorhouses. Criminals are sent to the provincial penitentiary at Dorchester, New Brunswick. The public charities in 1902–03 cost the province \$40,573. In 1912 there were 73 persons sentenced to the penitentiary and two were put to death.

Population.—The population of Nova Scotia is greater than that of any of the provinces of Canada except Ontario, Quebec and Saskatchewan. The population of Ontario in 1910 was 2,523,274; of Quebec, 2,002,712; of Saskatchewan, 492,432. Nova Scotia in the last census year (1921) had 524,579. In 1900 she had 459,574. The adjoining province of New Brunswick had 351,889. In origin, 177,701 are reckoned as English, 145,535 as Scotch, 54,244 as Irish, 51,746 as French, 38,844 as German, 6,541 as negro, 4,179 as Holland Dutch, 1,915 as native Indian, 1,360 as Jewish, 1,089 as Austro-Hungarian. The province has two cities, Halifax, the capital, with a population in 1921 of 57,674, and Sydney (in Cape Breton) with a population of 22,527. It has some 28 or 30 incorporated towns, of which the largest are: Glace Bay (in Cape Breton) with a population in 1921 of 16,992; Amherst, with 9,075; Sydney Mines (Cape Breton), with 7,470; New Glasgow, with 8,959; Yarmouth, with 7,067; Truro, with 7,651. In 1900 Halifax had a

population of 17,723; Sydney, the seat of the steel industry, of 9,908. In 1890, before the steel industry started, the latter had but 2,427.

Education.—Nova Scotia has an intelligent free school system, and there is no appropriation and no demand for appropriation for separate sectarian schools. In each of the 18 counties there is a county academy, the highest department of the public schools, the curriculum of which contemplates the fitting of pupils for college. At Truro there is a Provincial Normal College, in which about a thousand teachers are trained every year. In 1914 the whole number of public schools in the province was 2,724, with a total enrolment of pupils of 106,351. In the high school grades alone there were 8,903. The central control of public education is vested in a council of public instruction, which is identical in constitution with the executive council of the province, and is administered directly by a superintendent of education. Between the ages of seven and 12, attendance at school is compulsory. The schools are supported by local taxation and by subsidy, about two-fifths of the necessary cost being met by government grant and municipal aid. The total expenditure for public education in 1914 was \$1,556,618. Of chartered colleges with degree conferring powers, Nova Scotia ought to have but one, but she has six. Besides, there is the Wesleyan College at Sackville, New Brunswick, just over the boundary between the two provinces, which gets a great many of its students from Nova Scotia. One of these colleges, Dalhousie, at Halifax, is undenominational; the others are all under the domination of sects. King's, at Windsor, is Anglican; Acadia, at Wolfville, is Baptist; Saint Francis Xavier, at Antigonish, is Roman Catholic. The latter sect has also a college known as Saint Anne's, at College Point, in Digby County, and one called Saint Mary's at Halifax. The Protestant colleges are co-educational, the Roman Catholic not. The great wrong of this multiplicity of colleges in a small province is seen in the fact that the whole six, and Mount Allison besides, cannot muster over 1,500 students. The smallest (and oldest) of the Protestant colleges is King's, which in 1914 reported 97 students in all departments, only 46 of these being students of arts. The persistence of all these institutions, to the disregard of advanced learning, is one of the evil results of sectarian religionism. Besides these colleges is a technical college at Halifax, which in 1914 registered 33 pupils, and a College of Agriculture at Truro in connection with the government agricultural farm.

Government.—Since confederation the province has been represented at Ottawa by 10 senators and 20 members of the lower house. It has its own local legislature, meeting at Halifax, and a lieutenant-governor appointed by the governor-general and his council. The local legislature consists of a council of 21 members and a legislative assembly of 38. The executive consists of three ministers with salaries and six without portfolios. The house of assembly is elected by the counties, the municipal units of government being counties and towns. In each of the 18 counties the people elect a county council, which in turn appoints the other county officers. It is necessary to secure the sanction

of the people in order to borrow money, and the lieutenant-governor has a right to veto upon the money-borrowing powers as well as the by-laws passed by the council.

Religion.—All religious denominations are on an equal footing in Nova Scotia and none from superiority of numbers or social standing has any pre-eminent rights. The largest sect in point of numbers is the Roman Catholic, with 144,991 adherents. Then come the Presbyterians with 109,560; the Baptists with 83,854; the Anglicans with 75,315; the Methodists with 57,606; the Lutherans with 7,359; the Congregationalists with 2,690. The strength of the Baptist denomination is due to the fact that late in the 18th century the larger number of the New England Congregationalists in the province became members of this sect, thus reducing Congregationalism within narrow limits. Since 1900 the Baptists and Free Baptists have united and the two sects are now one. The recent movement throughout Canada to amalgamate the Presbyterians, Methodists and Congregationalists has many warm advocates and many opponents, especially among the Presbyterians, in Nova Scotia. Few Nova Scotians in their native province are without some church attachment.

Distinguished Citizens.—Nova Scotia has reared a large number of able and eminent men. Such are Hon. Sir Adams George Archibald, K.C.M.G.; Hon. Sir Edward Mortimer Archibald, K.C.M.G.; Hon. Sir Edward Mortimer Archibald, Kt.; Gen. John Charles Beckwith, C.B.; Rear-Admiral Sir Edward Belcher, R.N., K.C.B.; Hon. Sir Frederick William Borden, K.C.M.G.; Rt. Hon. Sir Robert Laird Borden, K.C.M.G. (the present Premier of Canada); Hon. Sir John George Bourinot, K.C.M.G.; Hon. Sir James Cochran, Kt.; Lieut.-Gen. William George Cochran, C.B.; Hon. Sir Samuel Cunard, Bart; Hon. Sir John William Dawson, K.C.M.G.; Baron Haliburton (Sir Arthur Lawrence Haliburton); Hon. Sir Brenton Halliburton, Kt.; Hon. Sir John Eardley Wilmot Inglis; Hon. Sir William Johnstone Ritchie, Kt.; Hon. Sir John Sparrow David Thompson, K.C.M.G.; Hon. Sir Charles James Townshend, Kt.; Rt. Hon. Sir Charles Tupper, Bart.; Hon. Sir Charles Hibbert Tupper, K.C.M.G.; Rear-Admiral Sir Provo William Parry Wallis, G.C.B.; Hon. Sir Robert Linton Weatherbee, Kt.; Vice-Admiral Sir George Augustus Westphal, K.C.B.; Maj.-Gen. Sir William Fenwick Williams, R.A., G.C.B.; Hon. Sir William Robert Wolsey Winniett, R.N., K.C.B.; Hon. Sir William Young, Kt.; Hon. Joseph Howe; Hon. Judge James William Johnstone, etc. Among the writers of note the province has produced are Thomas B. Akins, D.C.L.; David Allison, LL.D.; Hon. Sir John G. Bourinot; John B. Calkin, LL.D.; Hon. Sir John William Dawson, LL.D.; Arthur Wentworth Hamilton Eaton, D.C.L.; Rev. George M. Grant, D.D.; Hon. Judge Thomas Chandler Haliburton; Rev. George William Hill, D.C.L.; Hon. Joseph Howe; Mrs. Mary Jane Katzmans Lawson; Rev. Arthur J. Lockhart; Hon. Judge J. W. Longley, D.C.L.; Beamish Murdoch, Esq.; J. Macdonald Oxley; Benjamin Rand, Ph.D.; Rev. Silas T. Rand, D.D.; Theodore Harding Rand, D.C.L.; Rev. Edward Manning Saunders, D.D.; Hon. Judge A. W. Savary, D.C.L.;

Miss Marshall Saunders; Rev. T. Watson Smith, D.D.

History.—The Nova Scotian peninsula was the most important part of the ancient Acadia, and its little town Annapolis Royal, in French times called Port Royal, while the province remained in the hands of France, was the chief Acadian seat of authority and centre of influence. The name Acadia or Acadie is first found in the petition of De Monts to the French king for leave to colonize this portion of the New World. The province of New Brunswick was included in Acadia, but not the island of Cape Breton. Nova Scotia's authentic history begins with the landing at Port Royal in the spring of 1604 of Sieur de Monts, a gentleman of the bedchamber of Henry IV of France, who had previously accompanied Chauvin and Pontgravé to the Saint Lawrence. There is a French tradition that a little settlement was made in Cape Breton as early as 1541, but Port Royal was the first settlement ever attempted on any part of the peninsula. De Monts held a commission as lieutenant-general of Acadia with full powers to cultivate and hold the land, to discover mines and to convert the Indians. In his first expedition another nobleman, Baron Poutrincoart, accompanied him. Owing to the failure of the French trading company in 1607 the colony they founded at Port Royal was suspended for nearly three years. In 1610, however, Poutrincoart again came to Port Royal and from that time the town has had a continuous history. When Poutrincoart came the second time he took possession of the houses his people had built in 1604, and it may, therefore, be said that Port Royal is the oldest town in all North America, except Saint Augustine in Florida, which was founded by Spaniards in 1565. Jamestown, Va., was founded by the English in 1607, and Quebec by Champlain in 1608. Shortly after 1610 other explorers came to Port Royal, in their wake coming first Jesuit, then Recollet priests, who soon converted all the native Micmacs (an Algonquin tribe) to the Roman Catholic faith. In 1613 Argal (afterward deputy governor of Virginia) destroyed the fort at Port Royal. In 1621 Acadia was granted to Sir William Alexander, who named it Nova Scotia and helped James I establish the order of Baronets of Nova Scotia. In 1628 Sir David Kirk captured Port Royal for England, but in 1632 the province was restored to France. In 1654 Acadia was surrendered to English troops sent out by Cromwell, but in 1667, by the Treaty of Breda, was restored to France. In 1710 Col. Francis Nicholson finally conquered Port Royal for England, and in 1713 the Treaty of Utrecht confirmed Nicholson's conquest. In 1749 Col. Edward Cornwallis brought out an English colony and founded the town of Halifax, immediately afterward establishing a civil government there in place of the military government at Annapolis. In 1755 because of their persistent refusal to take the oath of allegiance the Acadian French were removed, and in 1760–61 their lands were occupied by some 10,000 New England people who thus started many of the best-known present families of the province. In 1758 a constitution, with an elective assembly, was granted Nova Scotia, in 1763 Cape Breton and Prince Edward Island were annexed to Nova Scotia, but in 1770 Prince Ed-

ward Island was separated. In 1773 began the large Scottish emigration which has given certain counties of Nova Scotia the chief part of their population. In 1776 and 1783 from 30,000 to 35,000 Loyalists, chiefly from New England and New York, poured into the province, the New York Loyalists founding the town of Shelburne and creating in Nova Scotia the first colonial see of the English Church. In 1754 New Brunswick and Cape Breton were both separated from Nova Scotia, but in 1820 the latter was reannexed. In 1848 responsible government was introduced and in 1867 Nova Scotia became a province of the Dominion of Canada. In its history as an English province Nova Scotia has had to the present 35 governors (since Confederation they have been, of course, lieutenant-governors), many of them more or less famous military men. Before the appointment of Lord Dorchester as governor-general of Quebec, Nova Scotia and New Brunswick in 1786, she had also 11 lieutenant-governors, of whom Gen. Edmund Fanning, a Loyalist, was the last.

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NOVA ZEMBLA, *nó'va zēm'bla* (Russian, *Novaia Zemla*), two islands in the Arctic Ocean, belonging to Russia, and forming a dependency of the government of Archangel; lat. 70° 30' to 77° N.; long. 52° to 69° E. Area, 350,000 square miles. They are separated by the narrow Matotchkin Shar Strait, and from the Isle of Vaigatz on the south and from the mainland on the east by the Sea of Kara. Their greatest length, northeast to southwest, is about 700 miles; breadth, about 80 miles. The greater part of the interior, which is mountainous, with extensive snowfields, is unexplored. The general slope of both islands appears to be toward Matotchkin Strait, on which the mouths of at least 15 small streams have been counted. Lakes also are numerous. The whole territory is wild and desolate. The coasts swarm with seals, various kinds of fish and vast flights of waterfowl. The interior, which is partly covered with stunted shrubs, short grass and moss, is frequented by reindeer, white bear, ermines and Arctic foxes. Minerals discovered include

coal, gold and copper. In 1596 Nova Zembla was reached by Barentz, who wintered there. It was circumnavigated by Johannesen in 1869 and 1870, and the Kara Sea found comparatively free of ice. It was again circumnavigated by Captain Carlsen in 1871, and partially explored by Lieutenants Weyprecht and Payer in the same year, and again in 1872-74. Other explorations have been made since, and two or three settlements of Samoyedes have been established. Pop. about 100.

NOVACULITE, an extremely fine-grained quartz rock of sedimentary origin. It is used for fine whetstone, oilstone and hones and was formerly made into implements by the Indians. Large deposits in Arkansas and Oklahoma are the source of "Arkansas" stones and "Wichita" stone, the former mostly snow white and highly prized for whetstone.

NOVALIS, nō-vā'lis. See HARDENBERG, FRIEDRICH VON; HEINRICH VON OTFENDINGEN.

NOVARA, Italy, (1) a town in Piedmont, capital of the province of Novara, situated between the Agogna and Terdoppia, 51 miles northeast of Turin. It has an ancient and magnificent cathedral with a lofty tower, an episcopal palace, two colleges, museum, a ruinous old castle and a remarkably fine market-house. The manufactures include silk, cotton, linen, biscuits and organ building. The rice and grain markets are the most important in Piedmont. Pop. about 58,858. Novara is famous for the battle fought there on 23 March 1849 between the Sardinians and Austrians, in which the former were completely defeated, and Charles Albert, in consequence, abdicated in favor of his son, Victor Emanuel. (2) The province consists generally of a large and fertile plain, watered by the Po and several of its tributaries, and well adapted for the growth of rice. Area, 2,548 square miles. Pop. 768,658.

NOVATI, nō-vā'tē, **Francesco**, Italian historian and author: b. Cremona, 1859. From 1883 to 1889 he was a professor in Milan, Palermo and Genoa, returning to Milan in 1892. With Arturo Gal and Rodolfo Renier he founded the *Giornale Storico della letteratura italiana* in 1883. His specialties are the Middle Ages and Renaissance in Italy. Among his works are 'Studi critici e letterari' (1889); 'L'influsso del pensiero latino sopra la civiltà italiana del medio evo' (1897); 'Altraverso il medio evo' (1905); 'A raccolta' (1907); 'Freschi e minii del dugento' (1908); 'Storia letteraria d'Italia: le origini' (1900-09).

NOVATIANISM, nō-vā'shī-an-izm, the doctrine of Novatianus, a priest of the Church at Rome in the 3d century and who is said to have died a martyr's death between 254 and 260 A.D. Novatian had been a Stoic philosopher and carried out the stern, harsh views of that sect in his ministry as a Christian teacher. The schism called after him originated as follows: After the Decian persecution a controversy arose about the manner of dealing with those who apostatized or worshipped idols, before the threat of torture or death (*lapsi*). Novatian at first inclined to advocate their absolution after due penance, but when Cornelius, the Roman bishop, followed this course, Novatian opposed his authority, and was chosen and ordained bishop by three country bishops in op-

position to Cornelius, and thus became the first anti-Pope. He was condemned in councils at Rome and Carthage. The party who shared his views were called Novatians. They held that, in the case of idolatry through fear of persecution, the Church could not absolve the penitent; and this doctrine they extended, at a later period, to all grievous sins. They claimed for themselves a character of especial purity, assumed the name Puritans (*Cathari*) and insisted on the rebaptism of converts to their views. Their rigorous doctrines made headway from Spain to the confines of Asia Minor, and they were strongly represented in North Africa, where they continued to be taught up to the 6th century. See CYPRIAN.

NOVATION, a legal term derived from the Roman law, which recognized three kinds of *novatio*: (1) the substitution of a new debtor; (2) the substitution of a new creditor, and (3) a new contract. Novation as defined to-day signifies the substitution of a new obligation for an old one, the latter being thereby extinguished. The term is of civil-law origin and is rarely used in common law. Novation is a contract consisting of two stipulations: one, to extinguish an existing obligation; the other to substitute a new one in its place. In the civil law there are three kinds of novation: (1) where the debtor and creditor remain the same, but a new debt takes the place of the old one; (2) where the debt remains the same, but a new debtor is substituted; (3) where the debt and debtor remain, but a new creditor is substituted. To constitute a novation there must be (1) a valid pre-existing obligation; (2) consent of capable parties; (3) express intention to innovate. (See CONTRACT). Consult Civ. Code, Cal., § 1530; Civ. Code, Dak., § 863; *Hard v. Burton*, 62 Vt. 314, 20 Atl. 269; *McCartney v. Kipp*, 171 Pa. 644, 33 Atl. 233; *McDonnell v. Alabama Gold L. Ins. Co.*, 85 Ala. 401, 5 South. 120; *Skafer's Appeal*, 99 Pa. 246.

NOVEL, *The*. The word novel (derived from the Latin adjective *novella*, feminine of *novellus*, Italian and Spanish *novella*, French *nouvelle*) signifies literally, when applied to fiction, a new tale, new story or new anecdote: that is, one never told before, or at least one never heard before by the listener. Since the early period of the Renaissance the word, in its slightly variant forms, has been employed in most of the literatures of western Europe, except English, to denote a short fictitious narrative dealing mainly with the incidents and intrigues of ordinary life, and written usually, though not invariably, in prose. This was also the English usage in the 16th century when collections of Italian *novelle* were first translated into English, either directly or through the French. But during the next century the short tale of the Italian type underwent in English large expansion; and the word *novel*, naturally enough, was still retained as the name of the longer narrative, which by the time of Richardson had assumed, to a degree, the structure of the drama and the amplitude of the epic. *Clarissa Harlowe*, eight volumes in the whole, was called a novel. For a certain class of fictions we have also had since the time of Chaucer and before him the term *romance*, which (derived from the Latin adjective *ro-*

manicus, through the adverb *romanice*, "in the Roman fashion") meant at the outset anything composed in the *lingua romana*, that is, in the vulgar Latin tongue, like Provençal, French or Italian. As the early productions in the languages that sprang from the Latin were, in large measure, verse-narratives of love and adventure, the word romance became the general term for them. When at a later period, on the invention of printing and thereafter, these verse-tales were reduced to prose, it was natural that the old word should cling to them. Wherefore it is that *roman* in French and German (*romanzo* in Italian) is to this day the most general term for a prose-fiction, while *nouvelle* or *novelle* is reserved, in the Italian way, for a short story. In English (and also in Spanish) the case is just the opposite. With us, a prose-fiction, whatever its length, which deals realistically with actual life is called, in criticism and conversation, pre-eminently a novel. A prose-fiction which deals with life in a fantastic manner, or represents it in the setting of strange, improbable or impossible adventures, or idealizes the virtues and the vices of human nature, is called a romance. 'Tess of the D'Urbervilles' is a novel. The 'House of the Seven Gables' is a romance. Likewise 'Henry Esmond' is an historical novel, while 'Ivanhoe' is an historical romance.

These distinctions, historical in origin, it will be well to bear in mind. But for the broad treatment of the theme now in hand, the novel must be made to include many fictions in prose and some in verse that do not fall strictly within the meaning of the term. Novels may be divided into two classes. There is, said Stevenson, the novel of incident and the novel of character. In the novel of character, the interest is directed to the portrayal of men and women; and the tale, the story or the yarn is a subordinate consideration. This type of fiction has no date earlier than 'Don Quixote'; it was made a fashion by Richardson and Fielding. In the novel of incident, the interest is directed to what happens; characters, if there be any at all, come only by the way; the tale, the story or the yarn is the main thing. As folktales, this type of fiction belongs to all races and peoples in a primitive state of civilization. As a cultivated literary form, it commonly follows the break-up of the primitive epic. After 'Boewulf,' the 'Nibelungenlied' and the 'Chanson de Roland' come, for example, the romance of King Arthur and the Knights of the Round Table. Consult Ker, 'Epic and Romance' (London and New York 1897).

The Orient.—For centuries before the invention of printing, the professional story-teller was everywhere a most important figure—in the East as well as in the West—and he still retains much of his ancient prestige among all peoples where the habit of reading has not become generally diffused. If he appears first in Egypt, it is simply because the records of Egyptian civilization are the most ancient of all. Just as at later times in the West, tales centred around Charlemagne or Richard the Lionhearted, so it was in Egypt. Among the débris of a most ancient cycle are three short stories known as the 'Tales of the Magicians.' On a day in the third millennium before Christ, Cheops, the builder of the great pyramid, suf-

fering from ennui, called his three sons into his presence that they might entertain him with the wonders wrought by famous magicians. One tells of a crocodile which a magician made of wax and threw it into the river, where it seized and carried away the lover of the magician's faithless wife, as he went out for an evening bath. This story is, so far as content goes, very like a mediæval *fabliau* or *novella*. Another relates that when King Seneferu was one day out on the lake of his palace with the maidens of his court, one of them lost a jewel from her hair, which was recovered by a magician who parted the waves and laid bare the bed of the lake. It is an exceedingly pretty tale. The last son tells of a magician who neatly restored the heads of animals after first cutting them off. Throughout these stories, the most ancient of the world, appears frequently "the chief reciter," who was a sort of master of the revels. In the story-telling of succeeding dynasties, magic gave way more and more to adventure, and the description of manners, especially among the peasantry. 'The Shipwrecked Sailor' (12th dynasty) is the Egyptian 'Robinson Crusoe.' 'The Doomed Prince' (18th dynasty) is a tale of romantic love. The prince, as in many a since popular romance, obtains the princess for his wife by climbing up to the window of her palace supposed to be inaccessible. And 'Anpu and Bata' (19th dynasty), the first part of which runs on the *motif* of Joseph and Potiphar's wife, has a beautiful pastoral setting. What one misses in Egyptian, as in all other ancient fiction, is the portrayal of character, except on the simplest lines.

In India the beast-fable, the fairy tale, the adventure and the love-intrigue have been current from the earliest times. Stories of these several types were, in the old time, usually fitted into the frame work of a single narrative after a very elaborate plan. Bearing most closely upon the fiction of the West is the 'Panchatantra,' a book of fables in which the ways and conduct of men—their friendship, disputes, craft, jealousies and virtues and vices in general—are frankly transferred to the lower animals, the bull, the lion, the crow, the owl, etc. These stories, always didactic in aim, abound in humor, irony and satire. Translated from the Sanskrit into the literary language of Persia in the 6th century of our era, the book passed thence into Arabic about 750 A.D., under the name of the 'Fables of Bidpai'; and finally through the Latin into the modern literatures of western Europe. More remote from our subject are the 'Vetāla—panchavimcati,' a group of 25 fairy tales, well known in English under the title of 'Vikram and the Vampire'; and the 'Katha-sarit-sāgara,' or 'Ocean of Rivers of Stories,' an immense collection of verse-tales of various kinds, composed by Somadeva, a Kashmirian poet of the 11th century. Interesting also as approaching somewhat to the modern picaresque story of low life is the 'Dasa-kumāra-carita' (composed by Dandin in the 6th century), which tells of the adventures of 10 princes. Finally, out of Arabia came to the West 'The Book of the Thousand Nights and a Night,' a work in its kind as great as either of the Homeric epics. This treasure-house of stories consists of beast fables, longer and richer in incident than those

of India, beautiful tales of magic and fairy land and histories and historical anecdotes which localize the scene. Over all is the glamour of the moonlit night and the beautiful princess who relates them. Some of these stories had doubtless been recited for centuries by the professional raconteur, called in Arabic the *rawi*. 'Sinbad the Sailor,' for example, may be older than the 'Odyssey.' But the collection as a whole (which is based upon a Persian original of the 10th century) did not assume definite shape until the 13th century of the Christian era; and the famous 'Ali Baba' and 'Aladdin' exist in no manuscript earlier than the 16th century. Translated first into French and then into English and every language of the west, the 'Arabian Nights,' after scores of imitations, passed into romantic fiction and became a part of it. Scott's 'Talisman' would have been quite different but for this precious inheritance from the east.

The Greeks likewise added to the treasure-house of fiction. Their myths, epics, histories and biographies contained, from Homer to the end, elements clearly novelistic or romantic. The 'Odyssey,' for example, is a skipper's tale, one of many, made beautiful by weaving into it stories, long afloat, of Circe, Calypso, Polyphemus, the lotus-eaters, and the fairy realm of the Phæacians. Though we call it a hero-epic, it is really much like a mediæval romance of adventure. Plato was an admirable story-teller, as well as philosopher. Like Defoe he knew how to give an air of reality to fiction by an accumulation of details, not neglecting to tell by the way how he came by his story. The 'Republic' is perhaps too philosophical in aim for more than mention here. But it is the starting point of the scores of Utopias of western Europe from Sir Thomas More to Mr. H. G. Wells. Xenophon all but discovered the historical novel. In his 'Cyrupædia,' he took for his hero the elder Cyrus as representative of a king who by self-control and vigorous self-training became ruler of the world. Running through the romance is a pretty oriental tale, which tells of the beautiful captive Panthea, tempted by Araspes, but faithful to her husband Abradates. The 'Cyrupædia,' which was translated into French and English in the 16th century, became a model for historical fiction before Scott and gave great impetus to the creation of perfect gentlemen like Sir Charles Grandison. So much and much more may be said for the fiction of ancient Greece. Besides Plato's and Xenophon's, there were many other political, philosophical and historical tales. All along ran the novelistic treatment of heroic legend; moral allegories were at one time the fashion, and with the exploits of Alexander in India came many geographical wonders and several freely invented biographies of the hero himself, which eventually resulted in the Alexander novel or legend, well-known from its later development by the French poets of the 13th century.

The Greek novel as a cultivated *genre* wholly distinct from other literary forms belongs, however, to a period subsequent to Alexander; to Greece in its decadence after the glory of her letters had departed, when the centre of culture was no longer Athens but Alexandria and the cities of Asia-Minor. Then the erotic tale of

adventure took the place of the verse-epic. Of this type the oldest extant specimen is the so-called 'Nimrod Fragment' (1st century, A.D.), which has as subject the love of Nimrod, the legendary founder of Nineveh, for a maiden who may be identified perhaps with Semiramis. The motive for the hero's bravery is not unlike that in the mediæval romance of chivalry. Antonius Diogenes, the Jules Verne of the Greeks, wrote of 'The Marvelous Things Beyond Thule' (2d century), descriptive of a voyage to the North Pole, a descent into Hades, and travels in the sun and moon. To the same century belongs the 'Babylonica' of Jamblichus, a Syrian, so-called because its scene is in and near Babylon. The 'Ephesiaca' of Xenophon of Ephesus (3d century) is built in part on the *motif* of 'Romeo and Juliet.' 'Apollonius of Tyre' (3d century), known in English since the Anglo-Saxon period, furnished the plot of Shakespeare's 'Pericles.' 'Clitophon and Leucippe' by Achilles Tatius of Alexandria (5th century) abounds in marvels, gorgeous descriptions, and metamorphoses. Best of all in this kind is the 'Ethiopica, or Theagenes and Chariclea' by a Syrian who called himself Heliodorus (5th century). The boy and girl lovers, after separation, adventures and miraculous escapes, are finally united and live happily ever after. The involved and complicated structure of this tale was taken over into western fiction by Sir Philip Sidney and the French romancers. One beautiful Greek prose-pastoral of the same period has survived: the sweet and sensuous 'Daphnis and Chloe,' the far distant shadow of 'Paul and Virginia.'

The impossible adventure of the Greek tales, especially of the class represented by 'The Marvelous Things beyond Thule,' did not escape the wit and banter of Lucian, the orator and rhetorician. In his 'True History' he sailed with his mariners beyond the pillars of Hercules, on to the moon and morning star, and to the Elysian fields, where he met with the Homeric heroes. "I know what I am saying is incredible," he stops to remark by the way, "but I shall proceed notwithstanding." Lucian was the model of the burlesque romancers from Cervantes to Fielding. Of grotesque adventure in real life, we have from antiquity one fine example in 'The Golden Ass' of Apuleius (2d century), which, though written in Latin, is thoroughly Greek. Aside from its burlesque, the novel contains scenes of coarse and brutal manners mixed with descriptions and episodes of entrancing beauty, like the story of Cupid and Psyche, than which nothing more beautiful has survived for us from ancient romance.

Mediæval Romance.—The Romans had nothing of their own much like a novel, except perhaps the 'Satiricon' of Petronius Arbiter, descriptive of dissolute life in the time of Nero. Their tales and fables were little more than an adaptation of the Greek. But their language, both written and spoken—in Italy, Spain and Gaul—became the chief medium through which ancient fiction passed to the new nations of the West. The tradition, literary as well as oral, was never quite lost in the darkest period of the Middle Ages. Another source of transmission was the Crusades, when met the East and the West. Many a

medieval tale, clearly Greek or oriental in origin, was brought home by the Crusader and told to one and another until some one put it down in writing. The flourishing period of medieval romance is included in the years between 1150 and 1400. It was then that the poets developed, from Latin sources, the sagas of Alexander, Troy and the elaborate romance of Troilus and Cressida. The new nations possessed, too, their own myths, traditions and legends. Charlemagne and his peers became the heroes of a romantic cycle; and the French poets, working over Celtic matter, produced the great stories of Arthur, Lancelot, Guinevere and the Round Table. Most like the modern novel were the French *romans d'aventure*, which are only loosely connected with traditions and may cut themselves wholly free. There are extant scores of these verse-romances, both in French and in English, like 'Guy of Warwick' slightly Saxon in setting, 'Havelok the Dane,' 'King Horn,' and 'Gawain and the Green Knight,' which is one of the best. Certain of them, Greek or eastern in *motif* or outline, turn upon disguises and beautiful recognition-scenes at the close, just as in Shakespeare's 'Twelfth Night' or 'As You Like It.' Such for example, are the 'Life of Ipomydon' and 'Amis and Amile.' The flower in this kind is 'Aucassin et Nicolette' (part prose and part verse), the story of two lovers of Provence, who, as in Greek romance, are separated to be brought together in happiness at the end. By the side of this charming story may be placed also the less known 'Chastelaine de Vergi,' which announces the intense tragic passion of 'Romeo and Juliet.' More realistic in aim were the *fabliaux*, short poems usually, which dealt with a trick or humorous incident in ordinary life for the purpose of exciting laughter. The main incidents of these tales, mixed with beast-fables, were in many cases transmitted from the East. A point of diffusion was the 'Disciplina Clericalis,' a collection of 26 stories in Latin prose, made by Petrus Alphonsus, a Spanish Jew of the 12th century. Its great successor was the 'Gesta Romanorum' (13th century). Tales of intrigue drawn from these and other sources, when lightly treated in verse, were called *fabliaux*; if neatly turned into Italian prose, they were called *novelle*. At the end of the Middle Ages stands Chaucer, who, gathering up all the current types of fiction, breathed into them the spirit of a delightful personality. On the way to Canterbury, the knight begins the story-telling with a gorgeous romance of chivalry, the squire stops midway in a tale of eastern marvels, the prioress relates the legend of a saint, and the pardoner is ready with an oriental apologue. The Reeve's tale is an expanded *fabliau* and the priest's story of Chanticleer and Dan Russell the fox is a *fabliau* and beast-fable in one. Near Chaucer stands Boccaccio, who in the merry *Decameron* retold in prose the older *fabliaux*, giving thereby vogue to the *novella*. The various types of medieval fiction are described by Gaston Paris, in 'La Littérature Française au Moyen Âge' (2d ed., Paris 1890). Symonds' 'Renaissance in Italy' contains an account of the Italian *novelle* (Vol. V, London 1881).

Caxton to Richardson.—As in the Orient, the medieval story of western Europe, whether

in verse or in prose, was for the most part something to be related by a professional reciter or others in the gathering of friends, in public squares, or in the stately assemblies of lords and ladies. In the longer tales, verse was the more common inasmuch as rhyme was an aid to the memory. There were, however, persons who preferred to read by themselves the current fictions. For this public, various verse-romances about Arthur, Lancelot, and the Holy Grail were remodeled and expanded, as early as the 13th century, into an immense prose-narrative. The habit of reading, already begun, was greatly extended by the invention of printing, with the result that the old verse-romances were everywhere turned into prose, and the short prose-tales were expanded into narratives that might assume the magnitude of an epic or a saga. Conspicuous instances of this transformation are Malory's 'Morte Darthur,' a compendium of Arthurian romance, and the French 'La Fleur des Batailles,' a Charlemagne romance in which Ogier the Dane is the hero. These are but two out of hundreds of examples of what was taking place wherever the printing press was set up. To Caxton and the noble printers that followed him we are indebted for the creation of a prose style suitable to the novel.

The most striking innovations were made at first in the Spanish Peninsula. Out of a Portuguese verse-romance of adventure there grew up in the 15th century, by accretions from many sources, the famous prose 'Amadis of Gaul,' to which final form was given by a Spanish writer named Montalvo. In its outer structure *Amadis* differs from similar medieval tales of knightly adventure in that the narrative drifts on, as in Greek romance, to the marriage of the hero and the heroine. It was the first and the best of the modern romances of chivalry, which soon became so numerous as to fill the library of Don Quixote. In a like manner medieval verse-pastorals were turned into prose, though they usually still retained some mixture of verse. Among the first of them was the Italian 'Arcadia' (1504) by Jacopo Sannazaro. The type was further developed in the Spanish Peninsula by George of Montemayor, whose 'Diana Enamorada' set the fashion for France and England. It was in Spain, too, that some one first had the happy thought of placing behind the scenes of contemporary life a gay scamp to let him relate what he saw there. These so-called picaresque novels, or romances of roguery, began with the anonymous 'Lazarillo de Tormes' (1554) and were popular for a full century. Always realistic in aim and straightforward in movement, the romances of roguery were important forerunners of the modern novel. Akin to them and of still greater significance, was 'Don Quixote,' a vast prose-epic, written in burlesque of the romances of chivalry, but carrying along with its banter humorous descriptions of contemporary manners. Don Quixote and his Squire Sancho Panza were by far the most elaborate characters that fiction had yet produced. And no work comparable with that of Cervantes was to appear again in Spain or elsewhere for more than a century.

In France and Italy the novelistic literature chiefly cultivated at this time, aside from redac-

tions of the older romances and tales, was the *conte* or *novella*. Collections of these short stories were sent forth from nearly every city of Italy, and the 'Heptameron' of Margaret of Navarre became a close rival to Boccaccio's 'Decameron.' The great humorist was Rabelais, who made the farcical adventures of Gargantua and Pantagruel the occasion for social satire, weaving into his story as he went along many a coarse jest in the vein of the old *fabliaux*. He was followed by a group of imitators who tried to 'outdo him in ribaldry and buffoonery, but none of them possessed his immense learning and keen intelligence.

In Elizabethan England, men and women turned to fiction for amusement as well as to the drama. Beginning with Painter's 'Palace of Pleasure' (1566), the Italian *novelle* came into English in shoals; the best of the Greek romances were translated from the French; and the Spanish romances of chivalry, pastorals and rogue-stories were known in part. And whatever England took was worked over into fictions in harmony with her own society. For its wide scope Sidney's 'Arcadia' stands first with its noble chivalry and beautiful pastoral scenes, set in the complicated framework of the Greek 'Ethiopica.' Of slighter texture but none the less beautiful is Lodge's 'Rosalind,' which Shakespeare dramatized in 'As You Like It.' John Lyly's 'Euphues,' highly moral in tone, initiated the romance for the lady's boudoir. Robert Greene, the dramatist, supported himself by writing short tales, such as 'Menaphon,' which he called "love-pamphlets." Of all Elizabethans, Greene was by much the most fertile in incident. Two of his stories, 'Pandosto' and 'Philomela' were freely used by Shakespeare for 'A Winter's Tale' and 'Cymbeline.' Very curious are Greene's attempts at historical romance, like *Ciceronis Amor*, descriptive of "the loves of Cicero which Plutarch and Cornelius Nepos forgot in their writings." Greene also wrote several pamphlets dealing with beggars, rogues and sharpers, but in this kind he was surpassed by Thomas Nash, who ridiculed his rival's love-pamphlets and ironically alluded to him as "the Homer of Women." Nash's 'Unfortunate Traveller or the Life of Jack Wilton' (1594), which relates the adventures and escapades of a young courtier on the Continent, was the most carefully wrought of the English romances of roguery.

After the passing of the Elizabethans and of Cervantes (1616) the main stream of European fiction shifted for a century to France. The English 'Arcadia' and the Spanish 'Diana' were more than matched by the 'Astrée' (1610-27), an immense pastoral covering some 5,000 pages; begun by Honoré d'Urfé, and completed after his death by his secretary. Several writers turned to history for a setting of their romances. In 'Cléopâtre,' 'Cassandre' and 'Pharamond,' La Calprenède dealt in turn with Egypt, Persia and the legendary founder of the French monarchy. He was succeeded by Scudéri, best known for the 'Grand Cyrus' and 'Clélie, ou Histoire Romaine.' In all cases, historical scenes, incidents and characters were merely a disguise for a portrait of contemporary society. Scudéri's 'Cyrus,' for example, was drawn for the great Condé, and her Babylon was the Paris of her time. Near the end

of the line came Madame de la Fayette, whose 'Princesse de Clèves' has long been regarded as one of the classics in French fiction. Along with their pastorals and histories, the French continued to cultivate the stories of bourgeois life in line with the older *conte* and *fabliau*. Such were Sorel's 'Francion,' Scarron's 'Roman Comique,' and Furetière's 'Roman Bourgeois,' in which the aim was, to some extent, the ridicule of contemporary manners in low life. Burlesque in the style of Cervantes or Lucian made its appearance in Sorel's 'Berger Extravagant,' a hit at the 'Astrée,' and in Boileau's 'Héros de Roman,' descriptive of the descent of Scudéri's heroes into Hades to be flogged and cast into Lethe.

Through translation, the ponderous French romances became almost as popular in England and Germany as in the land of their birth. In both countries coteries of fashionable men and women were formed for reading and studying them as if they were all classics. Occasionally there was an imitation, like Roger Boyle's 'Parthenissa' or John Crowne's 'Pandion and Amphigenia.' Outside of their influence was Grimmelshausen's 'Simplicissimus,' the first of the German realistic novels, which described the adventures of a vagabond during the awful desolation of the Thirty Years' War. In this novel the picaresque element is quite apparent as well as in the 'English Rogue . . . a Complete History of the Most Eminent Cheats of Both Sexes,' composed jointly by one Richard Head and Francis Kirkman, a London bookseller. Mrs. Aphra Behn, the dramatist, set the fashion in England for scandalous tales of high life. Among her successors were Mrs. Mary Manley and Mrs. Eliza Haywood. Quite apart from these immoralities was Mrs. Behn's 'Oroonoko,' which gives a realistic account of a royal slave barbarously put to death at Surinam, where the author had lived for some years.

Interesting as much of this 17th century fiction may be, it is, with the exception of the 'Princesse de Clèves' and now and then another story, affected in style and involved in structure. A better and plainer narrative came with Bunyan's 'Pilgrim's Progress,' the newspapers, the biographers and the essayists. Steele and Addison described clearly scenes in London and the provinces; they deftly sketched and contrasted men and women as they knew them, with agreeable banter of prevailing absurdities in dress and conduct. In doing this they were really nearer to the modern novel than the romancers and the storytellers. And so was Defoe. He and Swift wrote the language that men speak in ordinary discourse, making fiction seem like truth. 'Robinson Crusoe' is indeed our prose 'Iliad.' Except for minor details, we have no better narrative in English, and the hero is a typical Englishman of the class to which he belongs, behaving as an Englishman should behave if cast upon a desert island. In France the Spanish picaresque novel was at this time cleverly employed by Le Sage in his 'Gil Blas' for social satire, and Marivaux, in a novel called 'Marianne,' began the delicate analysis of emotion. Not to be forgotten, too, is 'Manon Lescaut,' by the Abbé Prévost, a charming tale on the "divine right of passion."

Richardson to Scott.—For centuries, stories, tales and romances of all sorts had been set adrift; contemporary manners had at times been depicted under the guise of history and the pastoral life, and from the standpoint of rogues and adventurers. But no one, not even Cervantes, had ever been able to keep before him for long the ideal of the novel as we now understand it: to wit, the direct and faithful portrayal of character amid the scenes of real life. Strange to say, too, no one had ever seen that for this end much might be learned from the drama, that a narrative might be made closely and logically dramatic. These discoveries were left for Samuel Richardson, a London printer of no rank and little schooling. The interest in his first novel, to which he gave the name of 'Pamela' (1740), centres about the distress of a beautiful waiting-maid of humble birth. Her mistress dies and then the son and heir tries to win her to a dishonorable alliance. After a protracted struggle of will against will, the young man repents of his evil-doing and marries the young woman whom he would have betrayed. It is a simple story that may be told as here in two or three sentences. But for his treatment of the theme Richardson required two volumes, to say nothing of a continuation. During and after each struggle there were sensations to record; many characters had to be introduced as participants in the action; and the whole narrative was made to move from incident to incident with the logic of the drama, up to a climax and on to a catastrophe. When he had done with 'Pamela,' Richardson had created, perhaps without being aware of it, a novel from which characters emerge as clear and definite as from the drama, and in much greater detail. Richardson attained to his full stature in 'Clarissa Harlowe,' wherein a tragic theme is unfolded with great skill. His career closed with 'Sir Charles Grandison.' The plots of the three novels were developed, oddly enough, by imaginary letters, which pass to and fro between the more important characters.

The formula of the novel once discovered, it was easy for a man practised in letters to improve upon the humble printer. Henry Fielding, essayist and playwright, wrote 'Joseph Andrews' to show Richardson what a novel ought to be, and afterward went on with 'Tom Jones' and 'Amelia.' Fielding was a great humorist in direct descent from Lucian and Cervantes. The novel, as he understood it, was an immense comic-epic running on in the well-polished grooves of the drama, but suspended at intervals that the author might converse with the reader about his art, his fame and the conduct of his characters. Knowing England better than any other man of letters in his day, Fielding conveyed the wealth of that knowledge into characters like Parson Adams, Squire Western and Tom Jones, who always stand out full and complete. While the great master was at work on 'Tom Jones,' Tobias Smollett took the field with 'Roderick Random,' our first novel of the sea, which was followed by 'Peregrine Pickle'; 'Count Fathom'; 'Sir Launcelot Greaves'; and 'Humphry Clinker.' If Fielding was a comic writer who delighted in exposing to ridicule vanities and affectations, Smollett was a satirist who lashed hypocrisy and the darker vices with the glee of a madman. He

had in him also the spirit of fun, which welled up splendidly in 'Humphry Clinker,' "the most laughable story," said Thackeray, "that has ever been written since the goodly art of novel writing began." In the meantime Oliver Goldsmith had condensed the Richardson novel and given it a charming background in country life. From the 'Vicar of Wakefield' dates the brief pastoral-tale since common throughout Europe. Perhaps Laurence Sterne should not be classed with the novelists. He was rather a humorist who played with the novel. 'Tristram Shandy' is a sort of a novel written backwards. After setting out with the prenatal history of his hero, Sterne drops him and reverts to Tristram's uncle and father and elaborates their characters, without much attention to the main story. Of orderly narrative Sterne was, however, a master when he chose to be, as in the death of Yorick and throughout the 'Sentimental Journey,' which is a record of his emotions on a tour through France, from Calais to Paris and on through Languedoc in the vintage season. Sterne's art at the best was exquisite and wonderful, whether in the minute delineation of Walter Shandy and my uncle Toby or in the minor emotional portraits of his sentimental travels. Translated into French, German and other languages, Richardson and Sterne reinforced the stream of emotional literature on the Continent. For France the outcome was Rousseau's 'Nouvelle Héloïse,' and, at a latter date, Saint-Pierre's 'Paul et Virginie,' Chateaubriand's 'René' and Madame de Staël's 'Corinne.' For Germany the outcome was a long line of sentimental novels at the head of which stood Goethe's 'Leiden des jungen Werther.'

Owing to changed social conditions, the novel broke up into new types after the death of Sterne. Among large numbers of people in England and France, interest in the comedy and tragedy that grow out of love and intrigue gave way, in the years before the French Revolution, to the larger social and political relations and to theories of education and government. The novel at once became the popular medium of current speculation, incorporating into itself the tract, the pamphlet and the treatise. The novel of distinct purpose which began with Rousseau's 'Emile,' was continued by many English writers including Thomas Holcroft and William Godwin, the author of 'Caleb Williams.' In other hands the novel absorbed romance. The so-called Gothic romances all sprang from 'The Castle of Otranto,' a nightmarish tale by Horace Walpole. Among Walpole's successors were Clara Reeve; Mrs. Ann Radcliffe, author of the 'Mysteries of Udolpho'; 'Monk' Lewis; and Charles Brockden Brown, the American. In Germany there was a similar tendency to romance and superstition as illustrated by the work of Tieck and Hoffmann.

Meanwhile, a group of novelists, mostly women, held more nearly to older traditions. 'Evelina' and 'Cecelia' by Frances Burney (afterward Madame d'Arblay) brought the public back to London—to assemblies, Ranelagh, the opera, and Drury Lane, where thronged the world of fashion with nothing to do. With Miss Burney began the novel of manners in the most restrictive meaning of the phrase. Hitherto characters had been differentiated by

what they said and did. Miss Burney laid equal stress upon *how* they spoke and *how* they behaved, upon tone, look and gesture. From her art it is an easy transition to the characteristics of Maria Edgeworth. One may pass by, good as they are, Miss Edgeworth's tales of fashionable life and various fictions in which she sought to reform English society from top to bottom, for her stories of Irish life such as 'Castle Rackrent' and the 'Absentee,' wherein first appeared the Irishman as he really is, behaving himself in those ways that seem so absurd to an Englishman, and engaging in no long conversation without one or more of those delightful blunders in speech known as Irish bulls. From Miss Edgeworth's sketches, as she called them, flowed all these Irish tales which for the next 50 years flooded England. Miss Burney and Miss Edgeworth shared one defect, for neither of them knew how to manage a story. Their many natural and vivacious scenes are more or less detached and never firmly held together. But the art of Fielding, long since lost, was now to be regained and refined by Jane Austen, a woman of gentle breeding and charming style. Her first novel to be printed was 'Sense and Sensibility;' then followed 'Pride and Prejudice,' 'Mansfield Park,' 'Emma,' 'Northanger Abbey' and 'Persuasion,' of which the best is the novel one happens to be reading. The scenes of them all were laid in South England, where Jane Austen passed her life. Without employing the conventional devices of the novelist, she was able to awaken interest by the manner in which she developed her story, the nice discrimination between men and women much alike to the ordinary observer, and the wit and irony that accompanied the entire performance. Jane Austen was in a sense the last of her line, completing the work of Miss Burney and Miss Edgeworth; she also set the clock to the delicate impressionism of the 19th century.

Sir Walter Scott.—Scott, equally with Richardson, marks an epoch in the course of European fiction. From the earliest times, as in Egypt and Greece, history had been an adornment to the tale or story. Shakespeare and many others had written historical dramas. The French romances of the 17th century, many of them, were historical allegories. The Gothic writers laid their scenes in mediæval or early modern times. With several romancers just before Scott, history was a still more definite aim, especially with Jane Porter, author of the 'Scottish Chiefs.' But none of Scott's predecessors had the historian's perspective. None of them did much more than project the present into the past. Scott's aim was to restore as carefully as he could the manners and customs of our forefathers, to tell us how they behaved under the stress of civil and political commotions. The historical novel, as Scott organized it, was, then, the novel of manners pushed back, at first one or two generations, and eventually to the Middle Ages. He began in 'Waverley' (1814), with Scotch scenes; and, after exhausting interest in Scotland, he crossed the border, writing 'Ivanhoe'; then he crossed the channel, writing 'Quentin Durward'; and finally he went on to the East, to the camp of the Crusader. All Europe stood in admiration of the extraordinary feat. Scott

was clearly the founder of the historical romance. His numerous imitators in England included Horace Smith, G. P. R. James, W. H. Ainsworth, and in part, Dickens and Thackeray. Under Scott's direct inspiration, Cooper launched his great romances of the forest celebrating the career of Leather-Stocking; and as a challenge to the seamanship of Scott's 'Pirate,' he wrote 'The Pilot,' to be succeeded by other romances of the sea. From Scott, too, proceeded the German historical romances, from Wilhelm Häring on through Gustav Freytag and Georg Ebers. In Italy Scott's influence began with Manzoni's 'Betrothed,' and in France with Alfred de Vigny, Prosper Mérimée and Victor Hugo. Finally, the historical romance was transformed by the elder Dumas, a writer of rare narrative and descriptive powers, into tales of breathless adventure like the 'Trois Mousquetaires.' On Scott and the historical novel, consult especially, Maigron, 'Le Roman Historique' (Paris 1898); and Stephen, 'Hours in a Library' (first series, London 1874).

Varied Types of the 19th Century.—By 1832, the year of Scott's death, romance had run its immediate course in England, though there were many survivals. The passage of the Reform Bill and other legislation led to a break-up of society; the older bourgeoisie fared badly, losing their homes and drifting to debtors' prisons and workhouses; and a new middle class rose to wealth and power. The manners, virtues and vices of the new order became at once the main theme of the novelists. Bulwer-Lytton, who could write at will a history, a sentimental romance, a criminal novel, a ghost story, or a Utopia, well illustrates the transition from romance to the novel of contemporary manners. Dickens was the chronicler of those who had suffered most by political and social changes. Beginning with 'Pickwick' (1836-37), a long series of comic sketches unexcelled in their kind, he definitely struck the humanitarian note in 'Oliver Twist' (1837), which dealt, in humor and pathos, with the workhouse and the new poor-law. He thereafter passed in review private schools, public education, prison discipline, the red-tape of Downing street, delays in the Court of Chancery, graft (we should now call it) in business and the professions, and all sorts of hypocrisy and meanness that oppressed the people. Despite the sordidness of their matter, all of Dickens's novels were ennobled by the author's lofty idealism, and made delightful by a sense of humor that never deserted him. Those that were wrought out of the author's most intimate experience—'David Copperfield,' for example—were no doubt the best; but Dickens could interest when he took, as in 'Hard Times,' a subject about which he knew little or nothing. His Christmas stories were national events. Of immense creative power, Dickens added to fiction hundreds of humorous types, among which are Mr. Pickwick, Sam Weller, Micawber and Dick Swiveller. He was, however, surpassed in fertility by his early French contemporary, Honoré de Balzac, who in the vast 'Comédie Humaine' endeavored to portray every phase of French life, traversing its hell, purgatory and paradise. But what fell without the ken of Dickens was taken up by other novelists. Charles

Kingsley, now better known for 'Hypatia' and 'Westward Ho', canvassed the questions at issue between labor and capital, in 'Yeast' and 'Alton Locke,' drawing by the way vivid pictures of sweatshops and the distress of agricultural laborers. Mrs. Elizabeth Gaskell, in 'Mary Barton' and 'North and South,' described the frightful condition of women and children in the great manufacturing towns of North England. And Benjamin Disraeli created a sensation by his trilogy, 'Coningsby,' 'Sybil' and 'Tancred,' dealing in turn with "the state of parties," "the state of the people," and "the state of the Church of England." Disraeli's first novels, impressive for their scope, were all marked by keen intelligence, wit and mockery. The relation of Dickens, Kingsley, Gaskell and Disraeli to their times is exhaustively treated by Cazamian, 'Le Roman Social en Angleterre' (Paris 1904).

In the meantime Thackeray was depicting, with matchless humor and irony, the ways of the well-to-do middle class to which he himself belonged. 'Barry Lyndon,' the 'Book of Snobs,' various burlesques of contemporary novelists, and a multitude of sketches were succeeded by 'Vanity Fair, a novel without a Hero.' No English novel since 'Tom Jones' had contained so much of real life. It was a humorous transcript of what was going on among the rich bankers and merchants in Bloomsbury, with some invasions into the disreputable aristocracy of Belgravia. In 'Pendennis' Thackeray described much of his own career; and in the 'Newcomes,' he returned, though taking the edge from his irony, to the theme of his first novel. Finally, he carried his realistic methods into history, writing 'Henry Esmond' and the 'Virginians,' of which the former is rightly regarded as the best historical novel in English.

'Esmond' is, however, hard pressed for first place by the 'Cloister and the Hearth,' by Charles Reade, who also wrote several admirable novels under the humanitarian impulse, such as 'It is Never Too Late to Mend.' To the same period belong Charlotte Brontë's 'Jane Eyre,' 'Shirley' and 'Villette,' and her sister Emily's 'Wuthering Heights,' all of which are Byronic in the vehemence of passion. In the United States, Poe and Hawthorne had molded the short-story to a beautiful form, and the latter's 'Scarlet Letter' at once took rank among the great fictions. To Anthony Trollope descended Thackeray's humor, without, however, the master's irony and genius. For 20 years Trollope was the delight of a large audience. He was the easy and amusing chronicler of every-day English life, rising to his highest powers in the tales of cathedral life, which began with 'The Warden' and 'Barchester Towers' and closed with the 'Last Chronicle of Barset.' This series of delightful novels, no doubt, suggested to Mrs. Margaret Oliphant the 'Chronicles of Carlingford,' dealing with the ways of Dissenters. 'Salem Chapel' and 'Miss Majoribanks,' among the best of them, give Mrs. Oliphant a permanent place in the course of English fiction.

With Marianne Evans, known in letters as "George Eliot," there entered into the English novel a new and profound personality. Hitherto moralists and philosophers had tried fiction

with no great success. But George Eliot, besides her large acquirements from books, possessed wit, humor and a fund of fresh observation. Beginning with 'Scenes of Clerical Life,' based upon incidents and traditions brought over from her life as a Warwickshire girl, she published in 1858 'Adam Bede,' her first long novel. It was quite different from any other novel that had ever been produced. True, it ran on the lines of the conventional story of a young woman's betrayal; but beneath the outer sequence of incident was a relentless study of motive, clearly and logically developed from beginning to end. It was the first purely psychological novel ever written. Still more impressive work followed in 'The Mill on the Floss,' 'Romola,' and 'Middlemarch.' At the same time George Meredith was finding his way to the psychological novel. His 'Ordeal of Richard Feverel' appeared in the same year as 'Adam Bede,' but his subtle psychological manner came later, in the 'Egotist' and 'Diana of the Crossways.' Narrower in his outlook than George Eliot, he took fewer characters for his studies, carrying the analysis of motive to a refinement that sometimes rendered him unintelligible. And Henry James has since refined upon Meredith. The stories whereby James first won attention were international episodes, delightfully objective in method, like 'Daisy Miller,' depicting by contrast American and European types and manners. But by 1890, he began very complex studies of unconventional phases of English life, and adopted for his purpose an involved and indirect style, with the result that most readers are now uncertain just what happens in a novel like the 'Golden Bowl,' for the incidents must be largely inferred from the characters.

It is impossible to relate here in detail what has been done for fiction on the Continent since the death of Balzac. In France, Flaubert and Daudet were the great literary artists of their time. Zola, who established the vogue of "the naturalistic novel," described the ugliest aspects of life with a boldness never before attempted in fiction. His influence is obvious in very many English novels, but most of all in George Moore's 'Esther Waters,' by far the best novel we have of the Zola type. Paul Bourget, since 1892, has been the exponent of psychology. Scandinavia's representative has been first of all Björnson. Sienkiewicz, author of 'Quo Vadis' and an impressive trilogy dealing with the struggles between the Poles and the Cossacks, may stand for Poland. Among Germany's numerous novelists are Paul Heyse, author of 'Kinder der Welt'; Spielhagen, who presented his ideal of a novel in a collection of essays on the 'Theory and Technique of the Novel'; and Sudermann, the dramatist, whose pathetic 'Frau Sorge' soon found its way to English readers.

Of modern Russian fiction the founder was Gogol, whose 'Dead Souls' (1842) is a masterpiece of realism and grim humor. Again, Russia produced a novelist of the first rank in Turgenyev, whose art—say in 'Fathers and Sons'—is quite beyond praise; its influence has been long potent in the West. Tolstoi, beginning with 'Anna Karenina,' treated current social problems in novels of absorbing interest. His novels read, not like fiction, but as if they

were genuine documents on contemporary life. To the same period belongs Dostoevski, who, especially in *'The Brothers Karamazov,'* carried minute psychological analysis into the realm of pathology. Of less importance is Gorki, in whose *'Twenty-six Men and a Girl'* is well displayed his talent in the portrayal of hideous scenes among the lowest strata of the underworld. Chekhov, who died in 1904, was then assuming a position in Russian fiction second only to Turgenev. Still, he never developed the perfect art of his predecessor, nor had he the wide sweep of Tolstoi. Representative of his subtle work is the collection of tales called *'The Black Monk and Other Stories'* (1903). Artsybashev came to the front in 1907 with *'Sanin,'* a powerful novel exalting the natural instincts of man against all moral restraint. At the present moment the leader in Russian fiction is Andreev, author of *'The Red Laugh,'* *'The Seven who were Hanged,'* *'Judas Iscariot,'* *'A Dilemma,'* and many other terrible stories. Regarded as a whole, contemporary Russian fiction excels that of all other nations in uncompromising realism.

With the 20th century came, too, a revival of the "biographical novel," which aims to depict the entire career of the leading character or some important phase of his life. This type of novel is an interesting reversion through Dickens and Thackeray to the manner of Fielding and Smollett. Its extreme representative is *'Jean-Christophe,'* by the French novelist, Romain Rolland, running to 10 volumes and presenting in its wide sweep a remarkable view of European life and thought just before the outbreak of the Great War. In English fiction, the new fashion was established by the success of William De Morgan with *'Joseph Vance'* (1906) in the style of a loose autobiography, and deservedly maintained by his *'Alice-for-Short,'* *'Somehow Good,'* and *'It Never Can Happen Again.'* Slightly antedating De Morgan was Samuel Butler's brilliant study in the diabolism of human nature, called *'The Way of All Flesh.'* To the same group belong Arnold Bennett, who won his public with *'The Old Wives' Tale'* and has since written prodigiously; and John Galsworthy, whose best novel thus far is *'The Man of Property.'* Of larger calibre is H. G. Wells, the socialist and reformer, who would make over society in accordance with the facts of biology. Representative of his work are *'Ann Veronica,'* *'Marriage,'* *'The Wife of Sir Isaac Harman,'* and *'The Research Magnificent.'* Somewhat apart from this group, but within it in her reflection of current views on social conventions is May Sinclair, the author of *'The Divine Fire,'* *'The Helpmate,'* *'The Judgment of Eye,'* and *'The Three Sisters,'* all of which are iconoclastic in tone. And during all these years the wonderful portrayer of men and women has been Joseph Conrad, whose readers have been comparatively few.

The Great War gave the novelist a new subject and is profoundly altering his art. The novelist now strives by all means in his power to make his fiction appear as fact. He relates the experiences of an officer or a private at the front, working stories and anecdotes into a sequence; he writes of a man or a woman caught in Germany at the outbreak of

the war; or seeks to tell the world how the war affected him or his friends far behind the battle line. He needs little or no plot. His art is essentially a return to the art of Defoe, whose sole aim was a good tale dressed in the garb of truth. So we have Mrs. Ward with *'Missing,'* and *'Towards the Goal';* Locke, W. J., with *'The Red Planet';* and an unknown writer with *'Christine,'* purporting to be genuine letters out of Germany from a daughter to her mother. Thus far have appeared two very notable novels in this style. They are Well's *'Mr. Britling Sees It Through'* and Henri Barbusse's *'Le Feu'*—the story of a squad under fire.

Howells, who has often interpreted Tolstoi in brief essays, has held firmly to a realistic treatment of current types and manners, eliminating so far as possible the conventional plot which the novel early took over from the drama. His *'Rise of Silas Lapham'* is by far the best American novel of the present generation. Hardy is the English novelist of most thought and substance since George Eliot. He struck the note of his stern realism in *'A Pair of Blue Eyes'* and *'Far From the Madding Crowd,'* and rose to the height of his genius in *'Tess of the D'Urbervilles.'* Mrs. Humphry Ward gained her public with *'Robert Elsmere,'* and after writing several other problem novels, shifted her theme in *'Lady Rose's Daughter'* and the *'Marriage of William Ashe,'* to beautiful women in risky situations. A tendency toward the abnormal in recent fiction, slightly visible in Mrs. Ward, is best represented by Mrs. Harrison's *'Sir Richard Calmady.'* The intensity of Hardy's tragedy, though less well-rendered, descended to Phillips, author of the *'Secret Woman'* and other Wessex novels. His *'Three Brothers'* is almost worthy of his great master.

Toward the close of the 19th century, the English novel passed through a brief cycle of romance, history and adventure. No decade and perhaps no year since Scott and Dumas had been without an historical novel or a story of adventure. In recent years Blackmore's *'Lorna Doone'* had been received with delight by a wide public; and Shorthouse's *'John Inglesant,'* a spiritual romance of singular beauty, had met with almost equal favor. But the novelist who revived history and adventure as a fashion was Stevenson. He became for his time a lesser Scott, though, in technical detail, he surpassed his countryman. Beginning with *'Treasure Island,'* a story of pure adventure, he passed on through the ethical parable of *'Dr. Jekyll and Mr. Hyde'* to *'Kidnapped,'* *'David Balfour,'* and the *'Master of Ballantrae,'* which were tales of adventure in an historical background after the style of Dumas. These and other tales and short stories, admirable in form and style, and revealing a charming personality, won the hearts of the critics as well as of the larger public. As in the case of Scott, Stevenson was accompanied and followed by scores of historians, among whom were Conan Doyle, S. R. Crockett, Stanley Weyman, Anthony Hope Hawkins, Weir Mitchell, Mary Johnston, Gertrude Atherton and Winston Churchill. Most of this work, though there are exceptions, is mechanical in execution and is destined to pass quickly into oblivion. But Maurice Hewlett es-

pecially has made an interesting psychological study of Mary Queen of Scots under the title of the 'Queen's Quair'; and in the 'Forest Lovers,' 'Little Novels of Italy,' and 'New Canterbury Tales,' he has revived in his own beautiful way the spirit of the Renaissance and the Middle Age.

No less interesting than the recrudescence of romance was the exploitation of remote districts and countries for fresh material, until the earth has now become well-nigh exhausted. First of all comes to mind Kipling, who revealed India in tales of wonderful vigor and insight, like those in collections named 'Soldiers Three,' 'Phantom Rickshaw and Other Tales,' 'Many Inventions,' and in 'Kim,' a longer novel, while his 'Jungle Books' gave rise to an extensive animal literature. Conrad carried the novel to the Malay Peninsula; and Hornung to Australia. Hichens described an oasis in the Sahara and the road to Timbuctoo. Coming nearer home, Barrie and Watson discovered the humor and pathos of the peasantry of Scotland. In the United States, the novel of provincial character was long practised by Mary Wilkins Freeman, Sarah Orne Jewett, Mary Murfree, Bret Harte, G. W. Cable, T. N. Page, Hopkinson Smith, Booth Tarkington, and scores of others. Owen Wister and Hamlin Garland invaded the northwest, and Elizabeth Robins Parkes wrote of the Klondike. Throughout the long period Mark Twain was the supreme humorist. This kind of novel, aiming at local color, still maintains its immense popularity.

The 20th century opened with a remarkable vogue of the short-story, so well adapted to the newspaper and magazine. Short narratives in prose have been cultivated from the earliest times. Egypt and India had them long before the dawn of modern civilization. As *novelle* they were brought to high finish by Boccaccio, and ever since his time they have been frequent in all the literatures of the West. But a new type, depending less upon narrative interest than upon conveying a definite impression or an emotional state, came in with Poe and Hawthorne. Short stories of this kind, containing few characters and shorn of unnecessary incident, were exquisitely wrought by Daudet and Maupassant. Less clean-cut but admirable in their several styles are the short stories of James, Stevenson, Kipling, Hewlett, Aldrich, Davis, Stockton, O. Henry, Edith Wharton and many another writer. Recently supreme excellence has been attained by several Russian novelists—Chekhov, Kuprin, Sologub and Andreev.

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translations of the Arabian Nights are by Burton (10 vols., London 1885–86, and six supplemental vols. 1887–88); by Payne (8 vols., London 1882–84), and by Lane, edited by Jacobs (6 vols. London 1898). Burton's translation was abridged by Lady Burton (6 vols. London 1887–88).

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(rev. ed., Paris 1896); Wells, 'A Century of French Fiction' (New York 1898); and Brunetiere, 'Le Roman Naturaliste' (New ed., Paris 1892). In various essays Brunetiere has covered nearly the whole field from the beginning of the 18th century.

Germany.—Mielke, 'Der Deutsche Roman des XIX Jahrhunderts' (Braunschweig 1890); Rehorn, 'Der Deutsche Roman' (Köln und Leipzig 1890); and Spielhagen, 'Beiträge zur Theorie und Technik des Romans' (Leipzig 1883).

Russia.—The great body of Russian fiction, along with biographies of the authors, is becoming more and more known through numerous translations. Consult W. L. Phelps, 'Essays on Russian Novelists' (New York 1911) for an excellent guide. See also the articles on individual novelists in this encyclopedia.

The Short Story.—Specimens of tales and short stories from the Egyptian survivals to the present day are given by Jessup and Canby, with an introductory essay on the *genre*, in 'The Book of the Short Story' (New York 1903). The best collection of British and American short stories is Sherman's 'A Book of Short Stories' (New York 1914), which contains a very fine essay by the editor. The art of the short-story has been admirably treated also by Matthews in 'Philosophy of the Short-Story,' in 'Pen and Ink' (New York 1888) and by Perry in 'A Study of Prose Fiction' (Boston 1902). Among other interesting books consult Barrett, 'Short Story Writing' (New York 1900); Esenwein, 'Writing the Short Story' (New York 1909); Grabo, 'The Art of the Short Story' (New York 1914); Hamilton, 'The Materials and Methods of Fiction' (New York 1908); and Pitkin, 'The Art and the Business of Story Writing' (New York 1912). Phelps, W. L., 'The Advance of the English Novel' (1906).

Further information on the novel may be gained by consulting the articles in this encyclopedia on the various literatures and on the leading writers mentioned in this essay.

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NOVEL CONSTITUTIONS, or NOVELS, *in law*, were the supplementary constitutions of some Roman emperors, and especially those of Justinian, so called because they appeared after the authentic publications of law made by such emperors. The Novel Constitutions (also called Novels), together with the Institute, Digest and Code, constitute the whole body of law which passes under the name of Justinian. Although no official compilation of the Novellæ was made they were preserved in several private collections, the most important of which, the 'Liber Authenticorum' was incorporated, in the 12th century, in the 'Corpus Juris Civilis' with the other Justinian codes. Consult Sohm, R., 'The Institutes' (Oxford 1901, trans. by J. C. Ledlie).

NOVELETTE, (1) *in music*, a term denoting certain compositions in free form, characterized by a great number of short themes introduced without regular succession. Schumann (q.v.) was the inventor of this composition. (2) An abbreviated novel, or short work of fiction. A short story usually contains from

1,000 to 20,000 words; a novelette from 20,000 to 40,000 and a novel from 40,000 words upward.

NOVELLINO, *nō-vě-l'ě-nō*, **II, or CEN-TO NOVELLE ANTICHE**, a 13th century collection of Italian stories of a very multifarious character taken from every possible source, biblical, classical, chivalrous and historical. The style is simple and natural and often distinguished by a charming naïveté. The tales were gathered from various sources. Early Latin collections, oral traditions, folk-tales, books of chivalry, the French fabliaux all contributed to them. Consult Gualteruzzi, 'Novellino' (Bologna 1525); Colombo, Michele, 'Novellino' (Milan 1825); other editions by Carbone (Florence 1868); and by Donin (Turin 1890); Biagi, 'Le Novelle Antiche' (Florence 1880).

NOVELLO, VINCENT, English composer: b. London, England, 6 Sept. 1781; d. Nice, France, 9 Aug. 1861. He was one of the founders of the Philharmonic Society of London and of Novello, Ewer and Company, London music publishers. His contributions to cathedral music are numerous and valuable, and in editing the unpublished compositions of great musicians he accomplished an important work.

NOVEMBER (from *novem*, nine), the eleventh month of our year and the ninth month of the Roman year when it consisted of 10 months. It has 30 days, and in Great Britain is generally regarded as perhaps the gloomiest period of the year. The first day of the month is All Saints Day. (See CALENDAR). In the United States Thanksgiving Day comes in November.

NOVGOROD, or VELIKI-NOVGOROD, *vě-l'ě-kě nōv'gō-rōt* ("Great Novgorod"), Russia, (1) a town, capital of the government of Novgorod, on the Volkhoff, near the point where it issues from Lake Ilmen, 103 miles southeast of Petrograd. It is divided by the river into two parts, which communicate by a stone bridge. The portion of the town on the right bank contains in its centre the Kremlin or citadel. Within it is the cathedral of Saint Sophia, built after the model of Saint Sophia at Constantinople; and numerous churches and several monasteries. The town-hall, post office and commercial building stand on the left bank of the river. The manufactures are of little importance and consist of sail cloth, leather, tobacco, candles, vinegar, etc. The trade in corn, flax and hemp, carried on chiefly with the capital, is considerable. Novgorod was in early times the capital of an independent state. So great was its power and wealth that it excited the jealousy of the Muscovite princes, and in 1478 the Tsar Ivan III nearly destroyed the city, deprived it of its liberties and banished its most influential citizens. On the opening of Archangel to English traders, but more especially after the founding of Saint Petersburg, the town rapidly declined. Pop. 27,130. (2) The government of Novgorod has an area of 47,236 square miles. Pop. 2,200,000, chiefly engaged in agriculture and stock-raising. Consult Kluchevsky, V. O., 'History of Russia' (3 vols., London 1911-13).

NOVGOROD-SYEVERSK, *syā'vērsk*, Russia, city on the Desna River, 148 miles northeast of Tchernigov, in the government

of Tchernigov. It is one of the oldest towns in Russia. In the 11th century it was the capital of an independent principality. Subsequently it was annexed to Lithuania. Novgorod-Syevsk possesses an Orthodox Cathedral, dating from 1671; an ancient monastery; and a college, dating from 1808. Novgorod-Syevsk is a brisk trade centre. It manufactures soap, bricks and has tanneries and tobacco and sugar plantations. Pop. 12,727.

NOVI LIGURE, nō'vê lē'goo-rā, Italy, town in the province of Alessandria, 33 miles northwest of Genoa and 13 miles southeast of Alessandria. The town has several churches, a museum, public library, a lyceum and technical schools. The chief industry is the culture and manufacture of silk. Woolen goods are also made here. Novi was the scene of a battle (15 Aug. 1799), when the French were defeated by the Austrians and Russians and General Joubert was killed. Pop. 20,000.

NOVIBAZAR, nō'vê-bā-zār, or **NOVI-PAZAR** (Yenibazar), Jugo-slavia, the capital of the district of Novibazar, Kossovo, on the Rashka, 130 miles southeast of Bosna-Serai. There are no public buildings worthy of notice except the ruined citadel. It is the chief point of communication between Bosnia and Serbia; several of the chief roads of the country cross each other here. By the terms of the Treaty of Berlin of July 1878, the liva or district of Novi-bazar was maintained under a dual Austro-Turkish control. The town was given to Serbia by the treaties of London 30 May 1913. Pop. about 14,000.

NOVICE. See NEOPHYTE.

NOVIKH, nō'vêk, **Gregor** ("Rasputin"), Russian lay monk: b. Tobolsk, Siberia, 1873; d. Petrograd, 29 Dec. 1917. He came of a peasant family with some hereditary gift of mesmerism. Known in youth as a dissolute character, he was given the sobriquet of Rasputin (q.v.). At 30 he became religious and although never in religious orders, his fame as an ascetic grew, and the dignitaries of the Church favorably regarded him as one who might prove a popular "miracle worker." Though he never changed his immoral life, his reputation extended first in Moscow and from 1900 in Petrograd, among the highest circles of society. He started a new cult, in which dancing and debauchery were interspersed with mystical séances. He was introduced at the Imperial Court, where he exerted a powerful influence for years. In 1915 he published some details of his amours in the *Novoye Vremya* and was shortly after banished to his native Tobolsk. He was allowed to return in 1914; in July he was stabbed in the street by a peasant woman who wished to avenge one of his victims. The secret of his popularity at court, where he held the office of "Lighter of the Sacred Lamps," was stated to be due to an alleged miracle he had performed in restoring the young ex-tsarevitch, Alexis, to health. M. Gutchkoff (q.v.) denounced Rasputin in the Duma in 1912 as "a mysterious tragi-comic figure, an apparition of the Dark Ages." Both the ex-tsar and his consort were frequently exhorted to expel the sinister monk from the court. All efforts to remove him failed and criticism of his actions were forbidden by the censorship. The scandal grew to such dimen-

sions that the nobility—including grand-dukes and princes of the royal blood desired to remove what they called a "plague spot" from the national life. He grew frightened and shut himself up in his house, surrounded by a private bodyguard and secret police. On the night of 29 Dec. 1917 Prince Yussupoff, a young graduate of Oxford and married to a connection of the Imperial family, invited Rasputin by telephone to his palace to a supper party. Rasputin, taken off his guard, entered the waiting automobile of his host and was driven to the Yussupoff palace on the Moika Canal. Here he was shot by the young prince in the presence of a grand-duke, a former Minister of State and several members of the Duma. The body was dropped into the Neva through a hole in the ice. It was recovered three days later, taken to Tsarskoe-Selo and buried in a silver casket.

NOVIKOFF, nōv'ikōf, **Nikolai Ivanovitch**, Russian author: b. near Moscow, Russia, 27 April 1744; d. there, 30 July 1818. He entered the Imperial service, but soon turned his attention to literature and became editor of the *Moscow Gazette* (1779-89). He established in Moscow a Typographical Society, whose purpose was to further inexpensive reprints of valuable books, and he also founded there the first circulating library in Russia, and in many various ways endeavored to promote the cause of education. In the *Drone* (1769-70) and the *Painter* (1772-73) he fought for the liberation of the Russian slaves and ridiculed the passion then shown by the upper class for everything French. Both periodicals were stopped by order of the court. He was imprisoned (1792) for writing 'A History of the Jesuits,' and his property was confiscated, and his hospitals, schools, libraries and bookstores closed. His other works include 'The Painter'; 'Russian Biographies,' etc. Consult Gretch, 'Essai sur l'Histoire de la Littérature Russe,' also Luginnoff, 'Novikoff and the Moscow Martinists' (1897).

NOVIKOFF, **Olga Kiréeff** ("O. K."), Russian political writer: b. Moscow, 1840. Her parents belonged to the nobility, and at 19 she was married to General Novikoff. She removed to England and there found friends among the most eminent statesmen of the day. Her political writings, signed "O. K.," aimed to further an Anglo-Russian alliance and continued the work of her brother who was killed in the Turkish War. She has published 'Is Russia Wrong?' (1877); 'Friends or Foes' (1878); 'Skobelev and the Slavonic Cause' (1884) Consult Stead, W. T., 'The M. P. for Russia: Reminiscences and Correspondence of Madame Olga Novikoff' (New York 1909).

NOVO CHERKASK, nō'vō chër-kās'kā, or **TCHERKASH**, Russia, city, capital of the province of the Don Cossacks, near the Don River, about 40 miles from its entrance into an arm of the Sea of Azof. Anthracite coal mines and rich farm lands are in the vicinity. Two large fairs are held here each year, which bring considerable trade to the city. It has a number of manufacturing establishments, several excellent schools and a large library. Brewing was the chief industry of the city up to 1914. Pop. 68,200.

NOVOGEORGIEVSK, nō'vō-gē-ōr'gē-yěfsk, Poland, fortress on the Bug and Vistula rivers, nine miles northwest of Warsaw. This spot was fortified by Charles XII of Sweden and the fortifications were extended by Napoleon. It was captured by the Russians in 1813 and occupied by the Poles in 1830 during their insurrection. One of its names is the "Polish Quadrilateral." The Poles also call the fortress Modlin, because it stands on the site of an ancient town of that name. The fortress is built on the banks of the Bug and the Vistula. The Germans captured Novogeorgievsk early in the World War.

NOVOROSSISK, nō'vō-rōs-sēs'k', Russia, city on the Black Sea, in the government of Tchernomorsk, Caucasus, 60 miles south of Ekaterinodar by rail. A fortress was erected here by the Turks in 1722 and in 1838 Novorossisk was built. The English and French bombarded it in 1855. Novorossisk, situated on a large bay, is the chief outlet for the North Caucasus district. A large mole protects the harbor. North of the bay, in Novi Gorod, are the Russian Standard Petroleum Works and a large grain elevator. Grain and naphtha constitute the chief industries. There are also iron foundries and cement works. Novorossisk exports barley, wheat, linseed, wool, kerosene, oil cake and cement. Pop. 61,200.

NOVUM ORGANUM (literally, new method or instrument), a famous work by Francis Bacon, published in 1620. It forms the second part of Bacon's philosophical work entitled 'Instauratio Magna,' 'The Great Restoration' of Sciences. The first part, 'De Augmentis Scientiarum,' is an extension of the previous work on the 'Advancement of Learning.' The third is the 'Historia Naturalis.' The 'Novum Organum' contains the outlines of the scientific or inductive method; namely, that of proceeding from facts to general laws, instead of inferring facts from assumed general principles which have never been proved. This latter, the philosophical and metaphysical method, was repudiated by Bacon and, together with the "superstitions" of theology, was declared to have no place in the new learning. 'The New Method,' therefore, is an attempt at an interpretation of nature from direct observation.

NOVY, nō'vī, Frederick George, chemist and bacteriologist: b. Chicago, Ill., 9 Dec. 1864. He was graduated from the University of Michigan in 1886 and studied in Berlin. In 1891 he became assistant professor at the University of Michigan and was several times promoted until in 1902 he was made professor of bacteriology. He was at Pasteur Institute in Paris in 1897 for the prosecution of his studies and in 1901 he formed one of the United States commission to investigate the plague in San Francisco. He is a member of many scientific societies, domestic and foreign, and is the author of 'Cocaine and Its Derivatives' (1887); 'Laboratory Work in Physiological Chemistry' (1893); 'Laboratory Work in Bacteriology' (1899) and several books in collaboration. He has also published results of many researches in physiological chemistry, bacteriology and proto-zoology.

NOWANAGAR, nō-wā-na-gār', or **NA-WANUGGUR**, na-wā-nū-gūr', India, the sea-

port capital of a native Gujarat state of the same name in the Kathiawar peninsula, at the mouth of the Nagna, on the Gulf of Cutch, 54 miles east of Rajkot, with which it is connected by a branch railway line. It is noted for its textile manufactures, pearl fisheries and carries on an active export and import trade and has extensive coastwise and inland trade. The town is encircled by a very strong ancient wall over four miles long. Pop. 44,887.

NOWATA, nō-wā'ta, Okla., city and county-seat of Nowata County, on the Saint Louis, Iron Mountain and Southeastern and on the Missouri Pacific railroads, 23 miles south of Coffeyville, Kan., and 32 miles northwest of Wagoner. Nowata is situated in a region rich in natural gas and oil-wells. Apart from this source of income the industries are farming and stock-raising. The city owns its waterworks. Pop. (1920) 4,471.

NOWELL, nō'ēl, Increase, Anglo-American colonist: b. in England, 1590; d. Boston, 1 Nov. 1655. One of the original patentees of the Massachusetts Bay Company, in 1630 he came to New England with John Winthrop. About 1632 he was dismissed from Boston because of his urging the separation of Church and State; and became one of the founders of Charlestown and ruling elder in the church. He was outlawed by the English authorities for failure to appear before them. Nowell was secretary of the colony (1644-49), treasurer of Harvard College and chaplain to the force sent against the Narragansett Indians. He died in poverty, but a large land grant in New Hampshire was voted by the colony to his widow and his son, Samuel (1634-88), who had distinguished himself in the swamp fight with the Narragansetts.

NOX. See **Nyx**

NOYADES, nwā-yād, in French history, the name given to the execution of political offenders by drowning them, practised during the Revolution, especially during the Reign of Terror, by Carrier at Nantes. The method adopted was crowding the victims into a boat, withdrawing a plug in the bottom and casting them adrift. See **CARRIER**, **JEAN BAPTISTE**.

NOYAU, or **CRÊME DE NOYAU**, nwō'yō', a French liqueur prepared from white brandy, bitter almonds, sugar-candy, grated nutmeg and mace and sometimes flavored with the kernels of apricots, peaches, the peel of oranges, etc.

NOYES, noiz, Alfred, English poet: b. Staffordshire, England, 16 Sept. 1880. He was educated at Exeter College, Oxford, where he gave evidence of his fine taste for literature. In 1913 he came to the United States to deliver a course of lectures at the Lowell Institute, Boston, choosing for his subject "The Sea in English Poetry." Yale gave him the degree of LL.D. in that year. In 1915 he became professor of English literature at Princeton University. He has contributed verse to the leading magazines of England and the United States. His books are published in London and New York. They include 'The Loom of Years' (1902); 'The Flower of Old Japan'; a tale in verse (1903); 'Poems' (1904); 'The Forest of Wild Thyme' (1905); 'Drake, an English Epic' (1908); 'Forty Singing Sea-

men' (1907); 'The Enchanted Island and Other Poems' (1909); 'Collected Poems' (2 vols., 1910); five volumes in America with additional poems (1911); 'Robin Hood' (1912); 'Tales of the Mermaid Tavern' (1912); 'The Winepress, a Tale of War' (1914); 'Roda' (1915); 'A Salute from the Fleet' (1915); 'The New Morning' (1919). In addition he has also published a volume of essays—'The Sea in English Poetry' (1913); a 'Life of William Morris' (in the 'English Men of Letters Series,' 1908); and edited 'The Magic Casement and Minstrelsy of the Scottish Border' (1908); 'A Book of Princeton Verse' (1916); 'The New Morning' (1919).

NOYES, Arthur Amos, American chemist: b. Newburyport, Mass., 13 Sept. 1866. He received the degrees of S.B. in 1886 and of S.M. in 1887 at the Massachusetts Institute of Technology and of Ph.D. at Leipzig University in 1890. At the Massachusetts Institute of Technology he was instructor in analytical chemistry from 1890–94; assistant professor of organic chemistry from 1894–97; associate professor from 1897–99; professor of theoretical chemistry from 1899; and director of the research laboratory of physical chemistry from 1903. He was acting president of that institute from 1907–09. He has received honorary degrees of LL.D. from Maine University, 1908; LL.D. from Clark University, 1909; Sc.D. from Harvard University in 1909; Sc.D. from Yale University in 1912; and LL.D. from Pittsburgh University in 1915. He was president of the American Chemical Society in 1904. He is author of 'A Detailed Course of Qualitative Chemical Analysis of Inorganic Substances' (1895); 'Class Reactions and Identification of Organic Substances' (1899); 'General Principles of Physical Science' (1902); 'The Electrical Conductivity of Aqueous Solutions' (1907); 'General Principles of Chemistry' (1916); also of numerous papers on researches in physical, analytical and organic chemistry and on educational topics.

NOYES, Frank Brett, American journalist: b. Washington, D. C., 7 July 1863. He is the son of Crosby Stuart Noyes (1825–1908), a well-known American journalist and was educated in the public schools of his native city and the preparatory department of Columbian College (now George Washington University). From 1881 to 1901 he was manager of the *Washington Star* and in 1902–1909 was editor of the *Chicago Record-Herald*. Since 1910 Mr. Noyes has been president of the Evening Star Newspaper Company in Washington. In 1894 he was made a director of the Associated Press, of which he became president in 1900.

NOYES, Henry Drury, American eye-specialist: b. New York City, 1832; d. 1900. He was graduated at New York University in 1851 and at the College of Physicians and Surgeons in 1855. From 1868 to 1900 he was professor of otology and ophthalmology in Bellevue Hospital Medical College. He was one of the founders of the American Ophthalmological Society in 1864 and was its president from 1878 to 1884. His published works include 'A Treatise on Diseases of the Eye' (1881); 'A Text Book on Diseases of the Eye' (1890; 2d ed., 1894).

NOYES, John Humphrey, American author and founder of the Oneida Community (q.v.): b. Brattleboro, Vt., 6 Sept. 1811; d. Niagara Falls, Canada, 13 April 1886. His father was a representative in Congress 1815–17 and his mother an aunt of President R. B. Hayes (q.v.). He studied at Dartmouth, took theological courses at Andover and Yale, was licensed to preach as a Congregational minister in 1833. He soon lost this license, having professed a second conversion, a belief in the dual sexual nature of God and the doctrine that the Christian is bound by no rule of duty or conduct. With these tenets and an attempted return to the communism of the primitive Church, he gathered round him a Perfectionist Community at Putney, Vt., whose practice of complex marriage forced them to migrate to Oneida, N. Y. But there, too, they outraged public sentiment, so that they gave up their peculiar tenets in 1880 and Noyes and some of his adherents moved to Canada. He wrote 'The Berean,' which may be called the 'Bible of the Oneida Community' (1847; 'Communism' (1848); 'The Second Coming of Christ,' that is in 70 A.D. (1859); 'Salvation from Sin' (1869); and 'History of American Socialism' (1870). See ONEIDA COMMUNITY.

NOYES, Walter Chadwick, American lawyer: b. Lyme, Conn., 8 Aug. 1865. He was educated at Cornell University and was admitted to the bar in 1886. From 1895 to 1907 he was judge of the Court of Common Pleas of New London, Conn., and from 1907 to 1913 was United States circuit judge of the second circuit. In 1913 he removed to New York to practise in that city and in 1915 he was appointed receiver of the Chicago, Rock Island and Pacific Railroad. He became general counsel for the Delaware and Hudson Company and engaged in general practice in New York. In 1909 and 1910 he was United States delegate to the International Conference on Maritime Law in Brussels. He is author of the 'Law of Inter-Corporate Relations' (1902) and the 'American Railroad Rates' (1905).

NOYES, Willam Albert, chemist: b. near Independence, Iowa, 6 Nov. 1857. He was graduated at Iowa (now Grinnell) College in 1879, from Johns Hopkins University (Ph.D.) in 1882. Received the degree of LL.D. from Clark University in 1909. He was professor of chemistry in the University of Tennessee, 1883–86, in the Rose Polytechnic at Terre Haute, 1886–1903 and chief chemist of the Bureau of Standards, 1903–07. Since 1907 he has been professor of chemistry and director of the chemical laboratory of the University of Illinois at Urbana, Illinois. He is a member of the National Academy of Sciences and has been editor of the *Journal of the American Chemical Society* since 1902. He organized and edited *Chemical Abstracts*, 1907–09 and is the author of 'Elements of Qualitative Analysis' (1887; 6th ed., 1911); 'Organic Chemistry for the Laboratory' (1897); 'Organic Chemistry' (1903); 'Kurztes Lehrbuch der organischen Chemie' (1907); and 'Text-book of Chemistry' (1913); also of many scientific papers.

NOYES, William Curtis, American lawyer: b. Schodack, N. Y., 19 Aug. 1805; d. New York, 25 Dec. 1864. He was admitted to the bar in

1827, was appointed district-attorney of Oneida County, and later established a law practice in New York, 1838. He was one of the strongest advocates at the New York bar, and earned a reputation for highest integrity. At the time of his death was engaged in codifying the laws of the State, a work begun in 1857. In 1861 he was a member of the Peace Convention, held in Washington previous to the outbreak of the Civil War, where he strove to maintain the Union. He willed his extensive law library to Hamilton College, Clinton, N. Y.

NOYON, nwä'yôn', France, city in the Department of the Oise, 67 miles north of Paris on the railway to Brussels. Noyon suffered greatly during the European War. It is a town full of historic interest, built on the slopes and at the foot of a hill and on a small stream the Verse, which flows into the Oise about a mile distant from Noyon. Noyon was a military post in Caesar's time. Three famous councils were held here—in 814, in 1233 and in 1344. Noyon was the birthplace of John Calvin in 1509. Noyon was until the devastations of the War of 1914-18 full of antiquarian and architectural interest. Among these were remains of an old Roman wall and a beautiful statue of Apollon Gaulois, or Belenus, discovered in 1856 in the wood near the Mont de Choisy. The cathedral of Notre-Dame, which was begun after the original church was burned in 1131, was a fine example of the transition from Romanesque to Gothic. Until the European War the principal industries were sugar-refining, oil refining, beer, chemicals, tanneries, iron-foundries, manure works, lace, linen and tulle, leather and cloth. Pop. 7,300. Consult A-Le-franc, 'Histoire de Noyon jusqu'à la fin du XIII Siècle' (Paris 1887).

NU, noo, or **NUU**, or **NÛN**, was the Egyptian deity who represented the primeval waters out of which sprang the sun-god Râ, "while as yet there was no heaven and neither serpent nor reptile was formed" Nu "gave birth to himself and made his name to come into being" reads the old Egyptian text. Out of the bosom of Nu sprang all the primeval gods of Egypt; and these gods are the names of his limbs—Later Râ, Temu and Nu became identified as one supernatural being; and Râ takes to himself the attributes of all the other gods who sprang from Nu. Thus in Chapter XLII of the Book of the Dead Râ says of himself: "My hair is the hair of Nu; My face is the face of Disk; My eyes are the eyes of Hathor; My ears are the ears of Apuat," etc., throughout a long list which includes every member of the human body. In the Egyptian as in the Christian religion, God the Son assumes all the attributes and functions of God the Father. It was in the presence of Râ, the father god, that Nu created the other gods out of his own being. Consult Breasted, J. H., 'Development of Religion and Thought in Ancient Egypt' (New York 1912); Budge, E. A. W., 'Egyptian Ideas of the Future Life' (London 1908); 'The Gods of the Egyptians' (1904); Wiedmann, A., 'Religion of the Ancient Egyptians' (Vol. I, London 1904).

NUBA, noo'bä, an ethnological name given to the negro tribes of Kordofan, in Eastern Sudan, whence they spread into Dafur and Wadai. They are divided into two distinct

groups, the Nubas proper, in central and southern Kordofan; and the Nilotic Nubas. The Nubas are true negroes. Consult Müller, F., 'Algemeine Ethnographie' (Vienna 1879); Stanford, 'Africa' (1895).

NUBAR PASHA, noo'bär päsh'ä, Egyptian statesman: b. Smyrna, January 1825; d. Paris, 14 Jan. 1899. An Armenian Christian, he was educated in Switzerland and France; in 1842 he became secretary to Boghos Bey, Egyptian Minister of Commerce and Foreign Affairs. He later rose to be bey, and was sent on important diplomatic missions. Under Said Pasha he was in charge of the transport service through Egypt to India, and built the railway across the desert from Cairo, to Suez. After the accession of Ismail Pasha, who at first strongly relied upon him, he was Egypt's first Minister of Public Works, and from 1866 Minister of Foreign Affairs. He successfully concluded at Constantinople and Paris the negotiations toward the construction of the Suez Canal, obtained for Ismail the title of khedive, and strove to introduce European culture and methods of administration. At that time in Egypt the consulates of 17 various powers administered as many different codes of law, and to these courts alone the subjects of the said powers were amenable. Nubar prevailed upon the powers to allow the organization of international courts with a uniform code, perhaps his greatest achievement. He was dismissed in 1874, but on demand of the powers was at the head of the ministry in 1878-79, directing the financial reforms. In 1884-88 and 1894-95 he was again Premier. He was very adaptable, not to say pliant, and readily became the administrator of a British policy of which he did not approve.

NUBIA, nü'bī-ä, Africa, a comparatively modern name for a large region, formerly a portion of Ethiopia, and extending on both sides of the Nile from Egypt to Abyssinia; touching the Red Sea on the east and the desert on the west. Nubia proper, or Lower Nubia, extends from Assuan on the Egyptian frontier to Dongola; beyond that is Upper Nubia. But of late the name of Egyptian Sudan, properly applicable to a section of Upper Nubia, has come to be used for Nubia in its widest sense, together with the once Egyptian territory actually in the Sudan, and the equatorial provinces. The great Nubian Desert lies east of the Nile, opposite the great west bend of the river. See EGYPT; SUDAN.

NUBLÉ, nüo'blä, Chile, an inland province, bounded on the north by Linares, on the east by Argentina, on the south and west by Concepcion; area, 3,407 square miles. It is an agricultural region in which the chief product is wheat, and considerable attention is given to raising cattle. Pop. 210,000. Capital, Chillan.

NUCLEIN, nü'klē-in, from the Latin *nucleus*, a kernel, is the principal constituent of cell-nuclei, or the complex chemical substance termed also chromatin by virtue of which a cell grows, develops and reproduces. It is most abundant in white blood corpuscles. Nucleinic acid is an organic acid rich in phosphorus. From blood serum a nuclein or nucleinic acid, may be separated. Consult Allbutt's 'System of Medicine' (1896). See CELL; CYTOLOGY.

NUCLEUS. See CYTOLOGY.

NUDDEA, nūd'ē-ā. See **NADIA**.

NUDIBRANCHIATA, nū'di-brān'ki-ā'ta, one of the two primary divisions (orders or sub-orders) of the opistho-branchiate gastropods (q.v.). The name is in allusion to the absence of the primary gills or ctenidia, which in mollusks occur typically within the mantle cavity, and the functional substitution for them of external processes or cerata which perforate the mantle when the latter is present. The cerata differ greatly in form and arrangement and their peculiarities characterize the different families. They may be retractile or not; armed with stinging cells or without them; simple, pronged or arborescently branched, in the latter case usually penetrated by portions of the complexly ramifying liver. In their arrangement they may form dorsal or lateral rows, or a circle about the anus. Frequently they are most beautifully colored, and in many cases closely resemble the object on which the animal lives. The young are provided with a nautiloid shell, which is lost early in life, leaving the adult devoid of this protection. A mantle may or may not persist, and the integuments are frequently filled with calcareous spicules. On the head are found a pair of minute sessile eyes, and a pair of often retractile tentacles, which are olfactory in function and are known as rhinophores; in addition to which there may be a second pair of tractile tentacles. The mouth is provided with a radula and sometimes with jaws. Because of the usually elongated form of the body and their strictly marine habit, the nudibranches are known popularly as "sea-slugs." With the exception of a few free-swimming, pelagic and parasitic forms, the vast majority of the species belong to the littoral zone, where they creep upon algæ, hydroids, polyzoans and similar organisms, which afford them concealment and a place to attach the gelatinous capsules in which the eggs are deposited, besides furnishing the animal or vegetable food on which the particular species subsists. Most, if not all, of them are hermaphrodites. Upward of 1,000 species have been described and arranged in 17 families. On the Atlantic Coast of the United States 21 genera and 33 species occur in the region north of Cape Hatteras.

NUECES, nwā'sēs, a river in Texas which rises in a ridge of low mountains in Edwards County and flows south into Dimmit County, then east, northeast and southeast into Corpus Christi Bay. It formerly marked the boundary of the province of Texas in Mexico. It is about 400 miles long and navigable only a short distance from the Gulf. It drains an area of about 19,000 square miles and there are many irrigation plants along it, especially in its watershed in Edwards County.

NUELSEN, nūl'zēn, **John Louis**, American Methodist Episcopal bishop: b. Zurich, Switzerland, 19 Jan. 1867. He received his education in Germany and came to the United States in 1886. He was ordained a Methodist Episcopal minister in 1889 and was given a church in Sedalia, Mo. In 1890 he graduated at the Drew Theological Seminary (Madison, N. J.) and in 1892 took the degree of M.A. in the Central Wesleyan College. In 1890-92 he was professor of ancient languages in Saint Paul's College, Minnesota, and in 1892-93 he

studied in the universities of Berlin and Halle. From 1894 to 1899 he was professor of exegetical theology in the Central Wesleyan Seminary, Warrenton, Mo., and in 1899-1908 he was professor in the Nast Theological Seminary, Berea, Ohio, where he edited the *Deutsch-Amerikanische Zeitschrift für Theologie und Kirche*. In 1908 he became bishop of the Methodist Episcopal Church. In 1912 he was placed in charge of all Methodist Episcopal work in Continental Europe with Zurich as his headquarters. He has written for encyclopædias on theology and is associate editor of the International Standard Bible Encyclopædia (Washington, D. C.). His books include 'Die Bedeutung des Evangeliums Johannes' (1903); 'Das Leben Jesu in Wortlaut der vier Evangelien' (1904); 'John Wesley, ausgewählte Predigten' (1905); 'Luther the Leader' (1906); 'Kurtzgefasste Geschichte Methodismus' (1907); 'Recent Phases of German Theology' (1908); 'Methodismus und Weltmission' (1913), and 'Reformation and Methodismus' (Zurich 1917). The University of Denver gave him the degree of D.D. in 1903 and the Nebraska Wesleyan University that of LL.D. in 1910.

NUEVA CACERES, nwā'vā kā'thā-rēs, Philippines, formerly Naga, a pueblo and capital of the province of Ambos Camarines, situated in the southern part of the province on the Naga River at the head of navigation for large vessels, 10 miles inland from San Miguel Bay. It is a port of entry, an important road centre, and has an excellent trade. It is well built, contains a government house, a cathedral episcopal palace, a seminary, hospital, parochial school and a normal school for girls. It was at one time the seat of the episcopal see of the Philippines. Pop. about 20,000.

NUEVA ECIJA, ā'thē-hah, Philippines, a province of central Luzon, having a coast line of 23 miles on the Pacific, and bounded on the north by Pangasinán and Nueva Vizcaya, and on the south by Infanta and Bulacán. The surface is mostly low, but is broken in the northeast and south by foothills of the Cordilleras. The Grande de La Pampanga River crosses the province from north to south, the Canarén tributary of the Agno follows the northwestern boundary, the Pampanga Chico, the southwestern; many smaller rivers are tributary to these. The soil is very rich, the larger rivers frequently overflowing and fertilizing the fields with their deposits. Rice is raised in the southern and central portions; other important products are corn, tobacco, sugar and papay. The chief industry is agriculture; there are some manufactures for home consumption only; sugar is manufactured and refined on the plantations. Cattle are raised in the central part of the province. A road parallels the entire course of the Grande de la Pampanga River. There are numerous other roads, and a large boat traffic along the Pampanga and its tributaries. Civil government was established in Nueva Ecija in June 1901, and at the end of that year the governor reported that the province was "free from insurrectionary movement." Pop. 156,610, mostly Tagalogs and Ilocanos.

NUEVA ESPARTA, ās-pār'tā, Venezuela, a state composed of islands off the northwest coast of the republic. Margarita is the largest island of the group. Nueva Esparta was a part of the state of Guzman Blanco until 1901, when it became a separate state.

NUEVA SAN SALVADOR, sän sāl-vā-dōr, or **SANTA TECLA**, Salvador, Central America, city in a mountainous region a little northwest of the centre of Salvador and about eight miles from the capital. The chief occupation is mining. Pop. about 17,000. See SALVADOR.

NUEVA VIZCAYA, vēth-kā'yā, Philippines, a province of the island of Luzon, situated south of the centre of Northern Luzon, bounded on the east by the province of Isabela and on the west by Pangasinán and Benguet; area, 1,075 square miles. The surface of the province is uneven, being broken by the foothills of the Sierra Madre, the Cordillera Central and the Caraballo range. The Magat tributary of the Grande de Cagayán River crosses the province from northwest to southeast and there are numerous smaller rivers and streams. The only crop raised to any extent is rice; sugar, chocolate and tobacco are also raised, but not in sufficient quantities to supply the inhabitants of the province. Several kinds of building stones, granite, sandstone, etc., are found in the mountains, but quarried only to a small extent; there are also valuable forests containing resin and gum trees, but these products are not gathered on account of the difficulty of transportation. A few simple fabrics are woven for domestic use. The main highway of Luzon from Manila to Aparri passes through this province, but there is but little traffic on account of the difficulty of reaching the interior. Civil government was established for the province in January 1902; and a special form of municipal government organized for a few of the larger towns, which is being extended to other towns as they are prepared for it. Pop. 67,000, mostly non-Christian tribes.

NUEVITAS, nwā-vē'tās, Cuba, seaport in the province of Camagüey, in the northeast part of the province, on the coast and on the railroad which extends 39 miles to Puerto Principe. It has an excellent harbor and a large trade with other seaports of Cuba, the West Indies and the United States. Pop. about 7,000.

NUEVO LAREDO, nwā'vō lā-rā'dō, Mexico, town in the state of Tamaulipas, on the Rio Grande and on the Mexican National Railroad. It is opposite Laredo, Texas, and about 160 miles north by west of Monterey. Nuevo Laredo figured prominently in the revolution which began in Mexico toward the close of 1910 and it was partially burned by the Federals in 1914. It has a customs house and is the seat of a United States consulate. Pop. 9,000.

NUGENT, John F., American legislator: b. LeGrand, Ore., 28 June 1868. He was educated in the public schools of Silver City, Idaho, was admitted to the bar and began the practice of his profession at Silver City in 1898. He served four terms as prosecuting attorney of Owyhee County, Idaho, and two

terms as chairman of the Democratic Central Committee of the same county. He also served two terms as chairman of the Democratic State Central Committee and was appointed United States senator by Governor Moses Alexander, on 22 Jan. 1918, to fill the vacancy caused by the death of James H. Brady.

NUISANCE, *in law*, a term used to denote whatever is a serious disturbance, annoyance or discomfort to one's neighbors, or in a general sense to the public at large, in the exercise of their rights of property. Sometimes the same act may be legally considered both a nuisance and an injury for which damages may be obtained. Nuisances are of two kinds, public or common, and private.

Public nuisances are offenses against the public at large such as annoyances in the highways, bridges and public rivers, by rendering the same difficult or dangerous to pass, either by actual obstructions or by want of repair; injurious and offensive trades and manufactures, which, when hurtful to individuals, are actionable, and when detrimental to public health or convenience, punishable by public prosecution, and subject to fine according to the nature of the offense; keeping hogs in a city; disorderly houses, unlicensed plays, gaming houses and brothels; lotteries; making and selling fireworks in unlicensed places. The storing of petroleum, ammunition, gasoline and explosive material in general is also strictly regulated. From the very nature of it a public nuisance is a criminal offense, and consequently punishable as such by the State. Therefore, as a general rule and principle, the individual must institute proceedings against a public nuisance, not in his own name, but in that of the State, unless he can show that some particular injury has been done or is being done to himself above that suffered by the public in general. The injury must be direct, substantial and consequential.

A private nuisance may be defined as an injury or annoyance to the person or property of an individual. Such an act is not generally a criminal offense. If a person builds a house so near to that of his neighbor that the roof of the new building overhangs that of the other, and throws the water on it, this is a private nuisance, for which an action will lie. But depriving one of a mere matter of pleasure, as of a fine prospect, this, as it abridges nothing really necessary or convenient, is not an injury for which there is legal remedy. To keep hogs near one's house, to carry on any offensive trade, as a tanner, tallow-melter, soap-boiler, or the like, are all nuisances for which an individual has remedy by action, but it is necessary to show that such nuisances are of a character to render serious discomfort to ordinary persons or to sensibly damage property. So also is it a nuisance if life be made uncomfortable by the apprehension of danger, or by employing a steam engine, which produces a continual noise and vibration in the apartments of a neighbor. Besides the remedy by action, injured parties may, in a clear case, take the law into their own hands, and remove or abate the nuisance, but it is never advisable to take this course. But in some cases a nuisance may be legalized by statute. In England the power of the Parliament in this respect is unlimited; but that of the United States Congress is restricted by the

Constitution. In all municipal codes there are elaborate provisions with reference to sewers and drains, the disposal of sewage, scavenging and cleansing, water supply, cellar dwellings and lodging houses, the prevention, abatement, etc., of nuisances, offensive trades, unsound meat, infectious diseases and hospitals, mortuaries, highways and streets, lighting of streets, public pleasure grounds, markets and slaughter houses, police regulations, prosecution of offenses, alteration of areas, etc. The overcrowding of houses may be stopped. Provisions are also made to prevent the spread of diseases in times of epidemics, and common lodging houses from being kept unclean. The inspector of nuisances or the medical officer of health has, at all times, power to inspect any animal, carcass, meat, poultry, game, fish, fruit, vegetables, corn, bread or flour, and if found unfit for food, or diseased or unsound, they may be carried away and destroyed, and the owner or dealer fined. The local authority may order house proprietors to provide proper water closets, to cleanse gutters and cesspools, and to remove any pool, ditch, drain, urinal or privy injurious to health.

The victim of a private nuisance has three remedies open to him: A suit for damages, an injunction and an abatement. If he proves his case he is entitled to nominal damages, in any case; but if, in addition, he prove that he has sustained real material damages or injury, he may secure such damages; and if the defendant has been proven to have acted with malice, he is liable to punitive damages also. An injunction is not always available; and in some States it is often difficult to secure; especially when it can be shown that an injunction would work hardship upon the defendant, other individuals or the public in general. In this case the injured party has still open to him an action for damages. This is the general mode of procedure employed by individuals against incorporated concerns and powerful companies on account of the difficulty of securing an injunction against them. Consult Garrett, E. W., 'Law of Nuisances' (London 1897); Joyce, J. A. and H. C., 'Treatise on the Law Governing Nuisances' (Saint Louis 1906); Pollock, Sir Frederick, 'The Law of Torts' (London 1908); Wood, H. G., 'Law of Nuisances' (San Francisco 1893).

NUIT DE MAI (May Night). The "Nuit de Mai" remains one of the most celebrated and characteristic of de Musset's lyrics. His theory of poetry, in so far as so spontaneous a singer may be said to have held to any theory, was far different from Wordsworth's, for instance. Poetry is not the result of reflection on experience "emotion recollected in tranquillity." It is experience itself. Its excellence depends upon the intensity of the emotion which has thrilled the poet and the sincerity with which he has reproduced it. For this reason de Musset's poetry is not poetry of description or reflection, and his favorite theme was love, since it was the source of life's deepest joys and sorrows. His own emotional life reached its climax when, hardly more than a lad, at 23, he fell passionately in love with George Sand and set out with her on the great flight to Venice. What had begun as a divine adventure, after a brief heyday, ended in heart-break and a long bitterness. This, the cardinal

experience of his life, he recorded after his return to Paris in the 'May Night,' a dialogue between the poet and the muse, his confidant. In it he parallels in almost identical terms the sentiment expressed in Shelley's 'Skylark' — "Our sweetest songs are those that tell of saddest thought."

The high sense of spring's return, of the keenness of youth and genius foiled, the bitterness of lost love, the now ineffectual consolation of poetry, there expressed with wonderfully symphonic, rhythmic power, make of 'Nuit de Mai' the most intense and direct of the romantic love lyrics of France. To have written it one must have been 23, have loved George Sand and have been Alfred de Musset, whose heart strings, like Israel's, "were a lute."

CHRISTIAN GAUSS.

NUKHA, noo'khä, Russia, town in Transcaucasia, about 120 miles east by south of Tiflis and 150 miles northwest of Baku. It is near oil fields and is the industrial and commercial centre of a silk-producing region. The inhabitants are mostly Armenians and Russians. Pop. about 41,804.

NUKUALOFA, noo-koo-ä-lö-fä, Friendly Islands, the capital of Tonga, the largest island of the group. See FRIENDLY ISLANDS.

NULATO, noo-lä'tō, Alaska, native village on the north bank of the Yukon River, above the mouth of the Koyukuk. Nulato has long been the trading station for the natives of this region. A government school and the Roman Catholic mission of Saint Peter Claver are situated here. There is also a telegraph station. Pop. about 300, chiefly natives.

NÜLL, nül, Eward van der, Austrian architect: b. Vienna, 9 Jan. 1812; d. there, 3 April 1868. He was professor of architecture and ornamentation in the Vienna Academy, and a prominent practising architect. Most of his designs were executed with August von Siccardsburg. These include the Larisch palace and the Opera, at Vienna, 1861-69. Nüll's style was largely Renaissance, inclining to late Renaissance and rococo, and he exercised a decided influence on the architectural development of Vienna.

NULLA BONA (no goods), the name of the return made by the sheriff to a writ of execution, when he has not found any goods of the defendant within his jurisdiction on which he could levy. The sheriff must, however, use all reasonable means to find the goods of the debtor. If the sheriff should give a false report, he is liable for the value of the goods he should have seized. See ATTACHMENT; EXECUTION.

NULLIFICATION, in American history, the formal suspension by a State within its territorial jurisdiction of a law of the United States. A political doctrine first suggested in the Kentucky Resolutions of 1798. Its fundamental principle was accepted by the Hartford Convention of 1814, but it was not until 1832 that the theory was fully developed by the master mind of Calhoun, and acted on by South Carolina in its famous Nullification Ordinance of 24 November of that year. The Federal Constitution recognized both the Union and the States as bearers of power, but did not clearly apportion it between them, nor clearly deter-

mine, in cases of disputed claims, which was the final arbiter. The nation possessed only delegated authority, while to the States remained the residuary powers. Calhoun, in elaborating this doctrine, claimed that historically the States came into being first and were the creators of the Union, the grantors of power to their agent, the Federal government. It followed, therefore, as a natural consequence, that the final judge of the amount of power granted could not lie with the created—the agent—but must remain with the States as the creator. Also at this point the question arose in regard to the remedy should the agent of the States exceed the authority delegated, and pass laws that were contrary to the reserved rights of the partners in the Union. The fundamental basis then of nullification as Calhoun developed it was State Sovereignty (q.v.); and, in cases where the Nation was encroaching on the reserved rights of the States, he found in nullification a peaceable remedy. Secession and revolution were thus to be made unnecessary. The Union was as perfect after as before nullification. All rights and duties of the States and the Union remained unchanged except in regard to the one nullified and therefore void law. Should any of the co-States desire to test the matter a constitutional convention might be called, and the question be settled by process of amending the Constitution; but till overruled in this way the law was void in the nullifying State.

The cause of nullification is bound up in a compound of the protective tariff and sectional slavery. The former offered the immediate occasion for its promulgation, while the conditions that made protection popular in one section, and hated in the other, were found in the latter. As late as 1816 the South was not radically opposed to a protective tariff. But under the slave system manufactures and commerce did not develop. The South therefore could not profit by the protective system, and gradually developed a strong opposition to its continuance. By 1828, under the teaching of President Thomas Cooper, of the University of South Carolina, public opinion in that State had come to hold that the producer and not the consumer paid the tariff duty. It was also noted that about three-fourths in value of all exports from the United States consisted of the products of the South, cotton, rice, tobacco, etc. Therefore, in harmony with Cooper's teaching, the South paid approximately three-fourths of the government revenues derived from imported goods. Hence the demand for lower duties grew apace. But instead of lower rates the tariffs of 1824 and 1828 raised them. The tariff of 1828—"the tariff of abominations"—aroused Calhoun to seek a remedy. In that year he set forth his nullification theory tentatively, but did not press for action under it. By 1832 the National debt having been extinguished, the South at once began to demand a lower tariff, insisting that the extinction of the public debt removed all excuse for the longer continuance of high duties—of protection. Instead, however, of revising the tariff in 1832 in such a way as to reduce it to a revenue standard, the duties in the new law were placed on a protective basis, and that principle affirmed to be adopted as a permanent one. In South Carolina, for some years, a struggle be-

tween the nullifiers and the anti-nullifiers to control the legislature had been in progress. The tariff act of 1832 for the first time gave the necessary two-thirds majority to the nullifiers, and on 24 Oct. 1832 the Senate by a vote of 30 to 13, and the House by 99 to 25 resolved to call a convention to meet 19 November. On 24 November the convention voted 136 to 26 to declare the tariff acts of 1828 and 1832 null and void, because beyond the powers delegated to the United States. The convention also authorized the legislature to pass all laws necessary to enforce the ordinance of nullification. Laws were accordingly passed to prevent the collection of the tariff within the State, to give to the governor the power to call out the State militia, and to give the State courts full control of all cases involved under the tariff laws.

President Jackson in his annual message of December 1832 barely noticed this nullification action, but in his celebrated Proclamation of 10 Dec. 1832 he discussed the subject in all its aspects. He denied the possibility of nullification being a peaceable remedy. He asserted the National as opposed to the States Rights interpretation of the Constitution, and concluded with an earnest plea for the Union. He appealed to the people of South Carolina not to be misled, not to be deceived into thinking that their action could end short of war and treason. He pictured their fate and the fate of the Union should they persist in their policy. In the meantime Congress had taken the matter into consideration. The great Webster-Hayne debate of 1830 had awakened the people to a realization of the issue. Now in February 1833 Calhoun and Webster were pitted against each other in the Senate of the United States, in the greatest constitutional discussion concerning the nature of the Union and the powers of the States that had ever occurred in the American Congress. Webster supported Jackson in his national views, while Calhoun reaffirmed the constitutionality of nullification, as a peaceable remedy, against the usurpation of power by Congress. Webster presented the Supreme Court as the final arbiter in disputed cases. Calhoun claimed that this would be making the agent the judge of his own powers—an impossible principle. The request of the President that he be granted increased powers was now met by the introduction of the so-called Force bill 21 January. The bill, however, made no progress until the introduction of Clay's Compromise Tariff bill 12 February. The two measures then moved forward with equal step. The one gave the President power to collect the revenues in South Carolina, using the whole power of the government for the purpose, if necessary; the other provided for a gradual reduction of the tariff duties, until by 1842 no duty should exceed 20 per cent, a revenue basis. The two measures reached the President at practically the same time:—he signed them both 2 March 1833, and on 16 March South Carolina repealed her ordinance of secession. Both parties could thus claim a victory; the administration and its friends, as well as Clay, in that the protective tariff still existed; the nullifiers in the fact that provision was made to reduce the tariff to a revenue basis, thus in fact yielding to South Carolina, at the very moment of adopting the Force bill.

Nullification as a constitutional and peaceful

remedy against oppression was never again asserted, but the basis of the theory—the doctrine that the States were sovereign—was not abandoned. In fact it was advocated even more strenuously than before. Instead of nullification in the Union, as a remedy, the doctrine of secession—a separation from the Union—gradually became the accepted principle of the States Rights school of statesmen. The advocates of the latter view held that to nullify a law and remain a member of the Nation was absurd; but affirmed that in case of a breach in the compact to withdraw from the Union was a constitutional right that flowed naturally from the character of the Union. Consult Houston, 'A Critical Study of Nullification' (New York 1896); Von Holst, 'Constitutional History of the United States' (Vol. I); Powell, 'Nullification and Secession in the United States'; Niles, 'Register' (Vol. 43); Richardson, 'Messages; Debates in Congress' (1832-33); Calhoun, 'Works'; Webster, 'Works' (Vol. III); Houston, 'A Critical Study of Nullification in South Carolina.'

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NULLIPORE, a name given to certain more or less massive sea-weeds of the family *Rhodophyceæ*, common on rocky shores in warm climates, and especially about coral islands, where they serve to protect the corals somewhat against the beating of the waves. From secreting lime on their surface, and hence resembling coral, they were formerly supposed to be a kind of zoophytes. Some small species occur on the northern Atlantic coasts.

NULLITY OF MARRIAGE. The entire invalidity of a supposed, pretended or attempted marriage, by reason of the relationship or incapacity of the parties or other diriment impediments (absolute bars to marriage). An action seeking a decree declaring such an assumed marriage to be null and void is called a suit of "nullity of marriage." Nullity of marriage differs from an action for divorce, because the latter supposes the existence of a valid and lawful marriage. See MARRIAGE.

NUMA POMPILIUS, nū-mā pom-pīl'i-ūs, 2d king of Rome, belongs to the legendary period of Roman annals. According to ancient accounts he was from Cures, in the land of the Sabines, and was distinguished for wisdom and piety. He was elected king after the year's interregnum following the death of Romulus. His lengthy and quiet reign (39 years) he devoted to the adequate establishment of religion; and to him the Romans ascribed their whole system of worship and ceremonial law. He also founded the temple of Janus, which during his rule remained closed. The sacred books of Numa, containing the prescribed manner of observance for the rites and ceremonies of religion, were said to have been entombed, and to have been discovered in 181 B.C. This story is now regarded as a forgery. Consult Carter, 'The Religion of Numa' (New York 1906); Lewis, G. C., 'Credibility of Early Roman History' (1855); Plutarch, 'Numa.'

NUMANTIA, nū-mān'shī-a, Spain, an ancient town, situated on the Douro, near the

place now called Soria in Old Castile. It is famous for its resistance to the Roman power. While the neighboring places yielded to the Romans, the Numantians were firm in refusing submission. Large forces under the prætor Pompeius Aulus (137 B.C.) and the consul Hostilius Mancinus were repulsed. Scipio Africanus, the younger, with an army of 60,000 was sent to subdue them. He surrounded the town and famine compelled them to yield after a siege of 14 months. The conqueror destroyed the town, 133 B.C.

NUMBERING MACHINE, in printing, a machine for impressing consecutive numbers on account or record books, coupons, railway certificates, bank-notes, railway tickets, etc. The invention is that of Blaise Pascal (1650), and consists of discs or wheels decimally numbered on their peripheries, the whole mounted on one axle upon which they turn freely, acting upon each other in serial order. The first wheel of the series containing the units is moved one figure between each impact, and when the units are exhausted the tens come into action, and act in coincidence with the units, which continue their action.

NUMBERS, Book of. The book of Numbers is the fourth of the so-called "Five Books of Moses," or the "Pentateuch," which constitutes the first division of the Hebrew Bible. The Jews call the book *Bemidbār* ("In wilderness"), which is the fifth word of the first verse, or *Wayedhabbēr*, "And he said," which is the opening word. The designation *Numbers* originated with the early Greek translation known as the Septuagint; it was suggested by the fact that the opening chapters narrate the numbering of the people who came out of Egypt; consequently, the name is meant to be descriptive of the contents of at least a portion of the book. A similar name was in use among the Jews after the opening of the Christian era, for in the Mishnah appears the designation "The fifth of the mustered."

Contents.—The early chapters of Numbers are closely connected with the books of Exodus and Leviticus; the closing chapters with Deuteronomy. The book may be divided into three parts: (1) Events before Mount Sinai (i, 1-x, 10); covers a period of 19 days, beginning one month after the setting up of the tabernacle (compare i, 1 with Exod. xl, 17). (2) Wanderings from Mount Sinai to the Plains of Moab (x, 11-xxii, 1) from the 20th day of the second month of the second year to the 40th year. (3) Happenings in the Plains of Moab (xxii, 2-xxxvi, 13); covers the closing months of the desert wanderings.

The contents may be summarized as follows: The book furnishes an account of the wanderings of Israel from the encampment before Mount Sinai to the settlement east of the Jordan. The arrival of Israel at Mount Sinai is recorded in Exod. xix, 1; the departure from there in Numbers x, 11ff; the events recorded in i, 1-x, 10 took place during the stay at Mount Sinai. Thus the book opens with an account of the census taken of the people who came out of Egypt, which is followed by a long legal section. Then comes the record of the wanderings during the period extending from the second to the 40th year: the survey of Canaan, the refusal to enter the land, the march back to the

wilderness and various rebellions. The more important events of the first 10 months of the 40th year are narrated in detail: the march around Edom, the death of Aaron, the conquest of the land of the Amorites and of Bashan, the episode of Balaam, the sin of Baal-peor, the second census, the slaughter of the Midianites and the settlement east of the Jordan. Interspersed with the historical narratives are legal sections.

Composition.—Like the preceding books of the Pentateuch, Numbers in its present form is a compilation of material taken chiefly from three originally separate sources, commonly designated by the letters J, E and P. (For proofs of this assertion and for the significance of these symbols see article **PENTATEUCH**). The P sections are easily separated from the J and E sections, but it is rather difficult to separate the J material from the E material. The first section (i, 1–x, 10) is taken entirely from P; in the second section (x, 11–xxii, 1) the JE material predominates, whole chapters being derived from the combined JE (for instance, chapters xi, xii, xvii, xviii, xix); the closing section (xxii, 2–xxxvi, 13) is made up largely of extracts from P (for instance, the whole of chapters xxvi–xxxi and xxxiii–xxxvi); chapters xxii–xxiv (except xxii, 1) are from JE; in the rest of the section material from the several sources is closely woven together. Of the whole book only about one-fourth comes from JE. The characteristics of the several sources are discussed in the article **PENTATEUCH**. For an analysis of the book according to the several sources consult any modern commentary on Numbers or any Old Testament Introduction. The contents of each source in an English translation are arranged consecutively in C. F. Kent, 'The Student's Old Testament,' and E. S. Brightman, 'The Sources of the Hexateuch'; compare also Carpenter and Battersley, 'The Hexateuch' and W. E. Addis, 'The Documents of the Hexateuch.'

The Legal and the Narrative Sections.—The laws contained in Numbers belong to P; no laws taken from JE are found outside of Exodus. These laws, though dealing with a variety of subjects, are chiefly ceremonial in nature. They are arranged in four groups; in Division I, chapters v–ix; in Division II, chapters xviii, xix; in Division III, chapters xxviii–xxx and xxxiii–xxxvi. Though late in their present form, there is every reason for believing that the legal sections contain some very ancient elements. The narrative sections are of unequal historical value. Naturally, the JE sections, written in the 9th and 8th centuries from an objective prophetic point of view, are of considerable importance; though even they were written primarily not to record history but to reveal the hand of God in the early history of Israel. The P sections, written later, with a pronounced priestly bias, are less reliable as historical sources for the period of the Exodus; on the other hand, they throw much light on conditions at the time the narratives assumed their present form.

Poetic Fragments.—The book of Numbers has preserved several poetic fragments: (1) The Priestly Benediction (vi, 24–26), embodied in P, but pre-exilic in origin. It may have been a part of the Temple ritual in Jerusalem

prior to the exile, but its date cannot be determined. (2) The Song of the Ark (x, 35, 36), must have originated at a time when the ark was still moved from place to place, that is, before the erection of the Solomonic temple. The first two lines seem to have been addressed to the ark as it was carried into battle, the rest on its return to the sanctuary. (3) A Song concerning the boundary line between Moab and Israel (xxi, 14, 15). Only a fragment of this has been preserved, whose meaning in doubtful and origin uncertain. (4) The so-called Song of the Well (xxi, 17, 18), an ancient folk-song, the origin and occasion of which are uncertain. (5) Song concerning Heshbon, the city of Sihon (xxi, 27–30). This fragment presents numerous difficulties; the text is corrupt, as a result the meaning is obscure and the date uncertain. (6) The Oracles of Balaam (chapters xxiii, xxiv). Chapter xxii and some verses in 23 and 24, written in prose, furnish the historical setting for the utterances of Balaam, which are poetic in form. There are seven poems, four longer ones centring around Israel, and three shorter ones containing threats against other nations: (a) Israel's exaltation (xxiii, 7–10); (b) Israel's conquering power (xxiii, 18–24); (c) Israel's prosperity and strength (xxiv, 3–9); (d) Israel's conquering king (xxiv, 15–19); (e) destruction of Amalek (xxiv, 20); (f) devastation of the Kenite territory (xxiv, 21, 22); (g) an oracle of uncertain meaning (xxiv, 23, 24). It has been suggested, with some degree of probability, that xxiv, 1–19 is not the continuation of chapter xxiii but a duplicate account of the same incidents. If so, poems c and d may be simply different recensions of a and b, the former representing the tradition current in the south, the latter that current in the north. As to the date of the poems there exists much uncertainty. For the poems centering around Israel, Gray considers a date prior to Saul out of the question and a date earlier than David improbable; they may well have originated during the period of the early monarchy. Of the shorter poems the first, against Amalek, may reflect conditions in the age of David (compare 1 Sam. xxx); but the other two are usually assigned to a later date; that against the Kenites seems to presuppose the rise of Assyria, and the last oracle the dawn of Greek power.

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NUMBERS, Theory of, in its elementary part, is that branch of mathematics which deals with the properties of integers. The scope of the whole subject can be best indicated after an explanation of the idea of a *modular system* of numbers, which is fundamental in it. An adequate treatment of certain problems relating to integers requires that the system of integers (including zero) under consideration be enlarged by the introduction of certain other numbers, and that the system, so enlarged, shall retain the fundamental properties of the original system. The latter is such that it contains the difference (and hence the sum) of any two of its numbers, and this property is selected as fundamental. A system of numbers which has this property is called a *modular system*; it always contains (1) the number zero, (2) the negative of each of its numbers, (3) an infinite (see ASSEMBLAGES, GENERAL THEORY OF) number of numbers. In general it is possible to select a certain set of numbers of the system, called the basis of the system, as say, $m_1, m_2, \dots, m_n$, called the elements of the basis, and to express every member of the system in the form $x_1m_1 + x_2m_2 + \dots + x_nm_n$, where the x 's are integers. The theory of numbers is the study of certain modular systems.

DIVISIBILITY OF INTEGERS.

The set of integers, which is a very simple modular system having one element, unity, in its basis, has the additional property that it contains the product of every two of its numbers; and two large classes of relations of integers are called *additive* and *multiplicative* since they depend mainly upon ideas of addition and multiplication respectively. The introductory part of the subject deals mainly with the latter relations. For the sake of brevity there will be assumed from Arithmetic and Algebra (see ALGEBRA) the commutative and associative laws for addition, the commutative, associative and distributive laws for multiplication, the meanings of divisor, or factor, common divisor, greatest common divisor (G. C. D.), multiple, common multiple, least common multiple (L. C. M.), [a, function, and the processes for finding the G. C. D. and L. C. M. of two integers.

Factorization of Numbers.—An important and at times an exceedingly difficult problem is that of finding all divisors of a number. Certain numbers have no divisors except themselves and unity. These are called *prime*. (Two numbers which have no common divisor except unity are called *relatively prime*). All divisors of a number may easily be found if all of its prime divisors are determined, but no satisfactory method has been devised for such determination. Nevertheless certain principles are clearly understood.

Consider now one modular system consisting of all positive and negative multiples of an integer a , and another consisting of all such multiples of another integer b . It may be shown that (1) the set of numbers consisting of all of the numbers of these two systems and also of the sums of all pairs of them is a modular

system consisting of the positive and negative multiples of d , the G. C. D. of a and b . For if any two integers of the first system be ax_1, ax_2 , and if any two of the second system be by_1 and by_2 , then any two of the third system can be represented by $ax_1 + by_1$ and $ax_2 + by_2$. The difference of these, $a(x_1 - x_2) + b(y_1 - y_2)$, is in the third system, since it is the sum of $a(x_1 - x_2)$ and $b(y_1 - y_2)$, which are in the first and second systems, respectively. The third system is, then, a modular system, and consists of all multiples of its smallest number, n , say. Since a and b are in the third system, n must be a common divisor of a and b . But every number of the system, being of the form $ax + by$, is divisible by d . Hence $n = d$.

As an example, let $a = 6, b = 8$, whence $d = 2$. The three systems are respectively
 $\dots, -24, -18, -12, -6, 0, 6, 12, 18, 24, \dots$
 $\dots, -32, -24, -16, -8, 0, 8, 16, 24, 32, \dots$
 $\dots, -8, -6, -4, -2, 0, 2, 4, 6, 8, \dots$

Corollary (2). If two integers a, b , have their G. C. D. equal to d , there exist integers x, y , such that $ax + by = d$. (This is true even if $d = 1$).

Example 1. $a = 6, b = 8, d = 2; 6 \cdot 3 + 8(-2) = 2$.

Example 2. $a = 5, b = 6, d = 1; 5 \cdot 5 + 6(-4) = 1$.

The following result is used repeatedly in later arguments:

Theorem (3). If of three numbers a, b, c , two of them, a and b , are relatively prime, then every common divisor of ac and b is a common divisor of b and c . For let ac and b have a common divisor d . Since a and b are relatively prime there exist numbers x and y , such that $ax + by = 1$. Then $acx + bcy = c$. But d is a divisor of acx and bcy , and hence of c . It is therefore a common divisor of b and c .

Corollary (4). If a and b , and also b and c , are relatively prime, so are ac and b .

A theorem of fundamental importance in relation to the factorization of numbers may now be proved.

Theorem (5). A positive integer can, in one and only one way, be represented as a product of prime factors.

If possible, let an integer n be expressed by two different products of prime factors, $p_1p_2\dots p_k$ and $q_1q_2\dots q_l$, where in each case the order of the factors is such that a smaller factor never follows a larger. Then $p_1p_2\dots p_k = q_1q_2\dots q_l$. If any factor, as p_2 , were not present in the second product it could not be a divisor of that product, nor of n (see 4). A continuation of this argument yields a *reductio ad absurdum*.

For large numbers the problem of factorization is very difficult, but for small ones it is comparatively easy. For since the smallest prime factor of a number n , not itself a prime, cannot exceed $\sqrt{n}$, it is necessary to test only prime factors up to $\sqrt{n}$.

Distribution of Primes.—The proof that the number of primes is infinite was given by Euclid, and is singularly brief. The assumption that there is a largest prime, p , is shown to be incorrect by the consideration of the number $1 + p$, which, not being divisible by any number less than $(p + 1)$, must either be divisible by a prime greater than p or be a prime itself.

The law of distribution of primes has been

carefully studied, but the investigations cannot be presented here, the law being a very obscure one. Two special results are of some interest. It has been shown that between any number n (>1) and its double, $2n$, there is at least one prime, and also that any number, m , of consecutive numbers can be found, no one of which will be prime.

Number and Sum of Divisors of a Number.

—If the number 55125 be expressed by means of its prime factors the result is $3^3 5^3 7^2$. Now every divisor of this number must be a product of powers of 3, 5 and 7. In fact, all of these divisors are terms in the expansion of the product $(1+3+3^2)(1+5+5^2+5^3)(1+7+7^2)$. This expansion contains $(2+1)(3+1)(2+1)=36$ terms. Hence the number of divisors of 55125 is 36. Again, the product mentioned is equal to the sum of these 36 divisors.

Also $(1+3+3^2)=\frac{3^3-1}{3-1}$ (see ALGEBRA, *Geometrical Progression*). Hence the sum of all divisors of 55125 is $\frac{3^3-1}{3-1} \frac{5^4-1}{5-1} \frac{7^3-1}{7-1}$. In

general, if $n=p_1^{a_1} p_2^{a_2} \dots p_k^{a_k}$ the p 's being primes, (6) the number of divisors of n is $(a_1+1)(a_2+1)\dots(a_k+1)$, and (7) their sum is

$$\frac{p_1^{a_1+1}-1}{p_1-1} \cdot \frac{p_2^{a_2+1}-1}{p_2-1} \dots \frac{p_k^{a_k+1}-1}{p_k-1}$$

Number of Numbers less than a Given Number and Relatively Prime to It.

The number $10125=3^3 5^3$. The numbers less than 10125 and relatively prime to it are those which are not divisible by 3 or by 5. From the first 10125 numbers all multiples of 3, and all multiples of 5, should be omitted. There are $\frac{1}{3} \times 10125$ multiples of 3, and $\frac{1}{5} \times 10125$ multiples of 5, but some of these, the $\frac{1}{15} \times 10125$ multiples of 15, are multiples of both 3 and 5. Hence the number of numbers relatively prime to and less than 10125 is $(10125 - \frac{1}{3} \times 10125 - \frac{1}{5} \times 10125 + \frac{1}{15} \times 10125) = 10125 (1 - \frac{1}{3}) (1 - \frac{1}{5})$, since the multiples of 15 should not be removed twice. In general, if $n=p_1^{a_1} p_2^{a_2} \dots p_k^{a_k}$ it may be shown that (8) the corresponding number, which is always denoted by $\phi(n)$, is $n \left(1 - \frac{1}{p_1}\right) \left(1 - \frac{1}{p_2}\right) \dots \left(1 - \frac{1}{p_k}\right)$. For example

$\phi(7)=6$, $\phi(10)=4$, $\phi(p)=(p-1)$. This important function $\phi(n)$ has the notable properties. (1) If n and m are relatively prime $\phi(nm)=\phi(n)\phi(m)$; (2) If $d_1, d_2, d_3, \dots$ are all of the divisors of n , $\phi(d_1)+\phi(d_2)+\phi(d_3)+\dots=n$.

THEORY OF CONGRUENCES.

Consider the modular system consisting of all positive and negative multiples of a positive integer m . Then any integer either is in this system or differs from a number of it by a number r , less than m . Hence every integer is expressible in the form $mq+r$. Integers may then be divided into m classes, all those in any class having the same remainder when divided by m . Then the difference between two numbers of the same class is divisible by m , and these two

numbers are said to be *congruent with respect to the modulus* m . If n_1 and n_2 are in the same class, this relation is written $n_1 \equiv n_2 \pmod{m}$, a notation which is due to Gauss. The statement is called a *congruence*. Thus the modulus being 3, the numbers 7 and 16 belong to the same class, since each gives the remainder 1 when divided by 3. Then $7 \equiv 16 \pmod{3}$, or in other words, the difference between 7 and 16 is a multiple of 3.

The following are fundamental properties of congruences, the modulus, when omitted, being m :

- (9) If $a \equiv b$, and $a \equiv c$, then $b \equiv c$.
- If $a \equiv b$, and $c \equiv d$, then $a+c \equiv b+d$, and $ac \equiv bd$.
- If $a \equiv b$, then $ca \equiv cb$.
- If $ca \equiv cb$, and if d is the G. C. D. of c and m , then $a \equiv b \pmod{\frac{m}{d}}$.

Between the methods used and the results obtained in the theory of congruences and the methods and results in the apparently unrelated field of the theory of equations (see EQUATIONS, GENERAL THEORY OF), there is a parallel so striking that one acquainted with the latter can promptly select, and even solve, a great many of the most important problems relating to the former. Thus congruences may state relations between known quantities only, or between known and unknown quantities, in the latter case suggesting the problem of finding possible values of the unknown quantities. Congruences of the latter sort may be classified either according to the number of the unknown quantities or according to the degrees of the expressions with respect to these unknown quantities. Thus if $f(x, y, z, \dots)$ is an algebraic expression containing several unknown numbers $x, y, z, \dots$, as well as known numbers, the standard problem is: *To determine integral values for $x, y, z, \dots$ such that the congruence $f(x, y, z, \dots) \equiv 0 \pmod{m}$, shall be true.* A set of values of the sort required constitutes a *solution* of the congruence. If there is only one unknown number in the congruence, any value of that number for which the congruence is true is called a *root* of the congruence. Two roots which are congruent are regarded as the same root.

Consider now congruences which contain only one unknown number x , and in particular, congruences of the form $f(x) = a_0 x^n + a_1 x^{n-1} + \dots + a_n \equiv 0 \pmod{m}$ where $a_0, a_1, \dots, a_n$ are integers, a_0 being relatively prime to m . Then by methods parallel to those of the theory of equations it may be proved that when the modulus is prime (1) the congruence has not more than n different roots; (2) if r is any integer, the remainder free from x obtained when $f(x)$ is divided by $(x-r)$ is congruent to $f(r) \pmod{m}$; (3) if r is a root of the given congruence, the remainder obtained by dividing $f(x)$ by $(x-r)$ is congruent to zero $\pmod{m}$.

Linear Congruences.—The general congruence of the first degree in x , namely, $ax + a_1 \equiv 0 \pmod{m}$, a_0 being relatively prime to m , has just one root. For of the m numbers $a_0, 2a_0, 3a_0, \dots, (m-1)a_0, ma_0$, no two differ by a multiple of m (see 9). Hence just one of them belongs to each of the m classes of numbers. If ka_0 and $-a_1$ belong to the same class, then

$\{ka_0 - (-a_1)\}$ or $ka_0 + a_1$ is a multiple of m . Hence $ka_0 + a_1 \equiv 0 \pmod{m}$; and k is a root of the congruence.

Corollary: The congruence $ax \equiv 1 \pmod{m}$ (a_0 relatively prime to m) has just one root, a_0 , say.

In this case the numbers $a_0, \bar{a}_0$ are called *associate numbers*.

If in the congruence $ax + a_1 \equiv 0 \pmod{m}$, a_0 and m have as G. C. D. the number d , the congruence has no roots unless a_1 is divisible by d , in which case it has d of them. For suppose that $a_0 = a'_0 d$, $a_1 = a'_1 d$, $m = m' d$. Then if $a_0 x + a_1$ is divisible by m , $\frac{a_0 x + a_1}{d}$ or $a'_0 x + a'_1$ is divisible by m' , and conversely. But the congruence $a'_0 x + a'_1 \equiv 0 \pmod{m'}$ is of the sort considered just above, and the numbers which satisfy it are all congruent $\pmod{m'}$. It has then only one root, say $k \pmod{m'}$. All numbers which satisfy the latter congruence are roots of the former, but they are not all congruent $\pmod{m}$. On the contrary, with respect to the modulus m , there are d distinct sets, and the original congruence has d roots $k, k + m', k + 2m', \dots, k + m'(d-1)$.

The last result furnishes an interesting example of the failure of the parallel between the theory of congruences and the theory of equations. Of these there are not a few. They generally occur when the modulus is not prime. Another interesting example is the possibility of solving several simultaneous congruences in one unknown quantity, the moduli of the congruences being different.

Theorems of Fermat and Wilson.—Before discussing the various classes of congruences of higher orders it is convenient to exhibit two of the most interesting results of the whole subject. They are the theorems of Fermat and Wilson.

FERMAT'S THEOREM. If p is any prime number, and a any number less than p and greater than zero, then $ap^{-1} \equiv 1 \pmod{p}$.

Consider the set of numbers $a, 2a, 3a, \dots, (p-1)a$. No two of them are congruent $\pmod{p}$. Hence they are congruent to different ones of the numbers $1, 2, 3, \dots, (p-1)$, though not necessarily in this order. The product of the first set is congruent to the product of the second set, whence $ap^{-1} |p-1 \equiv |p-1 \pmod{p}$. Then $ap^{-1} \equiv 1 \pmod{p}$ since $|p-1$ is relatively prime to p (see 9).

The statement of Wilson's theorem is: If p is any prime number, $|p-1 \equiv -1 \pmod{p}$.

Both of these theorems have been so generalized as to apply to the case in which the modulus is not prime.

Fermat's theorem furnishes another instance of the failure of the parallel between the theory of numbers and the theory of equations. For from it we see that the congruence $x^p \equiv x \pmod{p}$ is satisfied by every number of the system of integers.

Congruences of Higher Orders.—The general quadratic congruence may be written $a_0 x^2 + a_1 x + a_2 \equiv 0 \pmod{m}$. Its solution may be reduced to the solutions of a linear congruence and of a binomial congruence of the form $x^2 \equiv a \pmod{m}$. In connection with this congruence the important questions are: (1) What

relation must exist between a and m in order that the congruence may be solvable? and (2) What are the roots of a congruence of this sort which is known to be solvable? According as the congruence is or is not solvable, a is said to be a *quadratic residue* or a *quadratic non-residue* of m .

In regard to the first question it may be noted that if $(x^2 - a)$ is divisible by m , it is divisible by every prime factor, p , of m . Hence if the congruence is solvable a must be a *quadratic residue of every prime factor of m* . It may also be proved that the product of two numbers is a quadratic residue if each number is a residue, or if each is a non-residue, but that the product is a non-residue if only one is a residue. Hence it is possible to determine whether a is a residue of m if one finds whether each prime factor of a is a residue of each prime factor of m . This procedure raises three distinct questions, for a may have as factors, $1, 2$ or odd primes. It is easy to show that, p being a prime factor of m , (1) -1 is a *quadratic residue of all primes of the form $4n+1$* (e.g., 13, 17, 29), but a *non-residue of all primes of the form $(4n+3)$* (e.g., 23); and (2) 2 is a residue of all primes of the form $(8n+1)$ or $(8n-1)$ (e.g., 17, 23), but a non-residue of all primes of the form $(8n+3)$ or $(8n-3)$ (e.g., 11, 29).

To determine whether a given odd prime, p , is a quadratic residue of another odd prime q , use is made of the famous Reciprocity-Theorem, first proved by Gauss. This theorem states that if, of two odd primes p and q , one is of the form $(4n+1)$ then each is a quadratic residue of the other, or each is a non-residue of the other; while if both primes are of the form $(4n+3)$, one is a residue or non-residue of the other according as the other is a non-residue or residue of the one. This theorem is the most celebrated one in the theory of numbers; it has been proved in a great variety of ways. Gauss himself having contributed seven distinct proofs. The application of this result and of the two preceding ones is greatly facilitated by the use of what is known as Legendre's Symbol.

Legendre's Symbol.—It is found that according as a number a is or is not a quadratic residue of p , a certain function of a and p is congruent to $+1$ or $-1 \pmod{p}$. Legendre introduced the symbol $\left(\frac{a}{p}\right)$, defining it to be $+1$, or -1 , according as a is or is not a quadratic residue of p . The three results stated may be written symbolically:

$$(1) \left(\frac{-1}{p}\right) = (-1)^{\frac{p-1}{2}}; \quad (2) \left(\frac{2}{p}\right) = (-1)^{\frac{p^2-1}{8}}; \\ (3) \left(\frac{p}{q}\right) \cdot \left(\frac{q}{p}\right) = (-1)^{\frac{p-1}{2} \cdot \frac{q-1}{2}}.$$

The use of the third result may be illustrated by taking $p=13, q=3$. Then $\left(\frac{13}{3}\right) \cdot \left(\frac{3}{13}\right) = +1$.

But two congruent numbers are both residues or both non-residues. Hence, since $13 \equiv 1 \pmod{3}$, $3, \left(\frac{13}{3}\right) = \left(\frac{1}{3}\right)$. Moreover 1 is a quadratic resi-

idue of every number. Hence $\left(\frac{1}{3}\right) = +1$:

and so $\left(\frac{3}{13}\right) = +1$. Accordingly 3 is a quadratic residue of 13.

The difficulties of solving a binomial quadratic congruence which is known to be solvable are relatively slight, and the question will not be considered here.

The theory of congruence of degrees higher than the second is far from complete. Considerable attention has been given to binomial congruences of the form $ax^n + a \equiv 0 \pmod{m}$. Gauss found that he could not properly state the reciprocity-theorem for the case $n=4$, without making a study of the modular system of numbers of the form $a+b\sqrt{-1}$, a and b being integers. His results have been generalized and much more general modular systems have been studied. An account of these cannot be given here.

Other Branches of the Subject.—The theory of congruences belongs to the multiplicative part of the subject. Another notable branch is the theory of forms, which is essentially additive. In it the standard problem is "Given an expression $f(x, y, z, \dots)$ in which all of the numbers are integers, to determine whether by a choice of integral values for certain unknown quantities the expression can be made to assume a specified integral value." Thus in the case of the quadratic form $ax^2 + bxy + cy^2$, the problem is to find whether a specified integer m can be broken up into three integral parts of the form ax^2 , bxy , and cy^2 , and to determine in how many essentially different ways this can be done. The study of the classification of quadratic forms alone requires the use of infinite series (see SERIES) and of other agencies which at first sight seem to be entirely unrelated to the theory of integers. The theory of forms has been studied principally in connection with forms of the second order in any number of unknown quantities $x, y, z, \dots$, and forms of the second and third orders in two unknown quantities. One other branch, also of an additive nature, is the theory of partitions of numbers, the partitions of a number being the different ways of expressing it as a sum of a given number of integers. Thus the partitions of seven into four integers are $1+1+1+4$, $1+1+2+3$, $1+2+2+2$. The treatment of this subject also requires the aid of the higher analysis.

Historical Sketch.—Historically, the development of the Theory of Numbers falls into two well-defined periods, whose point of division is the year 1801. Until late in the first period the subject was not recognized as constituting a distinct branch of mathematics. The publication in 1801 of Gauss' famous 'Disquisitiones Arithmeticae' firmly established the subject as such a branch, and since that event its development has been rapid and uninterrupted.

Probably the earliest investigators in this subject were Pythagoras (580?-500? B.C.) and his followers, who were familiar with the ideas of odd and even numbers factors and multiples and primes. By the time of Euclid (about 300

B.C.) the subject included the idea of perfect numbers, that is, those which are equal to the sum of their divisors less than themselves, and of common divisors, the process for finding G. C. D., the proof that the number of primes is infinite. Diophantos (246?-300? A.D.) studied methods of finding rational solutions of indeterminate equations. His work inspired some of the best of the later writers of the first period, among them Bachet de Meziriac (1581-1638 A.D.) and Fermat (1601-55 A.D.), who edited his works. Fermat contributed several very notable results, though without proof. Among them are the theorem already mentioned in the preceding text and the theorem that no integral solutions exist for the equation $x^n + y^n = z^n$, if n is an integer > 2 . Euler (1707-1803 A.D.) proved this last theorem for $n=3$ and 4, generalized the former theorem, studied the function $\phi(n)$, stated the reciprocity-theorem and initiated the study of quadratic forms. The work of Lagrange (1736-1813 A.D.) and Legendre (1752-1833 A.D.) on quadratic forms closes the first period.

In the work which opened the second period Gauss (1777-1855) systematized the subject in much the same way as that in which Euclid brought order into the subject of geometry. He treated thoroughly the elementary theory of congruences, residues (quadratic and higher), quadratic forms and founded the modern theory of modular systems by the study of the system of numbers $a + b\sqrt{-1}$, a and b being integers. Of the many workers since Gauss' time it will suffice to mention Dirichlet, who simplified some of Gauss' methods, and made important contributions by the use of infinite series; Kummer, Dedekind and Kronecker, who considered general modular systems; and Eisenstein, Smith, Hermite, Sylvester and Minkowski, who contributed largely to the theory of forms.

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NUMERALS (from Latin *numeralis*, from *numerus*, number). In mathematics the word is commonly used to designate characters which represent numbers, as in speaking of the Roman numerals. In very ancient times there were approximately as many systems of numerals as there were languages, and particularly with the higher numerals there were often quite radical modifications from century to century. The numerals most generally used by the mathematicians of classical times were the Greek; of mediæval times, the Roman; of modern times, the Hindu or Arabic. Of these, the first two were but little used in actual computation, the abacus (q.v.) answering for this purpose.

The primitive Greeks, like other early peo-

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NUMERATION, the reading off of numbers that are expressed in figures. As shown in NOTATION (q.v.), the first figure on the right hand expresses units; the next, tens; the third, hundreds, and following the same nomenclature with the next three figures, we have the fourth expressing the units of thousands; the fifth, tens of thousands; the sixth, hundreds of thousands. The seventh figure, in like manner, expresses units of millions; the eighth, tens of millions, and the ninth, hundreds of millions. When this method is consistently followed out, as is the case with American, French and other Continental arithmeticians, the fourth period, or group of three figures, is denominated billions, the first figure of it (the 10th from the extreme right) being units of billions, the next, tens of billions, etc. Read in this way, the figures 27,684,563,904,209 express twenty-seven trillions, six hundred and eighty-four billions, five hundred and sixty-three millions, nine hundred and four thousands, two hundred and nine units. If every number had an independent name an ordinary lifetime would not be sufficient in which to learn them up to even 1,000,000. In Great Britain there is a variation in the mode as given above, the only effect of which is to render it more complicated: thus, after units of millions come tens and hundreds of millions, but then instead of billions we have, according to the current usage, thousands of millions; after this, tens of thousands of millions and hundreds of thousands of millions, and then billions, which occupy the 13th figure from the right, and are reckoned in the same way as millions, so that the next unit or trillions does not come in till the 19th figure. The above number, according to the British mode, would be read twenty-seven billions, six hundred and eighty-four thousand-five hundred and sixty-three millions, nine hundred and four thousands, two hundred and nine units. The first method is perfectly symmetrical, keeping throughout to divisions of three figures, the second only keeps to this division up to hundreds of millions, when it changes it for a division into parcels of six figures, which are named from units up to hundreds of thousands of units. The latter mode is, however, gradually falling into disuse. See NOTATION, ARITHMETICAL; NUMBERS, THEORY OF.

NUMERICAL APERTURE, a term used in optics; the method by which the illuminating and resolving power of high-power microscopic objectives is calculated. Since it became customary to interpose water, oil or other fluid between the object and the lens, it is found that a water immersion lens of $97\frac{1}{2}^\circ$, and an oil immersion of 82° , give equal results to a dry or air lens of 180° . This obviously depends on the diameter of the back lens of the objective and on the refractive index of the medium between lens and object. It is expressed by the formula $n \sin u$, where n is the refractive index of the medium—air or fluid—and u the semi-angle of aperture. It is thus found that an oil-lens of 180° has a numerical aperture of 1.52 against 1.00 for 180° in air. This only represents the comparative diameters of the effective pencils, and the relative illumination is, of course, obtained by squaring the numerical apertures to get the comparative areas of the pencils. We thus find that an oil-lens of 180° gives 2.310 the illumination of a dry object of 180° .

NUMERICAL NOTATION. Musical notation has been the subject of many experiments from time immemorial, and our present system is the result of long-continued development. At one time letters were used to represent tones; then came the peculiar signs known as *neumæ*; and these in turn were developed into the notes of to-day. But theorists have not been satisfied with the present system, and have tried to improve upon it in various ways. One innovation is that of designating the tones by means of numerals instead of notes. Although the ancient Persians already had a method of this kind, and Souhaity in the 17th century adopted a similar plan, it is Rousseau with whom the device in question is more especially associated. In 1742 he read a paper before the French Academy of Sciences entitled 'Projet concernant de nouveaux signes pour la musique,' in which he developed his ideas on the subject. Notes, as mentioned, were to be replaced by numbers, and the various octaves and accidentals were to be indicated by special signs. The plan did not meet with much favor, but similar schemes were from time to time brought forward again, largely by compatriots of the famous French thinker. Only one of these, embodied in the well-known Galin-Paris-Chevé system, has gained wider prominence. But the numerals in this system are only used in preparation, not replacement, of the ordinary notation, and there are other features on which the comparative popularity of the system in part depends.

It is doubtful whether any plan which endeavors to supersede the present method by means of numbers will ever be able to gain a secure foothold. In the first place, our system appears actually to be as good a one as it is possible to construct. The defect of the numerical method is that it does not appeal sufficiently to the faculty of perception. It involves the understanding rather than the eye. Its application would seem to be limited to extremely simple passages, while the extension to more involved harmonic and polyphonic sections would entail complexities as great as or even greater than those which it seeks to avoid. The staves of our present usage are a happy symbolization of musical strings, and the notes are

equally appropriate as representations of the hammers or fingers by which these strings are set into operation. To substitute numbers, therefore, would be a step backward rather than forward.

Again, the present system has been established so long that it is almost out of the question to think of replacing it with another. The attempt to do so would resemble the endeavor to establish a new system of weights and measures, or alter the spelling of entire languages. Even these latter changes, desirable though they may be, have been found impossible to effect in some countries. There is little hope, therefore, for a reform which does not promise advantages of a character so decided as to compensate for all the inconveniences incident to a change.

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NUMIDIA, nū-mīd'ī-ā, Africa, the ancient Roman name for the region now corresponding roughly with modern Algeria. It was divided among various tribes, but after the Second Punic War it was united under Masinissa, and several of its rulers became noted in Roman history, more especially Jugurtha. In 46 B.C. it became a Roman province. Under the Roman emperors Numidia attained a high degree of prosperity, and Christianity was in a flourishing condition here. It was afterward conquered by the Vandals, later by the Arabs and in modern times by the French.

NUMISMATIC AND ARCHÆOLOGICAL SOCIETY, The American. See AMERICAN NUMISMATIC AND ARCHÆOLOGICAL SOCIETY.

NUMISMATICS (Greek, *νόμισμα*; Latin, *numisma*, a coin) in the science which treats of coins, their origin and technique, their history, mythology and art. A coin (Low Latin, *cuneus* = a die, and then, coin) is a piece of metal of a determined shape and weight, bearing a mark, device or type stamped upon it by government authority, which constitutes an official guarantee of the fineness and weight of the metal. The coin serves as an official and guaranteed medium of exchange, and is thereby distinguished from the medal which is a commemorative piece resembling the coin externally but having no exchange function; and also from tokens, counters, etc., which are only semi-official in origin and do not possess the permanent legal character of the coin.

It is clear from the foregoing that objects of a monetiform character, such as medals, tokens, counters, medalets, metallic tickets and the like, while included in the study of numismatics according to its widest acceptance, are only brought within the scope of the science by a considerable extension of the term. Their study, while interesting and important and sometimes indispensable, does not form the chief subject of investigation. Neither does our modern paper currency, nor do the earlier forms of money before the invention of coined money, such as shell-money, ring-money, etc., nor the ancient and modern substitutes for metal coinage in various materials such as wood, leather and shell come within the strict definition of the subject. All such objects, metallic or not, monetiform or otherwise, are studied as subordinate branches of the science

whose main point of interest is the coin. Just outside and yet partly within the definition fall the official and private commemorative insignia called decorations or orders, which, including as they do medals issued in war and peace to be worn as decorations, can scarcely be denied a place in the family group. These, then, are the widest limits of the science. The field covers the coinages of all countries from the earliest times to the present day, and it will only be possible here to indicate the general outlines of the two chief branches, coins and medals.

Coins.—The question of the origins of coinage is to-day well established. Coins were independently invented in western Asia, more precisely on the coast of Asia Minor, and this invention is the starting point of the Greek and Roman series. Again, coins appear to have been invented independently in China and also in India, in the latter case at a considerably later date. The subject is most naturally divided into four groups, Oriental, Greek and Roman, mediæval and modern coinages. Under Oriental are classed all coins emanating from the Far and Near East with inscriptions in Chinese, Arabic, Persian and Indian, i.e., all Eastern languages except (1) coins of Semitic peoples in close proximity to ancient Greece, namely, the Jews and Phœnicians, (2) the coins of the ancient Persians and the Bactrian rulers of India which are usually, because of their close relationship, grouped with the Greek coins. Oriental coins may also be described as Asiatic and they extend over the whole period embraced by our other three divisions, Greek and Roman, Mediæval and Modern. Greek and Roman coinage comprises those coins bearing Greek, Latin and allied inscriptions (with the inclusions above noted), which were struck by the peoples of the lands surrounding the Mediterranean basin and in the far-way colonies of those ancient civilizations. The period of issue is from the invention of coined money about 700 B.C. to the fall of the Roman Empire, 476 A.D. Greek coins proper fall within the chronological limits, 700 B.C. to 268 A.D. (death of Gallienus, Roman emperor). Roman coins begin as late as the middle of the 4th century, or 338 B.C., and extend to 476 A.D.

Mediæval coinage includes all European coinages from the dissolution of the Roman Empire down to about the 16th century. The line of demarcation between mediæval and modern coins is to be found in the technical execution of the piece. The "milled" coin, that is, one struck by a "mill and screw" press in place of the hand-wielded hammer, marks the beginning of modern machine methods of striking. The process of striking coins by means of a screw press instead of by hand began in England about 1651 (and still earlier in France), but was not generally adopted until 1662. The greater and ever-increasing regularity and mechanical exactness achieved by machinery led finally to the complete mathematical symmetry of the modern coin.

Greek and Roman Coins.—The most ancient civilizations preceding that of the Hellenes or Greeks had not made the important discovery of coining money. Among the peoples of Assyria and of Egypt, among the Phœnicians and the pre-Hellenic populations, known as Minoan (Cretan) or Mycenaean, coins were un-







known, although a form of money consisting of metal in lumps, rings and bars was employed in exchange. The credit of adjusting a lump of metal to a fixed weight and stamping it with a mark must be given to the Greeks of Asia Minor living along the coasts of Ionia. Ancient tradition seems to assign the invention to the Lydians of Asia Minor, and the truth is probably that the Lydians and the Ionian traders or bankers issued the first coins of the Western World. There are no fixed types on these earliest coins, and this fact and other considerations lead to the view that the issues were neither civic nor regal, but somewhat private in their nature. These pieces are bean-shaped lumps of a mixed metal called electrum found in Ionia as a natural alloy consisting of gold and silver in a variable composition. The obverse or face of the coin is the side which at first bears the device or type. An example of a very primitive coin without any type is shown in plate I, 1. The obverse is merely roughened while the reverse has three irregular punch marks or incuses. Animal types are very common devices on the earliest coins, e.g., the stag (plate I, 2), the lion (plate I, 3) and lion and bull confronting (plate I, 4). The coin with a stag (unique, British Museum Collection) is remarkable for the Greek inscription reading: "I am the badge of Phanes," and was perhaps struck at Ephesus. At about the same time as the earliest Ionian coins, i.e., about 650 B.C., arose the silver coinages of Ægina, Corinth, Chalcis and Eretria (in Eubœa) in Greece proper. The coins of Athens, about 594 B.C., are among the earliest that show double types, i.e., a device on both obverse and reverse. The early Corinthian piece, called a stater or standard coin (plate I, 6) and the primitive currencies of Athens (plate I, 7) and Ægina (plate I, 8) formed together with the electrum staters of Asia Minor the chief currency of the period 700-480 B.C., the epoch of archaic art.

To Cræsus of Lydia, 561-546 B.C., belongs the credit of introducing a coinage of pure gold and silver, 10 of the silver pieces passing for one of the gold. These gold Creseids or staters of Cræsus (plate I, 4) are the earliest gold coins known, if we except the occasional pieces of the archaic electrum stater class in which the gold contents are much higher than the average (plate I, 3). The Creseids are at any rate the earliest pure gold coins. These were followed by the pure gold darics (plate I, 5) of the Persian conquerors of Lydia, named after Darius the Elder (521-486 B.C.), who issued a gold and silver coinage which became, like that of Cræsus, a state coinage of great proportions. Thus early was a standard gold coin invented which is the prototype of our modern standard gold coin, the English pound and French 20-franc piece, etc. The darics, like the electrum staters of Cyzicus in Asia Minor, and the silver tetradrachms of Athens, Ægina, etc., formed a sort of international coinage which passed readily in all the markets of the ancient world. Plate I, 9, shows a tetradrachm of Syracuse of the period about 500 B.C. still archaic in style. An intervening style called the transitional arose after the end of the Persian wars, 480 B.C., lasting for about 60 years and led up to the great blossoming of Greek art in the 4th century. Among the finest creations of Greek numismatic art are the

large coins known as Syracusan medallions, the decadrachms struck in Sicily about 413 B.C. They were victory coins issued after the defeat of the Athenians by the Syracusans. These masterpieces of die-engraving are the work of artists who signed their names on the medallions. Plate I, 10, is a decadrachm of Cimon signed KIM (Kimon) on the bandeau of the nymph's head on the obverse. Plate I, 11, is the work of Euaenetus signed EYAINET (Euainetos) beneath the head of the obverse. In plate I, 12, we have an example of the coinage of Alexander the Great which had a very wide circulation in Asia Minor following upon his conquest of the Persian Empire in 331 B.C. After Alexander's death in 323 B.C. these tetradrachms continued to be issued for 100 years or more. The conquests of Alexander extended even to the Indus (327 B.C.) and his successors founded an empire in Bactria, thus carrying the Greek types far to the East. The portraits on the Bactrian issues (plate I, 13—Antimachus) are very realistic and purely Greek in style.

The earliest coins of the Roman series are those issued for the Roman population in Italy and consist of large cast bronze issues of a most unwieldy size. The more primitive currency consists of irregular bronze lumps or ingots called *aes rude*. The next currency, *aes grave*, is regular in its shape which is circular and the coins weigh about a pound (Fig. A).



FIG. A.

These coins were issued about 335 B.C., and there were various subdivisions of the standard piece or *As* which is here represented bearing the head of Janus. Under the head horizontally is the mark of value, 1, or unit. The *aes grave* currency was issued in six denominations, viz., the *as*, the *semis* (half), *triens* (third), *quadrans* (fourth), *sextans* (sixth) and *uncia*, ounce or twelfth. At first these were of the liberal (pound) weight, but the system suffered a succession of reductions in weight from 335-89 B.C., at which final date the *As* had a minimum weight of one ounce or one-tenth of the old Oscan pound of 273 grams. The silver *denarius* or piece of 10 asses, with its half (*quinarius*) and quarter (*sestertius*) was first

struck in 268 A.D., and this with the bronze currency just described above forms the chief coinage of the Republican period. The Republican silver coins used to be known as Consular or "family" coins from the presence on them of the names (at first abbreviated) of officials who used the Roman gentile name. These officials were monetary magistrates, not consuls, although the consuls may have originally been in charge of the issue of coinage. The Republican silver and bronze coinage has been arranged chronologically in the catalogue of the British Museum, but the sales catalogues continue to follow the old family, or gentile, alphabetical system. Under the Roman emperors the currency was composed of the gold *aureus* (plate I, 15—Augustus, 29 B.C.—14 A.D.), the silver *denarius*, and the new coinage consisting of the large brass coin called the *sestertius* (of four asses) (plate I, 14—Nero, 54–68 A.D.), the middle brass, *dupondius* (two asses) and the copper pieces, the *as*, *semis* and *quadrans*. The obverses bear portraits of the emperors and the imperial family. The art is often excellent in the first two centuries after which it suffered a decline. The head of Faustina the Younger (plate I, 16), the wife of Marcus Aurelius, is a good example not of the finest, but still of excellent work. The appearance of the portraits of women of the imperial family is not to be understood as signifying that such coins were struck by the sovereign right of the empress or daughter of the emperor, for it was merely in the nature of a compliment that the portraits of the imperial family appeared on the coins.

The coins of Phœnicia, Parthia and Judæa are commonly classed with Greek coins. They are described at this particular point because we are now passing from the coinage of the Western world to that of Asia. The coins of Phœnicia, partly Hellenic and partly Oriental in character, show many interesting types of Phœnician deities. The Phœnician galley and the dolphin bear witness to the maritime character of the country. The two great mints of Sidon and Tyre issued abundant coinages. Plate II, 1, a coin of Tyre, 450–400 B.C., shows the dolphin above the waves and reverse, owl accompanied by the Egyptian royal emblems, the crook and flail. The independent coins of the Jews were probably first struck during the reign of Simon Maccabæus under the right of coinage granted by Antiochus VII of Syria in 139–138 B.C. The well-known shekel (plate II, 4) bears the sacred cup with the inscription "shekel of Israel" and "year 2"; the reverse has for type a branch with three buds and inscription "Jerusalem the Holy." The coins of Parthia begin in the 3d century B.C. and continue to about 220 A.D. These people gained their independence (248 B.C.) from the Seleucid kings who as successors of Alexander the Great had ruled Persia. The silver drachms and tetradrachms bear portraits of Oriental looking rulers in a Greek style. (Plate II, 1, MITHRADATES I, 174–136 B.C.). The reverse type, a Parthian archer in Oriental dress, is a fit emblem of this warlike race. The ancient Persian coinage, as we have seen above (plate I, 5), has a distinctively Western character and it was therefore described in connection with the Greek series. The Parthian coins are of Greek weight and

fabric (i.e., external appearance), and their types reveal a Greek origin. But the coins of the Sassanians, a Persian race which overthrew the Parthians (226 A.D.), are of true Oriental character. The coins are thin and flat in relief, being thus sharply differentiated from Greek coins. The types are: obverse, portrait of king in high Oriental head-dress; reverse, the Persian fire altar flanked by two attendants. The inscriptions are in Pehlevi. On the coin figured on plate II, 2 (Sapor II, 309–380 A.D.) the bust of the deity is placed above the altar where flames are usually seen. This coinage continued down to 651 A.D. when the Arabs conquered Persia.

Oriental Coins.—The Arabic coinage begins shortly after the establishment of the Arab dynasty, 661 A.D. The earliest coins are imitations in gold and copper modeled upon the coins of the Byzantine emperors of Constantinople. The Byzantine coinage (plate II, 14–17) is an outgrowth of the Roman imperial series, but as it was such a prolific currency and extended through the mediæval period, it is best treated later in connection with the mediæval coinage on which it exerted a lasting influence. Plate II, 13, shows an Oriental issue which preserves the old Byzantine types and has even an inscription in Greek, ΤΗΒΕΡΙΑΔΟ = Tiberias (mint-place in Palestine) followed by same mint-name in Arabic. It was struck probably before the orthodox Arab coinage, which began in 695 A.D. The original Byzantine prototype of the obverse is seen on the gold solidus (plate II, 12) of Heraclius I and his two sons. In Persia the Arabs copied coins of Sassanian types, bust of king and Persian fire altar (cf. plate II, 2) debased in style. Plate II, 3, shows an Arabic imitation of a Sassanian coin of Chosroes, 591–628 A.D., issued by the Arab governor in Persia, Abdullah ben Hazim, in 688 A.D. at the mint of Merv in Turkestan. Outside of the circle enclosing the obverse type is an Arabic inscription reading "In the name of God." The true Mohammedan coinage begins in 695 A.D. The Arabic issues present a striking contrast to all other coinages because of their limitation to mere legends as types, since images were prohibited. The coinage covers a vast territory and its general external characteristics are the thin fabric (true mainly for mediæval period), flatness, great regularity and good execution, especially of the earlier Arab or Cufic coins, and the almost complete absence of picture types, the conspicuous exceptions being certain imitative issues. The early coins shown in plate II, 5 and 6, belong to Haroun-el-Rashid, 786–809 A.D., well known to us from the 'Arabian Nights.' The Arab conquerors of Persia struck coins of the Sassanian types just noted throughout the mediæval period in Persia. About 1520 the coinage of the Shahs of Persia begins, and its thick *flap* (or metal piece on which the coin is struck) and flowing style of writing mark it off distinctively from the earlier Mohammedan coinages. Plate II, 7, is a coin of Shah Hussein (1694–1722 A.D.).

The earliest native coinage of India begins about 350 B.C. and consists of square, punch-marked silver and copper. Plate II, 8, shows a *purana* with the swastika, an ancient symbol, the sun and various punch-marks probably stamped

by bankers or traders as in the case of the earliest Ionian coins. A local coin struck at Taxila, single die, reverse plain (plate II, 9), bears the Buddhist symbols, the Chaitya and sacred Bodhi tree enclosed in a railing. The Kushan copper coin (plate II, 10) shows Kadphises II, king of Kabul and Northern India, 85-120 A.D., standing near an altar, Greek inscription and on the reverse, the god Siva and bull. The Kushan tribes conquered the Greek kingdom founded in the Kabul Valley by the Bactrian rulers. Thus Greek and Oriental characteristics combine.

The most ancient group of Oriental coins is that of the Chinese people who evolved a type of coinage entirely unlike the coinages of the Western world, and dating probably from just as early a date as the earliest coins of the Greeks, i.e., about 700 B.C. The coinage is of cast bronze and the shapes, which are those of various implements, knives, spades, etc., suggest the age of barter when different objects of every-day use passed as media of exchange. The familiar round coins with a square hole in the centre known as "cash" were issued at a very early period and this form of coin is still in use. A knife coin of Ming City issued during the civil wars in the 3d century B.C. is shown in plate III, 1. The mark on the blade indicates the mint place. The cash here shown (Plate III, 2) is a piece of almost pure brass of the ruler Chien Lung, 1733-96. It bears the name of the reign and the words *tung pao*, "current money," and on the reverse the name of the mint in Manchu.

The coinage of Japan is comparatively modern and began about the 5th century A.D. It consists of copper coins similar to the Chinese. Silver was not uncommon. The long ingots of base silver with various stamps impressed on them were issued in the 17th and 18th centuries. Small oblong silver pieces, rather ornamental in style, called *ichi-bu* and *ni-bu*, "one bu and two bu," were struck in the 19th century. Gold pieces were issued in the form of flat plates of oblong shape, rounded at the ends, called *o-ban* and *ko-ban*, "large plate" and "small plate." The piece here shown (plate III, 3) is a *ko-ban* and is about 150 years old. Both China and Japan have adopted a modern currency, although the old currency is still in use to-day.

Mediæval Coinage.—The Byzantine coinage forms a sort of appendage to the Roman series and is so closely connected that there is scarcely any perceptible difference between late Roman and Byzantine issues. An example of an issue of the declining empire is the gold solidus (plate II, 15) of Constantius II, 337-361 A.D., which has a Byzantine appearance but is classed with the latest issues of the Roman Empire in the East. Byzantine coinage proper begins in 491 A.D. The large bronze coin of Justinian, (plate II, 14) 527-565 A.D., shows the emperor holding the globe surmounted by a cross, a Christian emblem. The reverse is occupied by a large M, the Greek numeral for 40, indicating 40 nummi, the denomination, and below C O N for Constantinople, and at the sides A N N O XIII, 13th year of the reign, hence 539-540 A.D. This coin is therefore a dated piece and this is the characteristic ancient method of dating, which is by regnal or official years. Above the M is the Christian cross again. The two solidi

following (plate II, 16, 17) of Constans II (641-668 A.D.), and of Constantine VII with his son, Romanus II (945-959), show the emperors holding the cross; also, the globe with cross and the cross on a pedestal, all typical devices. The reverse of the former bears the figure of Christ with nimbus. These then are some of the characteristic Byzantine types: bust of emperor facing holding the globe; two emperors side by side facing; three figures standing (see plate II, 12); bust of Christ facing.

The influence of Byzantine coin types may be traced in Italy and Sicily, in Russia, in France and Germany and as far north as Denmark. The source of many mediæval types is therefore to be sought in Byzantine models. The European coinage from the fall of the Roman Empire to the rise of the empire of Charlemagne consists of barbarous, largely imitative issues struck by the Visigoths, Ostrogoths, Vandals, Lombards, Merovingians, etc. The year 800 may be taken as the beginning of the true mediæval coinage for the silver denarius of Charlemagne was a definite departure from the gold coinages of the age of the barbarians who based their issues upon the old Byzantine prototypes. The year 1252, when the gold florin was first struck in Venice, may be said to fix the point of departure from the old transitional mediæval styles to the more varied and original issues of the later mediæval period. The *denier* (denarius), the *grot* (groat, groschen) and gold *florino* (florin) were the types of coins from which arose a vast multitude of denominations and issues struck by a great number of authorities—kings, dukes, bishops, popes, abbots, and so on. With the Renaissance, the coinages assume a more independent character and the European coinages are full of the fresh inspiration of a great artistic epoch. The introduction of portraits led to one of the finest developments possible in the field of coins and medals. The period of the classical Renaissance which opens with the middle of the 15th century ranks with the best Greek period (end of the 5th century and the 4th century B.C.) for the distinguished excellence in numismatic and medallic productions. In Italy artists of world renown such as Vittore Pisano, known as Pisanello, Matteo da Pasti, Sperandio, Benvenuto Cellini, and others produced large cast bronze medals modeled with unerring artistic simplicity and grace. After the 16th century the art of the coin and medal began to degenerate. A formal classicism set in which held medallic art in fetters until the revival of artistic work on the medal in modern France led to whatever is good in our modern achievements. We cannot follow the details of the development of either coins or medals in the various countries of Europe during the period succeeding the Renaissance and the modern epoch. But we must briefly describe certain phases of the coinage of our own country.

United States Coinage.—The earliest coins struck in the American colonies are the New England shillings, six-pences and three-pences issued in Massachusetts, about 1652. The shilling (plate III, 4) bore the initials N.E. (New England) and the Roman numerals XII to indicate the denomination. There is no type properly speaking, just the stamps on a thin flat

piece of silver. In 1616-24 the English of the Bermudas, known then as Sommers Islands, struck copper shillings, six-pences, three-pences and two-pences bearing a hog on one side with Roman numerals to indicate the value, and on the other side a ship. These pieces, called "hog money," constitute the earliest form of money used in the colonies, though not a native coinage. The English government refused to allow the colonies the rights of coinage and on the other hand failed to provide coins for their use. Hence, the New England shillings were struck without authority from the home government. The coins are necessarily of the most primitive design. Six-pences and three-pences were also coined. In 1652 this type was given up and the more interesting series of shillings and fractions appeared. These bore the inscription IN MASSACHUSETTS on the obverse which bears as type a tree, commonly the pine, but sometimes the oak and willow, while the reverse bore the inscription NEW ENGLAND. A. N. DOM in a circle in the centre of which was 1652, under which XII (plate III, 5). These coins continued to be struck until 1686, but the date of the piece was never altered.

For about 100 years the coinage of the colonies consisted of local and foreign token coinage, that is to say, pieces of merely nominal value, the only authorized pieces provided by the English government being the Rosa Americana copper coins issued in 1722. In 1787 the State of Massachusetts struck copper cents (plate III, 6) bearing on the obverse an Indian standing and holding bow and arrow with inscription COMMONWEALTH and a star in the field to indicate the colony, while the reverse bore an eagle with open wings in heraldic pose holding an olive branch and arrows and the inscription MASSACHUSETTS and date 1787. On the eagle's breast is CENT (or HALF CENT). In 1788 New Jersey struck copper cents bearing the following types, head of a horse above a ploughshare and NOVA CÆSAREA, while the reverse bears a shield and the inscription E PLURIBUS UNUM (plate III, 7). The State of Connecticut likewise issued similar copper cents. The first national piece was the so-called Fugio cent bearing a sun-dial above which the sun and inscription MIND YOUR BUSINESS and date 1787, while the reverse consists of a link border composed of 13 circles, and a central circle enclosing the inscription WE ARE ONE; on the band around the central circle is inscribed UNITED STATES.

These were the simple and homely beginnings in the early development of the Union. There were pattern pieces of various kinds, cents with the head of Washington, the Continental dollar, a trial piece, and so on. In 1793 the first regular coinage of the United States began with an interesting issue of large copper cents bearing a quite agreeable and not inartistic head of Liberty (plate III, 8) accompanied by the inscription LIBERTY and date and varying reverses with inscriptions UNITED STATES OF AMERICA and ONE CENT. There were also corresponding half-cent pieces. The later developments are so familiar that we need not go into the details here. There was an early gold coinage beginning in 1795, eagles and half-eagles, showing an attractive Liberty head wearing a cap and on the reverse an eagle.

With the revival of the art of the medal in modern times, the coinage of modern peoples has undergone a decided improvement. The twenty-dollar or double-eagle gold coin designed by Augustus St. Gaudens is at once original and modern and of high artistic merit. The example here shown (plate III, 9) is the first type issued, and of high relief, an effect obtained by a slightly concave "field" or space about the type. The relief, unfortunately for art, was judged too high for practical uses, and the later issues are of lower relief.

Finally, there remains to be mentioned the very interesting private gold coinage struck in California, Utah, Colorado and Carolina during and after the great discoveries of gold in 1849. There are many varieties of this unique coinage of which two are here shown: The octagonal piece (plate III, 10), a fifty-dollar gold coin of Augustus Humbert, United States Assayer, struck in 1851 and an oblong bar issued by Moffat and Company (plate III, 11).

Consult Head, B. V., 'Historia Numorum'; Hill, G. F., 'Handbook of Greek and Roman Coins'; Macdonald, G., 'Coin Types, their Origin and Development'; Rawlings, G. B., 'Coins and How to Know Them'; Hazlitt, W. C., 'Coinage of the European Continent'; Engel et Serrure, 'Traité de numismatique du Moyen Age'; id., 'Traité de numismatique moderne et contemporaine'; the catalogues of the coin collections of the museums of Europe, especially the British Museum Catalogues (consult 'Numismatics' in the card catalogue of any public library); also the following numismatic periodicals: *Numismatic Chronicle*; *Revue Numismatique*; *Zeitschrift für Numismatik*; *Numismatische Zeitschrift*; *Rivista Italiana di Numismatica*; *Journal International de Numismatique*; *Revue Belge de Numismatique*; *American Journal of Numismatics*.

AGNES BALDWIN BRETT.

NUMITOR, nū'mī-tôr. See ROMULUS.

NUMMULITE, a genus of *Foraminifera*, mainly extinct, which forms vitreo-calcareous, many-chambered shells having much the form of a doubly convex lens, which when flattened by pressure, as in fossil examples, led to their being likened to little coins (*nummuli*). They varied in size from that of a pinhead to that of a silver dollar. The group originated in the Carboniferous, increased and flourished at its maximum during the early part of the Tertiary period, when these foraminifers swarmed in the seas in incredible abundance. Their shells constitute the bulk of the Eocene Nummulitic Sandstone of the Old World, where it is one of the most important, if not the principal formation of the Tertiary series of rocks, in point of extent. Attaining a thickness of many thousands of feet, it ranges from the Alps and Atlas to the Carpathian Mountains; appears in Egypt, Asia Minor, Persia, and can be traced through India and China into Japan. The pyramids of Egypt are built in greater part of this nummulitic limestone. *Orbitoides* is found in the Eocene deposits of our Southern States. See FORAMINIFERA. Consult Geikie, 'Text-book of Geology' (1882), and the writings of Lyell, Prestwich and other geologists.

NUN. See MONASTICISM; SISTERHOODS.

NUN OF KENMARE. See CUSACK, MARY FRANCES.

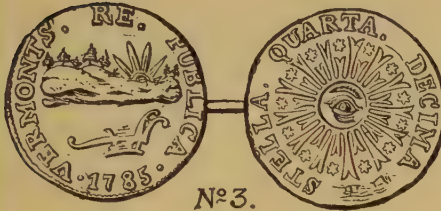
NUMISMATICS



Nº1.



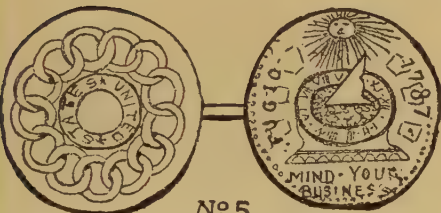
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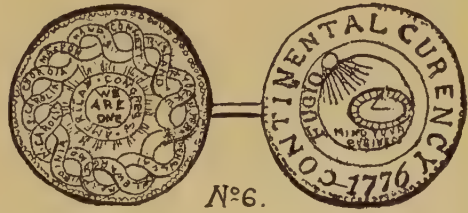
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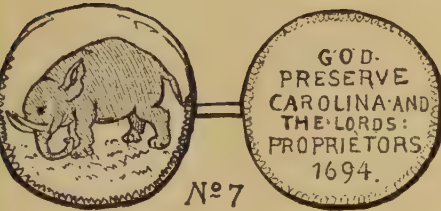
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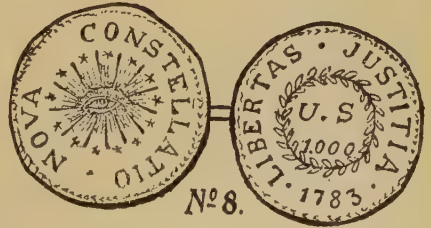
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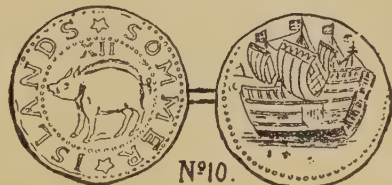
Nº7.



Nº8.



Nº9.



Nº10.

AMERICAN COLONIAL COINS

- 1 New Jersey Cent
- 2 Vermont Cents
- 3 Vermont Tokens

- 4 The Granby Token
- 5 The Fugio Cent
- 6 Continental Coinage
- 7 Carolina Tokens

- 8 The Nova Constellatio
- 9 Rosa Americana — Two Pence
- 10 Sommer Island Brass Coin

NUN OF KENT. See BARTON, ELIZABETH.

NUNATAK, a rock hill projecting through glacial ice in the form of an island. Particularly common near the edge of the Greenland ice sheet. See GLACIER.

NUNC DIMITTIS, *nunk di-mūt'is*, the first two words of the Latin version of the Song of Simeon (Luke ii, 29, 33), "Lord now lettest thou thy servant depart in peace," etc. It was anciently used in the Vespers or Compline services of the Eastern and Western Churches, and is found in the Book of Common Prayer as part of the evening service.

NUNCIO, *nūn'shī-ō*, a papal commissioner who permanently represents the Pope abroad, and corresponds to the secular ambassador at a foreign court. A papal commissioner who is sent on a temporary mission is styled a legate and, if a cardinal, is styled a legate *a latere*, that is, sent immediately from the side of the Pontiff. Previously to the Council of Trent the papal nuncios acted as judges in the first instances of matters which lay within ecclesiastical jurisdiction; since that time they have been formed into a kind of court of appeal from the decisions of the respective hishops.

NUNCOMAR. See HASTINGS, WARREN.

NUNEATON, *nūn-ē'tōn*, England, a town of Warwickshire, on the Anker, 17 miles north-east of the town of Warwick. It has two churches, a free grammar and several other schools. Cotton and woolen manufacturing is carried on to some extent. Pop. 27,700.

NUÑES, *noo'nyēsh*, **Pedro**, or **PETRUS NONIUS**, Portuguese geographer and mathematician: b. Alcacerdo Sal, 1492; d. Coimbra, 1577. He was professor of mathematics at the University of Coimbra. Among his works are a translation of parts of Ptolemy (1537); 'De Crepusculis Liber' (1542), in which is described the measuring instrument known as the nonius, which consists of a protractor graduated in 90ths, 89ths, . . . 46ths of a quadrant; and 'De Arte atque Ratione Navigandi' (1546). A complete edition of his works was published at Basel in 1592. It is to Nonius that we owe our knowledge of the mathematical instruments of the early Portuguese navigators.

NUÑEZ, **Cabeza de Vaca**, *noo'ñyās kā-bā'-thā dā vā'kā*, **Alvar**, Spanish explorer in America: b. Estremadura, about 1490; d. Seville, 1557. In 1527 he sailed from Spain in the ill-fated expedition of Pánfilo de Narváez in the capacity of royal treasurer and high sheriff of the expedition, which met with much ill-luck. Núñez showed great resourcefulness in his attempts to get the party back to the coast of the Gulf. The boats were finally wrecked and the survivors were washed ashore on the islands off Matadorda Bay (1528). While most of the Spaniards were retained as slaves, Núñez finally secured his liberty. He was successful in trade, exchanging the shells and wampum of the coast for hides and other inland commodities. During his eight years' captivity he also gained considerable reputation as a sorcerer and the reverence in which he was consequently held was undoubtedly an aid to his safety. He escaped; fell in with three other survivors of Narváez' undertaking and together they ascended the Rio Grande; crossed Chihuahua and

Sonora to the Gulf of California and finally (May 1536) reached Culiacan. They were sent on to the City of Mexico, which they reached in July of the same year. Thirteen months later Núñez reached Spain. The pilgrimage of 2,000 miles involved every sort of vicissitude. One result of the journey was to reveal to Spanish knowledge a great territory north of Mexico and to lead to the strange quest for the seven cities of Cibola. A joint account of their travels, given by the travelers at Santo Domingo, was printed in Oviedo's 'Historia General y Natural de Indias.' Núñez was sent as administrator or Adelantado of Rio de La Plata in 1540, and was the earliest explorer of Paraguay. In 1544 he was arrested on the charge of Irala, a follower; sent to Spain; condemned to exile in Africa, a sentence which was apparently never executed. In eight years he was officially pardoned. He published an account of his adventures in 1542. This appeared in an English version in 'Purchas his Pilgrimes' (1625); as well as in a translation by Smith (1857-71). Consult Bancroft, H. H., 'History of the North Mexican States and Texas' (San Francisco 1884); Lowery, W., 'Spanish Settlements within the Present Limits of the United States' (New York 1901); Oviedo, G. Fernández de, 'Historia General y Natural de las Indias' (Madrid 1853).

NUÑEZ, **Pedro de Villavicencio**, Spanish painter: b. Seville, 1635; d. there, 1700. He was of noble birth and early became a pupil of Murillo (q.v.) and one of the best Spanish painters of the Seville school. At Malta, where he resided as one of the Knights of the Order of Saint John of Jerusalem, he studied under Matteo Preti (q.v.), called "Calabrese." Returning to Seville he lived on the closest terms of intimacy with Murillo who expired in his arms. After the death of his great teacher he went to Madrid and there produced the picture, 'Beggar Boys Playing Dice,' which is altogether in the best style of Murillo. This work he presented to Charles II, king of Spain. 'Scenes from the Life of the Virgin' he executed for the Carmelite convent at Seville, while his fine likeness of Archbishop Spinola at Seville gives a good idea of his power and style as a portrait painter. He was an excellent portrait painter and his historical and genre compositions are, after those of Murillo, among the best of the Seville school.

NUÑEZ, **Rafael**, Colombian statesman: b. Cartagena, 28 Sept. 1825; d. there, 18 Sept. 1894. He entered Congress in 1851, became Secretary of the Treasury in 1855 and consul at Havre in 1862, and, later on, at Liverpool. He became governor of the state of Bolivar in 1876 and President of Colombia in 1879, 1883 and 1891. Several revolts took place during his occupancy of the Presidency, owing to the loosely organized form of the federation. So in 1886 Núñez carried through a reform of the Constitution by which the government was made a centralized republic and the presidential term of office extended to six years. This made Núñez virtually a dictator for the rest of his life. He was also, previous to this, a journalist, editing the *Porvenir* in Colombia and *El Continental* in New York; and he published several volumes of prose and verse, the most important

being 'La reform politica en Colombia' (Bogotá 1885).

NUÑEZ DE ARCE, Don Gaspar, Spanish dramatist and lyric poet: b. Valladolid, 6 Aug. 1834; d. 1903. He studied at the University of Toledo, became a deputy in 1865, a member of the Academy in 1876 and Minister for Colonial Affairs in 1882. Subsequently he became a senator and president of the Society of Spanish Writers. He was special war correspondent for *La Iberia* during the African campaign (1859-60), and his letters back from the front attracted nation-wide attention. His lyric verse won for him the title of the "Tennyson of Spain." Among his works are 'Gritos del Combate' (1875), poems of the revolution; 'La Selva Oscura' (15th ed.); 'La Vision de Fray Martin' (1880, 1886, on Martin Luther), translated into German by Fastenrath ('Luther im Spiegel Spanischer Poesie,' 2d ed., 1881); 'Ultima Lamentación de Lord Byron' (1879); 'El Vértigo' (1879); 'La Pesca' (1884); and 'Maruja' (1885). Among his dramas are 'Deudas de la honra'; 'Quien debe pagar'; 'Justicia providencial'; and 'Haz de leña.' In the edition 'Obras dramaticas escogidas' (Madrid 1884) are included most of his dramas.

NUÑEZ DE BALBOA. See BALBOA.

NUNIVAK, noo'ni-vāk, Alaska, an island off the west coast, in the Bering Sea; separated from the mainland by the Etolin Strait, about 48 miles wide. It is about 55 miles long and 40 miles wide; area, about 1,200 square miles. It is fertile and well wooded on the west and south; the inhabitants are Eskimos. They have considerable trade in ivory, skins and fish.

NUN'S PRIEST'S TALE, *The*, one of the stories in Chaucer's 'Canterbury Tales.' Its origin is a fable by Marie de France which was subsequently amplified in the 'Roman du Renart.' It relates the escape of Chanticleer from the jaws of the fox by inducing the latter to open his mouth for speech. Dryden modernizes the story in 'The Cock and the Fox.' In Æsop's Fables a similar narrative occurs.

NUPHAR, a genus of yellow water-lilies, order *Nymphæaceæ*. See WATER-LILY.

NUR-ED-DIN EL-BETRUJI, noor-ed-dēn' ēl-bē-troo'jē, Arabian astronomer: b. Morocco, 12th century. He was known also by the name of Alpetragius and was an authority upon astronomy in his day. He disproved Ptolemy's theory of the epicycle. See 'Alpetragii Arabis Planetarum Theoricis Physicis Rationibus Probata' (Venice 1531). Consult Suter, 'Die Matematiker und Astronomen der Araber' (Leipzig 1900).

NUR-AND-SPELL, an old English game, peculiar to the rural districts, played with a ball, which is "risen" from a trap and hit with a bat made for the purpose. The ball, called the "nur," is made of wood, a little bigger than a walnut. The bat, called a "tripstick," as it is also used to spring the trap or "spell," consists of a piece of hard wood, six by four inches, and one inch thick (the pommel), attached to a supple handle from three to four feet long, which the player grasps with both hands, giving the full swing of his body with the stroke. The game consists of the cumulative distance of a given number of strokes, the player who

has the greatest number of yards being the winner.

NURAGHE, noo-rā'gā, the name given to prehistoric monuments in Sardinia belonging to the Bronze Age. The origin of the word is unknown. It is very likely that it is derived from the Phœnician *nur*, meaning fire. The *nuraghi* are distributed all over the island, but are more frequent toward the centre and in the Nurra. In the district of Gennargentu some of them are 3,600 feet above sea-level. Notwithstanding the use of many of them as quarries by neighboring villagers, they still number between 3,000 and 4,000, suggesting a large but scattered population in pre-historic times. Sometimes they occupy inaccessible mountain tops or important sites on ridges, sometimes they are found in the approaches to tablelands, in narrow gorges and at the fords of rivers. Many are on the seashore and in fertile plains. Generally the *nuraghe* was near a spring or well. Each *nuraghe* was within sight of neighboring *nuraghe*, evidently for the purpose of signaling, and each was surrounded by a little plot of ground sufficient for the support of a family. Everything points to the supposition that they were fortified habitations and not tombs or temples.

The *nuraghe* in its simplest form is a conical tower about 30 feet in diameter at the base and decreasing in diameter as it ascends. When complete it is 60 feet high. It is built of rough blocks of stone (about two feet high), unhewn sometimes and sometimes roughly dressed on one side with bronze instruments. On the inside the gaps are often filled with clay. The roof is sometimes of wood, sometimes of earth and vaulted. The entrance almost invariably faces south, about five or six feet high. The architrave is flat, and there is a space over it to admit light and to relieve the pressure on it from above. Within the doorway there is usually a niche on the right and a stone staircase ascending in the thickness of the wall to the left. At the end of the corridor is a round central room unlighted except for the door. Small rooms or stone cupboards in the thickness of the wall occupy the sides of this chamber. The staircase leads to a platform on top of the *nuraghe*, or to a second chamber concentric with the first lighted by a window above the main doorway of entrance. Some of these simple *nuraghe* have additions, bastions or chambers; and in some cases there is a very complicated system of fortification—a wall of circumvallation with towers at the corners, protecting a small group of buildings, such as the Nuraghe Losa, near Abbasanta, and the Nuraghe Saurecci, near Guspini. Others, like the Nuraghe Lugheres near Paulilatino and the Nuraghe de S' Oreu near Domusnovas, are protected at the entrance by a regular system of courtyards—something after the fashion of a baronial castle of the Middle Ages. Stores and arms were probably kept in the recesses in the gloomy central chamber, where sometimes stone seats project from the walls and where there are traces, too, of a domestic altar. The upper floors seem to have been the residence of the chief's family. Here are hearths and a smoke-hole in the roof. The earliest type of *nuraghe* apparently coincides with the later Neolithic Age. The date of this *nuraghi* civili-

zation is now placed from toward the end of the second millennium, extending to about the 7th century B.C. Votive ships are found in some of the forts, and there are remains of marine animals used for food, shell necklaces, amber (evidently brought by sea) and blocks of copper with Ægean stamps. Many of the earlier bronze and stone figures have close analogies in Cretan finds. Whether we can regard these primitive Sards as themselves a maritime people or merely as possessing trade relations with the prehistoric Greek world is still uncertain. The fate of the nuraghi civilization is unknown. Whether from external attack or internal decay, it was already declining when Phœnician settlements began.

Close to or in sight of the *muraghe* to which they belong are the prehistoric tombs. These are of two classes: the "giants tombs" and the "tombs of the spirits," pointing in work as in name to the giant-race—Titans, Cyclops, "sons of Anak," "remnant of the Rephaim," etc., that raised cromlechs, lifted and poised the ponderous rocking-stone, erected dolmens and menhirs and built Stonehenge and "Cyclopean walls."

Consult Bouchier, Edmund S., 'Sardinia in Ancient Times' (Oxford 1917); Forester, Thomas, 'Rambles in the Islands of Corsica and Sardinia' (London 1858); Fergusson, James, 'History of Rude Stone Monuments' (London 1872); Bresciani, A., 'Dei costumi dell' isola di Sardegna' (Naples 1850); Peet, T. E., 'Stone and Bronze Ages in Italy' (Oxford 1909); Pinza, G., 'Monumenti primitivi della Sardegna' (Milan 1901); Perrot, G., and Chipiez, C., 'History of Art in Sardinia, Judæa, Syria and Asia Minor' (2 vols., trans., Gonino 1890); Mackenzie, Duncan, in *Papers of British School of Rome*, Vols. V and VI; Petazzoni, 'La religione primitiva in Sardegna' (in *Rendic. dell' Accad. dei Lincei*, 1910); Taramelli, Antonio, 'Il tempio nuragico ed i monumenti primitivi di S. Vittoria di Serri' (in *Reale acad. dei monumenti antichi*, Vol. XXIII, p. 313-440, Milan 1915); Taramelli, Antonio, 'I altipiano della Giara di Gesturi in Sardegna ed i suoi monumenti preistorici in R. acad. di Lincei monumenti antichi,' Vol. XVIII, pp. 5-120 (Milan 1907), also articles by Taramelli in *Bullettino di paleontologia Italiana*.

NUREDDIN-MAHMUD, *noq-rēd-dēn'* mā-mood', Malek al-Adel, sultan of Syria and Egypt, styled "Al Shahid," "the Martyr": b. Damascus, 21 Feb. 1118; d. there, 15 May 1174. He succeeded his father as emir of Aleppo in 1145 and repelled Jocelin de Courtenay's attack on Edessa. He held the armies of the Second Crusade (1147) at bay, and, after their departure, invaded Antioch and speedily wrested from the Christians all northern Syria, making Damascus his capital. The alliance of the Greeks and Franks against him came to nothing, and Nureddin extended his power to Egypt. But there his lieutenant Shirkoh was succeeded by the great Saladin (q.v.), who gradually made himself independent of his master. Nureddin was on his way to Egypt to punish Saladin when he died. He was highly praised by Christians and Mohammedans as a just, charitable and noble character.

NUREMBERG, *nū'rēm-bērg*, or **NURNBERG**, Germany, a city of Bavaria, in Middle

Franconia, the second in the kingdom, and once the greatest and most wealthy of all the free imperial cities of Germany. It is on the Pegnitz, 93 miles northwest of Munich. It is partially surrounded by an ancient wall flanked with towers and pierced with 10 gates, the whole enclosed by a dry ditch 100 feet wide and 50 feet deep; parts of these fortifications have been removed to make way for great extensions and improvements. The Pegnitz, traversing the town from east to west, divides it into two nearly equal parts, the north, or Sebalderseite, and the south, or Lorenzerseite, connected by numerous bridges. Notwithstanding modern improvements Nuremberg remains the quaintest and most interesting of German cities, owing to its many picturesque mediæval features. The Burg or royal palace, built (1024-1158) by Conrad II and Frederick Barbarossa, commands a glorious view of the surrounding country, and is rich in paintings and wood-carvings. Among conspicuous public edifices are the town-house, an Italian three-story building, with a fine front, and a great hall, the walls of which are decorated with paintings in oil, many of them by Dürer; the Germanic National Museum, founded in 1852 in a suppressed Carthusian monastery, a Gothic building of the 14th century, with extensive cloisters, since much extended by the addition of the adjoining rebuilt Augustinian monastery, among the first in Germany, and exceedingly rich in works illustrative of the arts and industries of the Middle Ages. The most remarkable edifice is Saint Sebald's Church, which gives its name to the north division of the town. It is a Gothic structure of great elegance externally and internally (its older parts dating from the 10th century), containing the shrine of Saint Sebald, a tomb in bronze by Peter Vischer, who, with his five sons, labored upon it for 13 years, and adorned it with nearly 100 figures, among which those of the apostles are conspicuous for size and beauty. Other buildings deserving of notice are the church of Saint Lorenz, containing a remarkable monument by Adam Kraft, exquisitely sculptured in white stone, 64 feet in height. There are several public fountains, the chief being the Schöne Brunnen, in the form of a graceful Gothic cross 63 feet high, adorned with figures. There are statues of Dürer, Hans Sachs, Melancthon and others. There is also a monument of the war with France, erected in 1876. The town library contains over 110,000 volumes, and educational institutions are numerous. Communication between the various parts of the town and with the suburbs is facilitated by electric tramways. Before the passage to the East Indies round the Cape of Good Hope was discovered Nuremberg was the great mart of the produce of the East coming from Italy and going to the north. The manufactures are still considerable, and again rapidly rising in importance. Among the most important at the present day are toys, lead-pencils, colors, chemicals, clocks and watches, brass and steel wares, playing cards, tobacco and cigars, railway-carriages, machinery, electrical apparatus, musical and scientific instruments, beer, etc. The toys made here and in the neighborhood go to all parts of the world. Printing, lithographic work, type-founding and book-binding are also extensively carried on. There are schools for the training of mechanics;

and there is a large industrial museum. The town is celebrated, in connection with its industry, for the invention of watches, wheellocks (used in discharging old muskets), gauge-plates for drawing brass-wire, clarinets and air-guns.

Nuremberg, though an ancient city, does not carry its origin so far back as Roman times. It had acquired considerable importance by the 10th or 11th centuries, and was frequently visited by the emperors of Germany. It was greatly enlarged by Conrad III, and received several embellishments and important privileges from Frederick Barbarossa. In 1219 it was raised to the rank of a free city of the empire. It early took part in the Reformation. Subsequently it suffered during the great European wars, and being repeatedly laid under contribution by both parties became so exhausted that the sources of its prosperity were almost dried up, and the population rapidly decreased by extensive emigration. Having finally incurred a load of debt, which made it an acquisition of little value to any state, it was formally taken possession of in 1806 by Bavaria, which undertook the settlement of its debts, and, by judicious arrangements, has considerably increased its trade. Many distinguished individuals have been born here, among them the poet Hans Sachs, the painter Albert Dürer (whose house may still be seen), and the sculptors Peter Vischer and Adam Kraft. Pop. about 400,000.

Bibliography.—Bell, N. R. E., 'Nuremberg' (New York 1905); Headlam, Cecil, 'The Story of Nuremberg' (in 'Mediaeval Town Series,' London 1899); Mummenhof, Ernst, 'Nürnberg's Ursprung und Alter' (Nuremberg 1908); Réé, P. J., 'Nuremberg and its Art to the End of the Eighteenth Century' (New York 1905); Reicke, Emil, 'Geschichte der Reichsstadt Nürnberg' (Nuremberg 1896); Rösel, Ludwig, 'Alt-Nürnberg' (Nuremberg 1895); Schröltes, Georg, 'Geschichte der Stadt Nürnberg bis zum Gegenwart' (Nuremberg 1909).

NURHAG, ancient round towers on the island of Sardinia. They are about 50 feet high and about 90 feet in diameter, measured at the base and outside of the platform on which the largest of them are founded. The materials are limestone, trachitic porphyry, granite or volcanic rocks, obtained from the neighboring quarries. Each block forms a cube about three feet each way, and its surface is an irregular line, such as the blows of the hammer in shaping it may be supposed to have made; the walls are without cement, within as well as without. A wall of 10 feet, built like the main structure, is surrounded by a parapet three feet high. The roof of each apartment is arched; the entrance terminates in a flat architrave, and is sometimes so high that a man can enter without stooping, and sometimes so small that he can only creep into it on his stomach, though it gets wider as he proceeds. Hence the low chambers are mere cells formed in the thickness of the wall, while the high chambers are supported by pillars. In the cells broken human bones mixed with earth, like that of ordinary graves, have been found. It is many centuries since these remarkable monuments attracted attention. The origin and aim of these structures is still, however, not free from doubt, though they are gen-

erally regarded as tombs, constructed so as to be available, in emergencies, for purposes of defense.

NURSE, Trained, is one who has followed a course of training in a school for nurses usually connected with large city hospitals, for two years or more, and who has received a diploma after a severe examination and has been graduated. It was not until the early part of the 12th century that a so-called school for nurses was organized, by the Abbess Hildegard, among her friends and associates for service in the hospitals. From this small beginning grew the system of a special training for nursing, which, however, remained in its infancy until the middle of the 19th century. In 1840 there was an organization of nurses in London which cared for the sick poor, but it remained for Florence Nightingale to give the impetus to a movement toward securing a more efficient training for nurses. This movement Miss Nightingale started in 1853. In 1870 Miss Louise Lee Schuyler, who was the founder of the New York State Charities Aid Association, organized the Bellevue Training School for Female Nurses in New York City, and in 1872 the first class of trained nurses in the United States was graduated from Bellevue Hospital. Now nearly every large hospital in the country has its training school.

The term of study, in most of the schools, is two years. In some of the small towns the course may be for six months or 18 months, and in some schools three and even four years is required. Application is made to the superintendent of the training school, and after a physical examination the applicant is received on a two-months' probation term. During this period the applicants receive board and lodging, but serve without pay, and education, strength, powers of observation and endurance are tested. If, after this probation, they prove acceptable to the superintendent, they are required to sign an agreement for the balance of the term, whereby they bind themselves to obey the regulations of the hospital and remain in the school until the term is ended. This agreement can be terminated for cause by either party. Pupils reside in the "home" connected with the hospital, wear a uniform, while on duty, and receive board, lodging, laundry work and a small compensation. Lectures are given by the members of the staff of house physicians, the visiting physicians and surgeons and head nurses. The lectures by the physicians cover anatomy, physiology, materia medica and all departments of medicine. The head nurses teach bandaging and the dressing of wounds. Obstetrics and the care of the insane are also taught. Massage is taught in a degree; but if a nurse wishes to take the full course, it requires a six-month term in a regular massage school. A diet-kitchen, where proper food for the sick is prepared, is generally under the charge of one of the head nurses. The first three months are occupied by the pupils in a general observation of the work of the hospital ward's head nurse and the assistant nurse. The care of the beds of the patients is one of the first duties learned. Taking the pulse, temperature and respiration of a patient and making a record of it on a chart provided are the next steps. In the surgical wards the dressing of slight wounds is a

part of the duties, and probably the pupil must assist in the care of the operating-room and making ready the dressing to be used after operations have been performed. The pupil is then examined and, if the examination is satisfactory, advancement to assistant nurse follows. After three months more comes another examination, and at the end of a year still another. The pupil then is a full-fledged nurse and is placed in charge of a ward, and full responsibility for the condition of the patients is placed upon her. She must receive the new patients sent from the receiving ward, note their condition and, if she thinks it warranted, send for the house physician at once. Otherwise the patients wait until the regular call. She must go with the house physician when he makes his visits to the bedside of each patient, carefully note his diagnosis of each case, make a memorandum of the medicines prescribed and see that the medicine is properly administered. She must note the least sign of change in the patient's condition, and, if for the worse, call the physician at once, or in extreme emergency be ready to know what to do and do it at once. She must be extremely self-reliant and be ready to know how to act on the instant, as the life of the patient very often depends on quick action. After graduation she goes into private practice and must be prepared any hour, day or night, to respond to a call. The salary received varies, according to the severity of the case.

In December 1887, D. O. Mills of New York, after a visit to the city hospitals, decided that the number of infirm and sick men who were in the hospitals made it a necessity to educate male nurses, and he organized the Mills Training School for Male Nurses of Bellevue Hospital, put up a building on the Bellevue grounds and gave it to the city of New York to be used as a "Home" for the male training school. The first class of male nurses was graduated from Bellevue in 1890. The male training school idea was taken up by the physician in charge of the City Hospital, on Blackwell's Island, and the first class graduated from there in 1890, shortly after the Bellevue class. The training is the same as in the female schools, the only difference being that greater attention is bestowed upon diseases of men. When the male nurse begins private practice his salary ranges from \$5 a day of 12 hours to \$10; and, in contagious or infectious diseases, to even more.

State registration of trained nurses is now a law in New York, Virginia, North Carolina, New Jersey, Maryland, Indiana, California, Colorado, Connecticut, New Hampshire, District of Columbia, Iowa, West Virginia, Minnesota, Illinois, Georgia, Wyoming, Washington, Texas, Oklahoma, Nebraska, Delaware, Pennsylvania, Missouri, Michigan, Massachusetts. The legislatures of these States passed bills between 1903 and 1910 requiring trained nurses to register their names and addresses with the county clerk of their respective counties. In the State of New York registered nurses are entitled to use the abbreviation "R.N." after their names, and it is made a misdemeanor punishable by fine for any person not a trained nurse to use the abbreviation. Nothing, however, contained in the acts is considered as conferring any authority to practise medicine or to undertake the treatment and cure of diseases.

Examinations are held under a commission of five members of the New York State Nurses' Association, appointed by the Regents of the University of the State of New York. They grant certificates which may be revoked for sufficient cause, after written notice to the holder, and no person is allowed to practise as a registered nurse after such certificate has been revoked. The law in the other States is virtually the same as in New York. The best-known training schools are those connected with the Bellevue, Presbyterian, Mount Sinai and City Hospital in New York City; the Massachusetts General Hospital in Boston; Philadelphia and Pennsylvania hospitals in Philadelphia; Johns Hopkins Hospital in Baltimore and the Illinois Training School for Nurses, Chicago. The first class of young negro women ever graduated as trained nurses was sent from the Lincoln Hospital and Home, New York City, in December 1903. For provisions of the State laws consult Body, L. C., 'State Registration for Nurses' (Philadelphia 1911). Consult also Goodnow, Minnie, 'Outlines of Nursing History' (Philadelphia 1916).

NURSE-FROG, any of various frogs and tree-frogs which have or make special arrangements for the care of the eggs or young, or of both. The most widely known example is probably the European obstetrical frog, the male of which takes charge of the eggs as soon as laid by the female, and carries them with him until they hatch. Many other species, especially among those living in the American tropics, take precautions as to their offspring. Thus one, the Brazilian ferreiro (*Hyla faber*), makes beneath the water in the ponds where it goes to spawn small walled-in basins of mud, within which the spawn is deposited and the tadpoles are reared in safety from many enemies that would attack them were they running at large. Several kinds of frogs have their few eggs placed upon the back of the female, in pits or pouches in the skin, and keep them there until they hatch; and in one well-known genus (*Phylllobates*) the tadpoles cling to the mother's back and are carried about and cared for until able to transform and care for themselves. Consult Gadnow, 'Amphibia and Reptiles' (1902). See FROG.

NURSE-SHARK, a name given by American fishermen to several different kinds of shark, as the Sleeper (*Somniosus microcephalus*), and especially a voracious tropical shark (*Ginglymostoma cirratum*) abundant about the coral reefs of the West Indies and the coast of Mexico, where it is called *gata*. The Port Jackson shark (*Cestracion*) is sometimes called nurse-shark.

NURSERY, properly speaking, any place in which plants are grown for transplanting. As used in America, however, florists' establishments have been excluded because they were developed later than the fruit nurseries and because their equipment is strikingly different. Since the development of nurseries in which ornamental plants such as herbaceous perennials are grown, the term has been gradually returning to its original meaning, for many nurseries now grow for sale all classes of plant materials—trees, shrubs, perennial herbs, "bedding stock" and even annuals.

As now constituted, the nursery business in

North America is a development of the past century and a quarter, for though there were some nurseries prior to 1800, they were few, small and local in their influence. With the development of fruit growing, especially in New York State, about the time of the opening of the Erie Canal in 1825, the nursery industry began to grow both in extent and influence. Until about 1860 the development of the business was mainly westward from New England to New Jersey and to Michigan and Illinois. After the Civil War the industry began to spread southward and southwestward until now practically every State has its nurseries.

On the Pacific Coast, especially in California, the mission fathers had their small nurseries, but not until agriculture began to rank in importance with mining were commercial nurseries established in these States. To-day some of the largest and most important ones are located in California, but New York still leads in this industry, its centre during the past 75 years continuing to be at Rochester.

Indexes of the relative importance of the industry are afforded by the 13th United States Census Report, which shows about 2,500 nurseries, representing an aggregate value of \$20,600,000 and an area of 80,600 acres. During the decade since the previous census the value of the product had more than doubled, being over \$21,000,000 in 1909. Of this amount New York contributed more than \$2,700,000, California \$2,100,000 and Texas \$1,200,000. Extensive nursery interests are also centred in Maryland, Florida, Michigan, Missouri, Georgia, Alabama, Tennessee, Ohio, Arkansas and Kansas.

In America nursery methods differ widely from those of Europe. They have mainly to do with extensive rather than intensive practices, the growing of large numbers of specimens for commercial ventures, instead of specially trained specimens for amateur plantings. This statement applies particularly to fruit trees, which in America are planted far apart, whereas in Europe they are more popularly grown upon walls and trellises or as cordons and espaliers in greatly restricted quarters. American nurserymen are interested in growing straight stemmed fruit trees in uniform rows, each specimen being as nearly as possible a replica of every other of its kind.

While berry bushes such as currant and gooseberry are grown from cuttings, and others (raspberries, blackberries, etc.) are reproduced by means of "tips" and "suckers," the tree fruits are propagated by grafting or budding. (See GRAFTAGE). Any of these method, depending upon the species or the variety, may be used for reproducing ornamental trees and shrubs. Forestry subjects are generally grown from seeds. They often demand great care and skill in the handling of the seeds and of the seedlings. Formerly piece root grafting was the most popular method of propagating apples and pears in the Eastern States. In some sections it is still in vogue, but as in the case of the stone fruits, such as peaches and cherries, budding is steadily replacing it. In the Middle West small pieces of root are advocated not so much because they permit the growing of several trees from the one stock, but because the "piece" merely serves to nurse the scion until this develops

roots of its own and thus the trees attain greater hardiness than might otherwise be the case. Experiments tried in various States seem to indicate that otherwise there is little advantage gained by budding over grafting, or long pieces over short ones except in convenience and speed of handling. In some cases nurseries practise "double working" to avoid the damage to weak trees, for instance, Tompkins King and Grimes Golden apple from diseases such as collar rot, these varieties being worked upon resistant stems such as Ben Davis or Northern Spy.

To supply the general nurseries with stocks upon which to graft or bud the various named varieties of fruit and ornamental trees, specialists have arisen during the past 20 years, so that to-day the nurseryman who grows his own grafting or budding stocks from seeds other than peaches is the rare exception.

Prior to the Great War practically all the pear, cherry, quince and many other stocks were imported from France. But the war almost destroyed that industry, so American nurseries and the fruit industry have both seriously suffered in consequence. The Prairie States furnish the great bulk of the apple stocks, the work being in the hands of men who sow the seeds in rows, cultivate the seedlings like carrots or beans, dig the plants after the leaves have fallen in autumn and sell them to those nurserymen who use them for grafting during the winter or budding the following summer. With the peach the case is different; each nurseryman sows each spring seeds for what trees he needs and during the summer buds them. An interesting fact in this connection characterized the last year of the Great War and the succeeding season; namely, that whereas American nurserymen were often unable to supply desired varieties of apples, pears, cherries and other fruit trees, due mainly to shortage of stocks, they usually had complete lists of varieties and adequate supplies of peach trees simply because they grew the seedlings themselves.

Because many diseases and insects cause serious damage to nursery stock, special State and national legislation has been passed to control the dissemination of stock and provide for quarantine of imported plants, both interstate and international. Under provisions of various acts inspectors are placed at ports of entry to scrutinize imports of nursery stock, pass "safe" shipments and condemn and destroy such as are infested with disease and insects. Had such inspection been established early enough, many of the pests imported from foreign countries, especially Europe, might have been kept out and losses amounting to millions of dollars thus prevented. See INSECTS OF IMPORTANCE TO MAN; also PLANTS, DISEASES OF.

While insects and diseases make production of nursery stock difficult the most important restricting factor is the necessity to use land that has not grown trees oftener than once in five years. The trouble is apparently not chemical but physical, the main reason being that the land is under crop for several years and is handled when it should be left untouched. The humus becomes depleted, even exhausted, so several years of rest in clover or grass are necessary to put the soil in good condition again.

In America special nursery tools have been developed to economize time and effort and thus make the industry more profitable. Among these are various knives for grafting and budding, hoes for planting, spades with reinforced metal handles for digging, plows and subsoilers for preparing the land and apparatus for spraying two or more rows at a time. But most important of all are the tree diggers operated by 8 to 16 horses, by traction engines or by stationary engines which use steel wire cables wound on drums to draw them from end to end of the rows.

In the north eastern United States and adjacent Canada nursery stock of fruit trees, grape vines and bushes, also of many ornamentals, is dug in the autumn and stored in frostproof buildings, the best of which somewhat resemble cold storage houses. The main advantages of such storage are that damage by mice and rabbits and winter injury by frost are prevented and the nurseryman is permitted to pack and ship stock earlier in the spring than would be the case were the stock left out of doors during the winter. Unless the temperature is kept at 28° to 34° Fahrenheit there is considerable risk of damage either by freezing if below this range or by mildew if above; also there is risk of drying out of roots and tops so that when the stock reaches the purchaser it may be lacking seriously in vitality. Thus the practice of winter storage favors the nurseryman more than the planter. Hence the advantage to the latter of ordering dormant stock for fall delivery, whether he plants in the autumn or merely "heels in" or buries the stock until spring.

Nursery interests in the United States and Canada are represented by several sectional organizations and the whole area by the American Association of Nurserymen which meets annually in various parts of the country and publishes an annual report. *The National Nurseryman* is a monthly magazine devoted to the industry and published at Rochester, N. Y. American books which deal with the propagation phases of the business are Fuller, 'Propagation of Plants' (New York 1887); Bailey, 'The Nursery Book' (New York, 11th ed., 1907), and Kains, 'Plant Propagation, Greenhouse and Nursery Practise' (New York 1916).

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NURSERY FOR CHILDREN, Hygiene of the. There is no part of the home requiring more particular and intelligent care with respect to the conditions of health than that which is assigned to the children of a household. The children's apartment should be a large, sunny, dry and well-ventilated room. Absence of sunlight is as bad for children as plants—both grow pale and sickly in consequence of it. Excess of sunlight can be averted by blinds, awnings or dark-colored (preferably green) window-shades. The room should be above the first floor, in a well-built house, on dry ground, and should have good plumbing. The furniture of a nursery should be comfortable, but simple and easily cleaned. The floor is best covered with a carpet or rug which can be readily removed for cleansing or when a contagious illness prevails. The walls should be either painted (preferably a light gray), varnished or

covered with a varnished paper which can be washed. Dirt must be kept out of the nursery. There should be no heavy furniture. All cupboards and closets should be kept clean and well aired. There should be no "tuck-away" places. Dusting, as ordinarily carried out—that is, the transferring of dust from one place to another—should be unknown. Dust should be removed by hand, with a slightly moistened piece of cheese-cloth, and with the cloth fastened in a metal grasp fitted to the end of a pole made for that purpose. The floor should be swept after moistened tea leaves or sawdust have been sprinkled over it, or better yet, with a vacuum cleaner. The corners of the room should be rounded so that no dust can lodge in them.

Ventilation and Warming.—While a nursery should be always comfortably warm, it should be well aired or ventilated and fresh air must come from out of doors. Few houses are equipped with such a good system of heating and ventilation that the opening of a window to admit air is not necessary. But cold air should not blow upon the child. In fact, in cold weather children should not be allowed to stay near a window, even if closed, as it is the cold air that comes through crevices that "cuts like a knife." As the current of cool air is greatest along the floor of a room, in cold weather children should not sit upon the floor. The room may be frequently ventilated by opening a window for a short time at the top, the children meanwhile being more warmly clad. Or the air may be admitted through an elbow tube or through the space between the upper and lower sash, the lower sash being raised several inches and having under it, along its entire length, a board (window-board). A stout piece of cloth, decorated if desired, may be fastened across the lower part of the window, with the window raised nearly to the upper edge of the cloth, the air comes tempered through the cloth and also between the upper and lower sash. The upper sash may be lowered a few inches and a frame covered with one or more layers of cloth fitted in between the sash and the window-frame. As lamp and gas light readily pollute the air of a room, electric light is preferable.

The temperature of a nursery should be from 65° to 70° F. Open fire-places or hot-water pipes are frequently better for heating purposes than close stoves or furnaces, which unduly dry the air. If close stoves are used they should have no dampers, because of the danger of coal-gas permeating the air of the room. All heating and lighting apparatus should be well protected, so that children cannot burn themselves or set fire to anything.

Nuisances and Sources of Contamination.—There should be no imperfect plumbing in the nursery—in fact all plumbing would better be in an adjacent room. Soiled napkins and other offensive articles should be promptly removed from the nursery, also remnants of food. Toys should, as far as possible, be unpainted and clean. Disinfectants are rarely needed, except in cases of sickness, if sunlight, good air and cleanliness are secured.

Toilet.—While a warm bath, with the occasional use of a pure soap and thorough drying, is necessary, the child should become accustomed to cool water. This can usually be

accomplished by gentle sponging with cool water after the use of warm water. A child does not always need a daily bath. Soft towels or cloths are best for drying purposes. Toilet-powders need not be used except where the skin remains moistened. Much of the soreness upon the buttocks and in the groins can be prevented by the use of dry, soft napkins, washed in soft water and with a soap containing little alkali. The scalp and teeth should be kept clean, and only soft brushes employed. A comb should rarely be used.

Dress.—This should be sufficiently warm, and as small in amount as is consistent with comfort. The underclothing is of the most importance and should be of woolen or linen mesh-work of varying degrees of thickness, depending on the seasons of the year. The fabric of children's clothing should be soft. Tight construction by bands is injurious. When a child begins to use its limbs freely the clothing should be shortened. Shoes should be soft, and for young children without heels, and should not cramp the toes.

Food.—The child's food should be well cooked and clean; the milk should be pure; if there is any doubt as to its purity it should be sterilized. Long-tubed nursing-bottles should not be used. All receptacles of food should be kept clean. Boiling and straining the drinking-water is frequently advisable. It should be cooled by placing it in corked bottles in the refrigerator. (See CHILDREN, DISEASES OF). Consult Dennett, R. H., 'The Healthy Baby' (New York 1912).

NURSERY LORE, songs and folklore of children. Nursery lore naturally divides itself into two distinct classes, the songs, rhymes and stories told from generation to generation in substantially the same form by older people, and the peculiar child lore handed on from one generation of children to another by the children themselves. The former include the vast body of nursery stories found recorded in books for the use of children, and the tales of mothers and nurses told to children. To the second division belong the songs, games and occasional stories which children habitually make use of in their play. Many of these are of great antiquity. The strongest faculty in the child is that of imitation. He lives over again in his games the occupations that interest his elders; and long after the latter has substituted newer interests and occupations for the older, the child continues to hand down to succeeding generations of children echoes of the past in the shape of imitations of these earlier activities of the human race. In the course of time these become conventionalized into an unchanging, meaningless form in which all memory of their origin is lost. These are repeated in the playroom, on the playground and wherever children meet together. The verse form of the songs and jingles helps to preserve them unchanged from year to year, and they, in their turn, aid in preserving the formulas of games which they accompany. These games, with their accompanying songs and formulas, were at one time the property of older people as well as of children, and some of them were dropped by the latter almost within the memory of persons still living. Out of the May dances and other ceremonial ob-

servances of a like nature, dating back to the days of a widely extended nature worship, sprang many later sports and celebrations, after the Christianized peoples had forgotten their former beliefs but had not yet altogether abandoned the more striking of the ceremonies connected therewith. These form a most curious and interesting survival of the manners and customs of tribes and peoples. In them are mingled and, as it were, jumbled together history, love games, flower oracles, rhymed formulas, striking alliterations and assonances, pleasing jingles, cadences and songs with refrains or choruses. The memory of the dead past that inspired them is gone; but the charm of music and of simple refrain has survived in a luxuriant growth of what appears pure senseless sound, beautified by the freshness, simplicity and earnestness of child nature.

Games.—When books and other reading material were not so plentiful as now, when means of communication were poor, and when people found few sources of public entertainment outside their own homes and those of their relatives and friends, then formal square dances, charades and games of many kinds were very popular and formed a part of every entertainment where young, middle-aged and even older people were met together for social ends. These games, some at least of which had a mythological origin probably of remote antiquity, were originally played to the accompanying of rhymed formulas, singing, and later to the sound of musical instruments in the case of the country dances. These rural entertainments included guessing games, dances, counting games, sports of such a nature that the youth of both sexes might take part in them, choruses (carols), riddles, games of hide and seek and pure nonsense contests. These were all imitated by the children in their play. The same thing may be seen to-day in Russia, Hungary, parts of Germany and Austria where the peasantry has preserved its more rural and primitive aspects. Among the American Indians, but a generation ago, the children imitated, in their games, the sports and ceremonies of their elders. In parts of Latin America, notably Mexico, the nine days preceding Christmas are given over to entertainment in which a memory of the "novenas" is the leading feature. (See POSADAS). The children imitate these semi-sports, semi-religious formulas at school, in the streets and at home, performing them exactly as their elders do; and often they continue them for several days after the "novenas" are past, probably because the constant movement and the music please them. In all of these there is in evidence the process through which the ancient folk ceremonies passed in becoming nursery lore.

Nursery lore, like everything human, has been subject to many changes stretching over long periods of time. Rhymes, choruses and tales have been detached from one connection and attached to another; and folklore has grown up about certain mythological personages and historical characters, giving us very distinct and abiding notions of them. Every child and older person, for that matter, knows that King Arthur was a goodly king, old King Cole was a merry old soul, Queen Guinevere was skilled in the baking of cakes,

Queen Anne once ruled the land (England), Georgey Porgey, the German Prince who reigned in England, was fond of pudding and pie, and that the merry Charley (the Stuart) loved good ale and wine. Many of us, too, remember that other luckless Charles of our childhood days, who went about, in our imagination, upon a black horse, and the James who had a daughter which he gave to the Oranger, only to be driven out of his kingdom by the two of them. All these more modern characters have been dressed up in ancient rhymes just as were Arthur and the chivalrous characters of his age. In the games and rhymes of children we still hear a curious echo of this burning past of English history, when the events chanted therein went to every true man's heart. The scurrilous songs sung by the Stuart adherents about the house of Guelph during the reign of the first four Georges is reflected in the rhyme showing that the Georgey Porgey already referred to "Kissed the girls and made them cry". Many a young girl cried and many a household mourned on account of the profligate character of members of the families of these early German sovereigns of England. Yet it is curious to have the echo of this non-moral age come down to us in the mouths of innocent children and to have it hobnobbing with "Poor Old Robinson Crusoe," the athletic cow who jumped over the moon, or the dish that purloined the spoon.

Cradle Songs are to be found in the lore of nearly all races; and they are undoubtedly of great antiquity. The North American Indian possesses some of the most beautiful of these lullabies. The structure of the latter gives an indication of how they were originally composed. If the child cried and remained awake past his natural bedtime, the assumption of primitive people was that he was being troubled by some spirit. Incantations and choruses were at once resorted to in order to free the infant from his unwelcome visitor. The more powerful the charm the more likely was the child to soon fall asleep. Practically all the Indian races had songs of this character, living examples of which are still to be found in current use among the Pueblo Indians and the native races of Mexico, Central America, Colombia and Venezuela. As the charm idea grew more and more obscured with the imposition of Christianity upon paganism, the lullabies assumed a more human and personal tone. Side by side with these humanized lullabies existed tales of changelings and bewitched children which continued to form a part of nursery lore in most countries until comparatively recent years. When children became ill, it was believed they were being troubled by some evil spirit, and songs, charms and incantations were resorted to to scare them away from the child or to induce them to leave it. In the course of time these, too, became lullabies in a modified form.

Riddles.—These are as old as the literature and ritual of races. We find them constantly appearing in biblical and other literatures in connections that show they played an important part in the life of the people from the highest to the lowest. The gods, the oracles, the prophets, the priests and the rulers frequently spoke in riddles and myths, and adventurers

and heroes are represented as propounding riddles to those high in authority. Oracular language was used in connection with almost every phase of life in its relation to religious ceremonies. It is but natural, therefore, that many of these should have survived among other superstitions of the past. They are found curiously intermingled with surviving child lore, often in a form that still reveals their ancient connections.

Charms entered into almost every phase of belief, every relationship of life, and, in the greater part of the world, belief in them has not yet altogether disappeared. They were used to cure every form of disease, to induce love, to drive out evil spirits, to scare away witches and wizards, to make butter come, to render fields, cattle and women fruitful. In the olden days they were of fearful import, and only priests and those empowered to handle them might lawfully use them. Those found using them without this authorization might be drowned, buried or otherwise put to death as a menace to the people. The old charms of making butter, milking a cow to an incantation and the driving away of witches are survivals, among others, of charms whose efficacy was once universally believed in. As already indicated, to this class belonged the lullabies or cradle songs which were, at one time, quite numerous. Many ancient prayers took the form of charms, as, for instance, in the nursery rhyme "Mathew, Mark, Luke and John guard the bed that I lie on," or "Mathew, Mark, Luke and John saddle the horse, and I'll get on!" ("I'll be gone"), and other variants: "Hickup, hickup, go away, come again another day!" The first invocation was to the saints, though it was probably of an earlier origin, while the latter invocation was to the thing itself which was creating the trouble. "Rock-a-bye baby, thy cradle is green," "Hush-a-bye baby, on the tree top!" and "Bye, bye, Baby Bunting, Father's gone a hunting," all point to a charm origin when conditions of society were vastly different from what they are to-day. Among the Pueblo Indians are very many stories in which the plot exists by virtue of some charm which is finally effective in saving the hero of the tale. These stories are in the transition stage when they please children and older people alike, as they are intended to. The Pueblos also possess many similar tales which are avowedly for the entertainment of the children.

Accumulative Stories are tales that keep adding to the original incident as the story proceeds, as "Old Mother Hubbard," "The house that Jack built." Sometimes each incident is repeated and a new one added until the end is reached; while in other tales these repetitions are avoided. These tales take many forms; some are short and some are quite long. Of the longer ones there are generally several versions with variations. Though they may be of considerable antiquity most of these stories seem to be tales of pure invention. This, in itself, would explain the many variants of such tales.

Proverbs and Refrains.—A large class of nursery rhymes in a sense may be called riddles. Of this class are "Humpty Dumpty," "The ship-sailing on the sea," "Little Nancy Red-head and white toes, the longer she stands the shorter she grows" (a candle), "Old mother Twitchell

who has but one eye," and "Higgledy, Piggledy, here we lie, plucked and picked and put in a pie." Closely allied to these are many tales that seem to be largely nonsense with a goodly mixture of humor. There is the hen who crossed the road to get to the other side, and "Peter White who never went right because he followed his nose and that was always awry," the piper who had a cow and no hay to give so he took his pipes and played "Consider, good cow, consider." In another closely related group of nursery rhymes a proverb is presented instead of a riddle. Many of these are undoubtedly of very ancient origin and mythological connection and signification. To these belong such sayings as "See a pin and pick it up, all the day you'll have good luck"; "Monday's child is fair of face, Tuesday's child is full of grace, etc." "The child that is born on a Sabbath day is bonny and blithe and good and gay." This takes us back to the pre-Christian days when children born on the day of the Sun were supposed to be under his protection and, subject, for this reason, to very favorable influences. All the other references in the nursery rhyme can be traced to pre-Christian beliefs in the character of the various gods after whom the days of the week were named. Sneezing was generally a sign of ill luck, but it was especially so on Friday. This old superstition survives in many countries. If you sneeze the German wishes you good health, and most of the Latin nations invoke the name of Jesus (for your protection). About this belief have grown up various nursery rhymes, many of which seem to be used purely in a proverbial sense. To these belongs such advisory verse as "He who would thrive must rise at five"; "A stitch in time saves nine" and "For every evil under the sun there's a remedy or there's none."

Some nursery rhymes are essentially dramatic in form. To these belong the good Doctor Faustus who whipped his scholars out of Scotland into France and out of France into Spain and into Scotland whipped them back again; "The man in the moon who came tumbling down and asked his way to Norwich town," "The Crooked man who went a crooked mile"; "Bryan O'Lin, his wife and his mother who all went over the bridge together"; old Mother Goose who whenever she wanted to wander, used to ride on a very fine gander; and the old woman who went up in a basket to brush the cobwebs off the sky. Of another kind, of a no less dramatic quality, are the sentimental stories of Billy Pringle, Cock Robin and Jenny Wren; the lady bug whose house was on fire. These all run into the tragic. More cheerful is the story of the hen that washed the dishes, baked the bread, scrubbed the floor and ran errands; and there's a distinctly joyful note in the tale of the little girl who gathered roses and took them to the queen and received in return a diamond as big as her shoe.

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NUS, Eugène, è-zhèn nūs, French dramatist: b. Châlons-sur-Saône, France, 1816; d. 1894. He was an ardent Socialist, and his first success as a dramatist was with his 'Jacques le Corsaire' (1844). Among his works are 'L'Enseignement mutuel' (with Desnoyer, 1846); 'Le Vicaire de Wakefield' (1849); 'La tour de Londres' (with Brot and Lemaitre, 1855), all dramas; and 'Les dogmes nouveaux' (1861); 'La république naturaliste' (1862); 'Lettre à Emile Zola' (1879); 'Choses de l'autre Monde' (1880); 'Ala recherche des destinées' (1891); 'Vivisection du Catholicisme' (1894), etc.

NUSHAGAK (noo'shā-gāk) **BAY**, Alaska, practically an extension of Bristol Bay. It is noted for its salmon fisheries. The annual catch varies from nearly 3,000,000 to 6,100,000. Since 1907 the government has protected the tributary streams, Nushagak and Wood, the spawning-grounds of the salmon. The native settlements of Chogiung, Nushagak and Kakanak are situated on the shores of Nushagak Bay and all are provided with government schools.

NUSKU, noos'koo, in Assyrian mythology, a solar deity who afterward became a fire god. He was regarded as a messenger of the gods.

NUSLE, noos'lyě, Austria, town in the Crownland of Bohemia, the southeastern suburb of Prague. A castle and park are the chief features. Candles, soap and cocoa-fibre mats are produced here. Pop., including the village of Pankratz, 53,000.

NUSSBAUM, noos'bowm, **Johann Nepomuk**, German surgeon: b. Munich, Bavaria, 2 Sept. 1829; d. there, 31 Oct. 1890. He studied in Munich, Würzburg, Berlin and Paris, and in 1860 became professor at the University of Munich. He published 'Die Pathologie und Therapie der Ankylosen' (1862); 'Die Verletzungen des Unterleibs' (1880); 'Ueber Chloroformwirkung' (1885), etc.

NUT, noot, in Egyptian mythology, the goddess of the sky, wife of Keb, the god of earth.

NUT, a piece of metal tapped and adapted to be screwed on the end of a butt. It is used for many purposes, but especially on the end of a screw-bolt, in order to keep it firmly in its place.

NUT BROWN MAID, The, an old English ballad, the earliest extant form of which is found in Arnolde's 'Chronicle' (1502). It is based on the legendary story of Henry Clifford, known as "The Shepherd Lord." Consult Percy, 'Reliques,' series 2, book i, 6.

NUT-GALL, a hard, nut-like gall (q.v.), especially those from the Asiatic oaks, used in ink-making and for other purposes. The Chinese and Japanese nut-galls of commerce, however, are from species of *Rhus*, and are large and very irregular in form. They contain from 30 to 60 per cent of tannin, and are the source of gallic acid ($C_6H_2(OH)_3COOH$) which appears in white silky needles, soluble in alcohol, less so in ether and sparingly soluble in cold water; it is precipitated blue-black by ferric salts, the color disappearing on boiling, and is not affected by gelatine, except in the presence of gum. Consult Maisch, 'Materia Medica' (2d ed., 1885).

NUT-GRASS, or **CHUFA**, a sedge of the genus *Cyperus*, especially *C. esculentus*, of the Eastern and Southern States, whose root-stocks bear small tubers, like nuts, which are edible to man, and of good flavor when roasted, and which are highly nutritious to hogs who eagerly search for them. Consequently these sedges are planted in some parts of the country as a food-crop for swine. An oil may be expressed from these tubers, or "ground-almonds," which is an excellent substitute for olive-oil for table use.

NUT-LOCK, a means for fastening a bolt-nut in place preventing its becoming loose by the jarring or tremulous motion of the machinery. Such are used upon fish-plates of railways, upon harvesters, etc.

NUT-WEEVIL, a snout-beetle of the genus *Balaninus*, which deposits an egg in the kernel of a nut, when it is young, where the egg hatches and the grub feeds until the kernel is destroyed, when it bores its way out through the shell. Several species infest the various commercial nuts.

NUTATION, a slight change in the direction of the earth's axis produced by the same cause as the precession of the equinoxes, namely, the attraction of the sun and moon upon the equatorial protuberances of the earth. If the orbits of the earth and moon were circular and in the same plane, the motion of precession, which consists in a slight revolution of the direction of the earth's axis in a period of about 266 years, would be regular and uniform. But, owing to the inclination of the orbits, and the revolution of the moon's node, the real direction of the axis of the earth revolves in a small circle around its mean direction in a period the same as that of the moon's node, namely—18.6 years. Bradley discovered and explained nutation not long after his discovery of the aberration of the fixed stars.

NUTATION IN PLANTS. The word comes from the Latin *nutatio*, a nodding, and in pathology is defined as "a constant nodding or oscillation of the head by which it moves involuntarily in one or more directions." The word has a more extended meaning in plant life for it defines the various movements executed by organs—such as stems, leaves, roots and tendrils by which the organ is inclined successively in various directions. Nutation is due to the unequal rate of growth on different sides of the organ. Nutation is, therefore, one of the problems of growth as well as of movement. Sachs, in 1873, restricted the term nutation to the movements of the apex produced by

growth. Frank had previously (1868) applied it to growth movements which result from external influences. Baranetzky (1883) associated circumnutation with the influence of gravity and Darwin (1880) asserted that "circumnutation is universal in all growing organs." Nutation is one of the problems of the movements of plants (phytodynamics) upon which botanists and physiologists are engaged, for phytodynamics is one of the most important foundations of vegetable physiology. Consult Sachs' 'History of Botany,' trans. by Garnsey and Balfour (Oxford 1890), pp. 535-563; Green, J. R., 'A History of Botany,' continuation of Sachs (Oxford 1909), pp. 445-457).

NUTCRACKER, the English name of a species of crow (*Nucifraga caryocatactes*) found ranging over a wide area in the pine forests of northern and sub-Alpine Europe and Asia. It is dull brown, thickly speckled with white spots and is about the size of a jay. The nutcracker is gregarious, wandering in bands of 50 or 100 in the autumn, but scattering to remote regions and becoming silent during the breeding season. Its chief food is nuts and seeds of conifers. It is said to hold nuts and cones with its foot and to extract the kernels by repeated blows of the bill.

A closely related American bird is Clark's crow (*Picicorvus columbianus*), discovered by the Lewis and Clark expedition in 1804-06. It is about one foot long, of a generally gray color, the wings and tail black with large white areas. It inhabits the coniferous belt of the Rocky Mountain slopes and congregates in great flocks, which rove in search of food. The well-concealed nest is built in the tops of pine trees in the highest mountain ranges. Consult Coues, 'Birds of the Northwest' (1874).

NUTHATCHES, small passerine birds forming the family *Sittidae*, related to the titmice, from which, and from the creepers, they are readily distinguished by the long, straight, slender bill. The typical genus (*Sitta*), with about 15 species, is confined to North America, Europe and Asia, but some related genera are found in the southern hemisphere. In the United States we have four species and several sub-species. The common resident eastern species (*S. carolinensis*) is nearly six inches long and has the under parts white, but is blue on top, and has a green-back crown. The red-bellied nuthatch (*S. canadensis*) is an inch shorter, with the under parts rusty brown and the glossy black cap cut by a pure white stripe on each side. This is a migrant species, which breeds in the Northern States and Canada and on mountain tops, but in winter extends its range to the Gulf Coast. Two still smaller species, the brown-headed nuthatch (*S. pusilla*) and the pigmy nuthatch (*S. pygmaea*), are respectively southern and far western. Both have the crown brown, not black, as in the other two species, and *S. pygmaea*, which is only four inches long, may be distinguished by the black and white markings on the middle tail-feathers, which are plain in *S. pusilla*. The habits of all are similar. They spend their time in traveling restlessly up and down the trunks and limbs of trees in the most nimble manner, hanging in any attitude supported by their strong, large feet alone and without the assistance of the tail. Consequently they display greater freedom of movement than either the woodpeckers or the

creepers. Their food consists chiefly of insects and their eggs. In the autumn and winter they have the habit of wedging acorns and nuts firmly in crevices, and hacking them with the bill till they break open; this is done partly for the kernels and partly for the grubs which they frequently contain. From this habit the common name is derived. Their only note is a hoarse call. They nest in holes in trees, often in crevices beneath bark, and lay four to eight speckled eggs.

NUTLEY, N. J., town in Essex County, five miles north of Newark and eight miles south of Paterson. The town was settled in 1680 and has several picturesque old colonial Dutch stone houses. Nutley was included in the Newark Patent of 1713 and when the townships were formed it became part of Bloomfield in 1812, part of Belleville in 1874, was formed into the Franklin township in 1882 and finally in 1902 it was incorporated as the town of Nutley. Nutley is practically a residential suburb of New York and contains many handsome houses. It possesses a Carnegie library, the Nutley School and an attractive high-school building. The chief industries are paper and woolen mills. In 1912 the commission form of government was adopted. Pop. (1920) 9,421.

NUTMEG, the hard kernel of the fruit of various species of *Myristica*, especially *M. fragrans* or *moschata*, of the order *Myristicaceæ*. The common nutmeg tree grows about 25 feet high, bears oblong, entire leaves, axillary racemes of small flowers, followed by golden yellow pear-shaped fruits which split in halves, exposing the kernel surrounded by a false aril which forms the mace (q.v.) of commerce. The fleshy halves of the fruit are used as preserves in countries where the trees are cultivated. Various species are cultivated in the tropics, particularly the East Indies, West Indies and Brazil. They are among the most important spices as which they are chiefly used. A fatty oil called oil of mace is expressed from the seed, and a nearly colorless essential oil is obtained by distillation. The tree thrives in the West Indies up to elevations of 2,000 feet, but is less productive there than at lower altitudes. It does best in a well-drained, rich loam, in warm, protected valleys.

NUTMEG-BIRD, a name among bird-dealers for an East Indian mynas (*Munia undulata*), also known as cowry-bird; it is brown, with white streaks above and spots below, a yellow rump and a white middle to the under parts. An Eastern fruit pigeon (genus *Myristicivora*) is also so called, because it feeds upon the nutmeg fruit.

NUTMEG MELON. See **MELONS**.

NUTMEG STATE, a popular name for the State of Connecticut, derived from the alleged ingenuity of Yankee inventors who were facetiously charged with manufacturing wooden nutmegs to be sold as genuine.

NUTRIA. See **COYPU**.

NUTRITION OF FARM ANIMALS, *The*. The common domestic animals are fed for a variety of purposes. With cattle, sheep and pigs it is the object to induce gains in weight, that is, to fatten them, or in the case of milk cows, to produce gains in the form of body secretion—milk, rather than fat on the

body. In a similar way, sheep are fed for the production of wool; goats for milk or their fleece, and poultry for the market and the production of eggs. Cattle are sometimes, and horses are almost universally, fed as beasts of burden. Animals with young require food for their development and after birth the young animal needs it for growth and the development of the body as well as for maintenance.

A great deal of information regarding food requirements has accumulated from the experience of countless generations and for many years the problem has been studied experimentally at agricultural colleges, experiment stations and similar institutions, in this and other countries. It is fair to say, at the present time, that the feeding of farm animals rests upon quite well-defined general principles, derived from the studies of the chemist and the animal physiologist, concerning the composition and functions of food and the way it is utilized after it is eaten. Such studies show that the materials composing the body are constantly breaking down and being consumed and that to keep the animal in a healthy and vigorous condition requires a constant supply of new material; if this is lacking or is insufficient, hunger and finally death result. To supply the needed materials for growth, maintenance and repair is one of the chief functions of food, but in addition to this it maintains body temperature and also furnishes the force or energy which enables the animal to do work, including that pertaining to the necessary functions of the body, such as keeping up the beating of the heart, the respiratory movements and so on. Since it furnishes heat and energy, the food may be said to serve as fuel. If, in addition to maintaining the system, growth is made, as in case of a young animal, or milk is secreted, more food is needed than for maintenance. If the supply is in excess of all demands, some is stored as a reserve material, principally in the form of fat. To supply food in the right proportions to meet the various requirements, without waste, constitutes scientific feeding. By carefully studying the composition of feeding-stuffs, the proportion in which they are digested and the requirements of different animals when at rest, at work, producing wool, giving milk, etc., the principles of feeding have been deduced. In applying these in practice, the cost and special adaptations of different feeding-stuffs must also be taken into account.

The animal body and the different feeding-stuffs which nourish it are all made up of a comparatively few chemical compounds, namely, water, ash or mineral matter, and the so-called nutrients, protein, fats and carbohydrates, the carbohydrates being subdivided into two groups, namely, "nitrogen free extract," that is, sugars, starches, etc., and "crude fibre." Of these protein is the only nutrient which supplies nitrogen, the characteristic element of body tissue in the right form, and is, therefore, the only one which can truly serve for building and repairing the flesh and other nitrogen containing portions of the animal body. Mineral substances are also essential for tissue building as well as other purposes. Fats and carbohydrates serve as fuel and yield energy in the forms of heat and muscular power. Protein may also serve as a source of energy and thus has a two-fold function.

Water.—Water, though not a nutrient, is essential, being needed to dilute the blood and for other physiological purposes. All animals also require oxygen of the air for maintaining the life processes. Water constitutes from 40 to 60 per cent and ash from 2 to 5 per cent of the body; fat varies greatly with the condition of the animal, but seldom falls below 6 or rises above 30 per cent. The dry matter of the flesh, skin, bones, muscles, internal organs, brain and nerves, in short, all the working machinery of the body, is composed quite largely of protein.

Accessory Substances.—Recent investigations have indicated that in addition to the foregoing ingredients there are present in feeding-stuffs minute quantities of other substances, variously known as "vitamines," "accessory ingredients," "growth substances," "stimulating substances," etc. However, the prevailing opinion is that they are not substances with stimulating or some other special function, but that they are rather to be regarded as food constituents in the same sense as mineral matter and protein are food constituents and that, like them, they are indispensable for body growth and development. Their nature and function are not yet fully understood but it is known that their absence from the ration may constitute a limiting factor in growth, may influence reproduction or may lead to the development of specific diseases. Fortunately these substances are usu-

ally plentiful in the leafy portions of plants, and rations containing such materials as pasturage clover hay, alfalfa hay, corn fodder or corn silage are comparatively unlikely to prove deficient in this respect. See NUTRITION OF MAN for more extended discussion of nutrients.

Character of Food.—The feeding-stuffs of most importance for farm animals are of vegetable origin and include cereal grains; such as oats and corn, either ground or unground, and the milling by-products, such as middlings and bran; leguminous seeds, as beans, peas and cow-peas; oil cakes and other commercial by-products, as linseed-oil cake, cotton-seed meal, gluten feed and so on; fodder crops, fresh and cured; and the different roots, tubers and green vegetables. In quite recent times, cane molasses, beet molasses and other beet-sugar by-products have also assumed more or less importance in this connection. As regards feeding-stuffs of animal origin, milk is the natural food of the young of all mammals. After weaning, skim-milk is a common food, especially for pigs. Dried blood, meat meal and similar feeds of animal origin are also sometimes fed. The composition of a number of the more important feeding-stuffs may be seen by reference to the subjoined table, which shows the average composition as determined by analysis and also the digestible nutrients furnished by each 100 pounds of the feeding-stuffs.

It will be seen that the cereal grains resem-

TABLE I.—AVERAGE COMPOSITION OF A NUMBER OF FEEDING-STUFFS.

KIND OF FEED	Percentage composition						Digestible materials in 100 pounds			Energy in 100 lbs. digestible nutrients
	Water	Protein	Fat	Nitrogen free extract	Crude fibre	Ash	Protein	Fat	Carbohydrates	
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Lbs.	Lbs.	Lbs.	Calories
Corn fodder.....	79.3	1.8	0.5	12.2	5.0	1.2	1.10	0.37	12.08	26,080
Kafir corn fodder.....	73.9	2.3	0.7	15.1	6.9	2.0	0.87	0.43	13.80	29,100
Oat fodder.....	62.2	3.4	1.4	19.3	11.2	2.5	2.44	0.97	17.99	42,090
Meadow fescue.....	69.9	2.4	0.8	14.3	10.8	1.8	1.49	0.42	16.78	34,760
Timothy.....	61.6	3.1	1.2	20.2	11.8	2.1	2.01	0.64	21.22	45,910
Kentucky blue grass.....	65.1	4.1	1.3	17.6	9.1	2.8	2.66	0.69	17.78	40,930
Red clover.....	70.8	4.4	1.1	13.5	8.1	2.1	3.07	0.69	14.82	36,190
Alfalfa.....	71.8	4.8	1.0	12.3	7.4	2.7	3.89	0.41	11.20	29,800
Cowpea, forage.....	83.6	2.4	0.4	7.1	4.8	1.7	1.68	0.25	8.08	19,210
Corn silage.....	74.4	2.2	1.1	15.0	5.8	1.5	1.21	0.88	14.56	33,050
Corn fodder, field cured.....	42.2	4.5	1.6	34.7	14.3	2.7	2.34	1.15	32.34	69,360
Oat hay.....	16.0	7.4	2.7	40.6	27.2	6.1	4.07	1.67	33.35	76,650
Timothy hay.....	13.2	5.9	2.5	45.0	29.0	4.4	2.89	1.43	43.72	92,730
Hay from mixed grasses.....	15.3	7.4	2.5	42.1	27.2	5.5	4.22	1.33	43.26	93,930
Red clover hay.....	15.3	12.3	3.3	38.1	24.8	6.2	7.36	1.81	38.15	92,320
Alfalfa hay.....	8.4	14.3	2.2	42.7	25.0	7.4	10.58	1.38	37.33	94,940
Cowpea hay.....	10.7	16.6	2.9	42.2	20.1	7.5	10.79	1.51	38.40	97,870
Mangel wurzels.....	91.2	1.4	0.2	5.4	0.8	1.0	1.03	0.11	5.65	12,890
Turnips.....	90.6	1.3	0.2	5.9	1.2	0.8	0.81	0.11	6.46	13,990
Corn, underground.....	10.9	10.5	5.4	69.6	2.1	1.5	7.14	4.97	66.12	157,220
Oats.....	11.0	11.8	5.0	59.7	9.5	3.0	9.25	4.18	48.34	124,760
Wheat.....	10.5	11.9	2.1	71.9	1.8	1.8	10.23	1.68	69.21	154,850
Cowpeas.....	14.8	20.8	1.4	55.7	4.1	3.2	18.30	1.10	54.20	139,490
Corn meal.....	15.0	9.2	3.8	68.9	1.9	1.4	6.26	3.50	65.26	147,800
Gluten meal.....	8.6	30.0	8.8	49.2	2.6	0.8	21.56	11.87	43.02	170,210
Gluten feed.....	7.8	23.4	8.3	53.2	6.2	1.1	19.95	5.35	54.22	160,530
Brewers' grains, dried.....	8.0	24.1	6.7	44.8	13.0	3.4	19.04	6.03	31.79	119,990
Wheat bran.....	11.9	15.4	4.0	53.9	9.0	5.8	12.01	2.87	41.23	111,140
Wheat middlings.....	12.1	15.6	4.0	60.4	4.6	3.3	12.79	3.40	53.15	137,000
Cotton-seed meal.....	8.2	42.3	13.1	23.6	5.6	7.2	37.01	12.58	16.52	152,650
Cotton-seed hulls.....	11.1	4.2	2.2	33.4	46.3	2.8	1.05	1.89	32.21	69,840
Linseed meal, new process.....	9.9	35.9	3.0	36.8	8.8	5.6	30.59	2.90	38.72	141,160
Sugar-beet pulp, fresh.....	89.9	1.0	0.2	6.3	2.2	0.4	0.63	.....	7.12	14,420
Sugar-beet pulp, dry.....	6.4	10.8	1.3	58.4	19.8	3.3	6.80	.....	65.49	134,460
Beet-sugar molasses.....	25.7	27.3	.....	658.2	.....	8.8	7.30	.....	58.20	259,180
Cane-sugar molasses.....	25.1	22.4	.....	669.3	.....	3.2	3.20	.....	69.30	298,300
Whole milk.....	87.2	3.6	3.7	4.9	.....	0.7	3.48	3.70	4.77	30,870
Skim milk.....	90.6	3.2	0.3	5.2	.....	0.7	2.94	0.29	5.24	16,439

a Largely non-albuminoid nitrogenous materials.

b Very largely sugars.

ble one another quite closely in composition, being characterized by a fairly low water content and a considerable amount of protein and nitrogen-free extract. Some crude fibre derived largely from the outer or bran layer of the grain is also present. Bran, shorts, middlings and other by-products and cereal grains vary in composition, but all have a low water content while the crude fibre content is rather high, and the nutritive ingredients are principally protein and carbohydrates. The large proportion of crude fibre is due to the fact that these products represent the outer layers of the grain, which are more hard and firm in structure than the interior portion which consists quite largely of starch. Beans, peas and leguminous seeds resemble the cereal grains in having a low water content, though in general they furnish a higher percentage of protein. Such foods are known to be useful and valuable, but with the possible exception of cowpeas, they are not very commonly fed in the United States, although much used in Europe.

Concentrated Feeds.—The various cakes, gluten meals and similar feeding-stuffs are, generally speaking, commercial by-products. Thus, cotton-seed cake is the material left after the oil has been expressed from the cotton seed. In the same way linseed cake is the residue obtained from flaxseed in the manufacture of linseed oil. When these are ground they become cotton-seed meal and linseed meal. In the manufacture of beer the malted grain remaining is known as brewers' grains, and is best fed after drying. When starch is manufactured from corn, the nitrogenous portion of the grain is rejected and constitutes gluten feed and gluten meal. There are a number of mixed feeds on the market which are made up of shrunken grains, branny material and other residues obtained in the manufacture of cereal breakfast foods, etc. These vary in feeding value, some of them comparing favorably with more common cereal feeds. Grain, ground and unground, commercial by-products, leguminous seeds, oil cakes and similar products are very frequently called concentrated feeds, the name being suggested by the fact that their feeding value, especially the protein content, is high in comparison with the bulk. So far as the general experience and the result of American and foreign experiments go, most of the common feeding-stuffs in the group are wholesome and valuable.

Forage Crops.—The various forage crops—grass, clover, Kafir corn, corn, etc., all have a high water content when fresh, that is, they are more or less succulent and juicy. They contain, however, considerable nutritive material, chiefly protein and carbohydrates, and are valuable feeding-stuffs. The leguminous forage crops—alfalfa, clover, cowpeas, soy beans, vetch, etc.—are richer in protein than the grasses. When forage crops are dried and cured the resulting hay is richer in proportion to its bulk than the green material; in other words, it has been concentrated by the evaporation of the greater part of the water present. However, this is not the only change which has taken place. When hay is properly cured, it undergoes a peculiar sort of fermentation or oxidation materially affecting its composition,

improving the hay by diminishing the quantity of crude fibre and by increasing the relative amount of other nutrients, especially nitrogen-free extract. Hay which has undergone proper curing has a better flavor and agrees better with animals and is apparently more digestible than hay which has dried quickly in the sun without fermentation.

The feeding value of different forage crops, fresh and cured, depends in considerable degree upon the stage of growth, the nutritive value of the crop, generally speaking, increasing until the growth is complete and diminishing somewhat as the plants mature or become overripe. Straw, the fully ripened stalk of cereal grains, contains some nutritive material, but is less nutritious than the same portion of the plant cut before ripening. In the perfectly ripe condition the nutritive material, elaborated in different portions of the ordinary forage plants, has been largely conveyed to the seed and used for its development or stored as reserve material. Young animals get needed mineral matter from milk. Later forage crops, fresh and cured, are important sources of mineral matter, indispensable for growth, development and health.

Silage.—Green forage crops are frequently preserved by ensiling. In this process the material undergoes a peculiar oxidation which correspondingly changes it in composition and food value. Some of the carbohydrates are changed into alcohol, acetic and other acids, and crude fibre is undoubtedly softened somewhat, and possibly the silage is thus rendered more digestible. Bodies having peculiar flavor and odor are also formed. By far the most important crop ensiled is corn, but various sorghums are also satisfactorily used. Green cereals are less satisfactory, but some of the legumes may be employed, as well as such materials as beet pulp, beet tops, refuse from pea canneries, etc.

Roughage.—The green crops, hay, straw and other cured crops and silage, are frequently called "coarse fodder" or "roughage." This term is due to the fact that they contain a comparatively small amount of nutritive material and a high proportion of crude fibre as compared with their total bulk. Although pound for pound inferior to concentrated feeds in composition, they are an essential part of the ration of farm animals, capable of producing a large part of the total food material, as well as serving to give the required bulk to the food and being useful in other ways, among them their richness in the "accessory substances" previously referred to. It is believed that unless the food when taken into the stomach is comparatively bulky and the mass is more or less loose in structure, it is not readily acted on by the digestive juices.

The outcome of many experiments made with farm animals is in accord with the observation of careful feeders: namely, that the various common coarse fodders may be fed very largely as circumstances demand. Although timothy hay is still regarded, in some regions, and corn fodder in others, as the best coarse feed, yet experience has shown that both these feeds, corn silage, and also hays from the cereal grains and from clover and alfalfa, are all of great value.

Fresh herbage was, of course, the original food of domestic animals, and in early times natural pasturage was almost entirely depended upon to support them during a considerable part of the year. The importance of pasturage is still conceded, but the fact is also recognized that if, owing to drought or other cause, the supply is insufficient, other food will be needed. When green food is cut and fed fresh to farm animals, more or less confined, the practice is called "soiling," and is becoming quite prevalent, especially in older countries where land is expensive. Partial soiling is much more common, being relied upon to carry animals through the period when pastures are short. Under the soiling system, a larger number of animals can be kept upon a given acreage, and by allowing open air exercise in a large yard or pasture, the practice has been demonstrated as entirely feasible for dairying animals. On an average, carrots, Swedish turnips or rutabagas and other roots and tubers, green vegetables and fruits contain a high percentage of water and small amounts of the different classes of nutrients. The percentage of crude fibre is smaller than in the green forage crops; but since the proportion of nutritive material is small in comparison with the total bulk, they are ordinarily referred to as coarse fodder. The establishment of beet-sugar factories in this country has led to the production of immense quantities of sugar-beet pulp as a waste material, sometimes called "diffusion residue," or "beet chips," which consist of the residue of the beet after the extraction of the sugar under pressure in the diffusion batteries. This is used as feed. Sugar-beet molasses is another product of the beet-sugar manufacture which accumulates in large quantities, and both this and cane molasses are coming to be regarded as an important feed. It owes its value largely to the sugar in it.

Preparing Feed.—It is often claimed that cooking feed increases its palatability and digestibility. The general opinion drawn from experiments with farm animals is that this belief is not warranted and that the cost of cooking is not made up for by the increased value of the ration. Soaking feed, especially hard grain, renders it more easily masticated, and possibly increases its digestibility, but the general conclusion is that the importance of soaking feed for most farm animals is overestimated. Opinions differ as regards the advantages of grinding grain, but from the results obtained in a large number of tests with farm animals it does not appear that the superiority of ground over unground grain is sufficient to pay for the cost of grinding, provided the animals have good teeth and sufficient time to chew their food thoroughly. Chaffed or chopped coarse fodder occupies less space for storage than uncut hay or straw and can be readily handled. Shredding corn fodder is a useful practice, and more of the stalks and harder portions will be eaten than when fed whole, but for most farm animals in general the practice of cutting or chopping coarse fodder is much less followed in the United States than in Europe. Precaution should always be taken to avoid feeding-stuffs which are harmful in themselves or which become harmful. Dirt, small stones, etc., should be removed from grain by proper screening and all feeding-stuffs should be clean. Moldy feeds and those which are more or less

decomposed are unwholesome and may prove a cause of various diseases. Plants which are infested with ergot are also harmful. There are a number of plants which are poisonous to stock, such as rattlebox (*Crotalaria sagittalis*), loco weeds (*Astragalus* sps.), larkspur (*Delphinium* sps.), death camas (*Zygadenus venenosus*), water hemlock (*Cicuta* sp.), etc., and care should be taken to prevent animals from securing them. An explanation of the poisoning of stock by young sorghum and other green plants ordinarily wholesome is offered by the discovery of a peculiar glucosid, which with the aid of a special ferment, also present in the plants, liberates prussic acid. This is doubtless always present in at least minute traces, but apparently becomes dangerous when the plant is arrested in dry weather at certain stages of its growth. Sunlight such as prevails in the arid and semi-arid regions of the United States sometimes causes the development of the poison in excess.

Digestibility of Feeds.—The real value of any feeding-stuff is determined not alone by its composition, but also by its digestibility; that is, by the amount of material which it gives up to the body in its passage through the digestive tract. It is evident that if two feeding-stuffs have practically the same composition, but one gives up more material to the body than the other—that is, is more thoroughly digested—it must actually be more valuable than the other material. The bulk of the substance of almost all feeding-stuffs is insoluble when eaten or not in the right condition for body use. Material in solution can pass through the walls of the stomach and intestines into the circulation and be utilized by the body; therefore, digestibility consists chiefly in rendering insoluble materials soluble. This is effected by the aid of digestive ferments and also to a less extent by bacteria. The usual method of ascertaining the digestibility of a given material is to feed it for a longer or shorter time, the amount and composition being determined. From the total nutrients consumed, the amounts excreted undigested in the faeces are deducted, showing the amount of each retained in the body. It is the usual custom to express the amounts digested in percentages, the results thus obtained being termed coefficients of digestibility. As regards the results of digestion experiments with farm animals as a whole, it may be said that the percentage of protein digested is fairly high, being greater in grains and seeds than in hay or grasses. Generally speaking, the value obtained for the digestibility of fat is rather low, but there are reasons connected with the analytical methods commonly followed which render the results obtained with fat not altogether satisfactory. Nitrogen-free extract is quite thoroughly digested by farm animals, but crude fibre is much less thoroughly assimilated. Farm animals differ considerably as regards the thoroughness with which they digest their foods. It seems fair to say that, in general, ruminants digest a larger percentage of fats and carbohydrates, including crude fibre, than horses, the difference being most marked in the case of the crude fibre. Pigs ordinarily digest their food quite thoroughly. These results are in accord with what might be expected from differences in the digestive organs of the different classes or animals.

Food Requirements.—Attempts have been made to ascertain the food requirements of various kinds of farm animals under different circumstances, and large numbers of feeding experiments have been made under varying conditions with this end in view. From the results various feeding standards have been deducted which attempt to show the amounts of digestible protein, fat and carbohydrates supposed to be best adapted to different animals when kept for different purposes.

The feeding standards prepared by Wolff, a German investigator in animal nutrition, as well as their energy requirements, were formerly the most widely used of any. Wolff's standards have been modified by Lehmann, as the result of additional experiments and practical experience, and also in the attempt to adapt them more closely to the practical needs of the animal. A number of these standards are as follows:

statement of the amounts of the different nutrients required by animals, as indicated by the results of experiments and observation, and are intended to apply to the average conditions. No single standard can be laid down for all conditions, nor need a standard be adhered to arbitrarily. Good judgment and intelligent observation on the part of the feeder are also necessary.

The value of any ration which may be determined upon may be calculated with the aid of the feeding standard and the figures in Table I. Suppose four pounds of oats constitute one of the ingredients of a ration. According to the table, it is evident that if 100 pounds of oats furnish 9.25 pounds of digestible protein, one pound will furnish .0925, and four pounds will furnish .37000. In the same way, if 100 pounds of oats supply 124,760 calories of energy, one pound will furnish 1247.60 calories and four pounds will furnish 4990.40. The sums of the protein supplied by all the feeds show the

TABLE II.—WOLFF-LEHMANN FEEDING STANDARDS.
(Amounts of nutrients required per day per 1,000 pounds live weight)

ANIMAL	Total dry matter	Digestible nutrients			Fuel value
		Protein hydrates	Carbo-hydrates	Fat	
	Pounds	Pounds	Pounds	Pounds	Calories
Oxen at medium work.....	25	2.0	11.5	0.5	27,200
Oxen at heavy work.....	28	2.8	13.0	0.8	32,760
Fattening cattle:					
First period.....	30	2.5	15.0	0.5	34,650
Second period.....	30	3.0	14.5	0.7	35,500
Third period.....	26	2.7	15.0	0.7	35,900
Milch cows:					
Giving 11 pounds milk per day.....	25	1.6	10.0	0.3	22,850
Giving 16.5 pounds milk per day.....	27	2.0	11.0	0.4	25,850
Giving 27.5 pounds milk per day.....	32	3.3	13.0	0.8	33,700
Fattening sheep:					
First period.....	30	3.0	15.0	0.5	35,600
Second period.....	28	3.5	14.5	0.6	36,000
Horses:					
Light work.....	20	1.5	9.5	0.4	22,150
Medium work.....	24	2.0	11.0	0.6	26,700
Heavy work.....	26	2.5	13.3	0.8	32,750
Fattening swine:					
First period.....	36	4.5	25.0	0.7	57,800
Second period.....	32	4.0	24.0	0.5	54,200
Third period.....	25	2.7	18.0	0.4	40,200

Recent investigations of the experiment stations of this and other countries have shown that in some respects these standards, which are still much used, are inaccurate, and extensive modifications, calling especially for less protein, have been proposed by Henry and Morrison. Other standards, based on determinations of net energy values, have been proposed by Armsby for several kinds of livestock, and by Bull and Emmett for fattening lambs. In Denmark and other Scandinavian countries what is known as the "feed unit" system is used for measuring the relative efficiency of milk production by different herds and individual cows. Standards for dairy cows have also been formulated by Haecker, Woll and Humphrey, Savage and Eckles. Of special interest are Armsby's discussions of the economics of animal feeding from the standpoint of the conservation of food energy.

It should be borne in mind that the feeding standards are simply a concise and approximate

total amount in the ration, and so on, with all the other nutrients, and with the energy. In making such calculations, it is a common practice to consider only the protein and energy value since these factors show features of the food best understood and the calculation is somewhat simplified without materially lessening the value of the results. Too little is known as yet to warrant similar calculation for mineral substances and vitamins. It is believed that well-chosen rations as regards protein and energy will supply these needs also. It is not necessary that a ration should furnish each day the exact amount called for by a standard, but rather that it should approximate it through long periods, a slight deficiency at one time being made up by a corresponding excess at another.

In calculating rations it is essential that weights be used rather than measures. It is often inconvenient to weigh the grains, but the weight may be calculated with sufficient ac-

curacy by the figures given below, which show the weight of a quart of a number of common feeding-stuffs.

Some of these materials, especially by-products like wheat bran, vary considerably in weight, and the given figures cannot be regarded as strictly accurate. Weighing is, of course, always the safer way where it is desired to feed quite definite amounts. In selecting feeding-stuffs for his stock, the farmer will naturally be governed by the conditions of the market. The cost of feeding-stuffs is controlled by other factors than the actual amounts of food materials which they contain; indeed, there often appears to be very little connection between the two. Bearing in mind that the protein is the most expensive ingredient, and the one especially sought in concentrated feeds, the farmer can make his selection with the aid of such data as are given in Table I. Of course, the special adaptability of some materials to different kinds of animals and different purposes will also be taken into account.

WEIGHT OF FEEDING-STUFFS PER QUART.

	lbs.	oz.
Corn, cracked.....	1	12
Corn meal.....	1	8
Corn-and-cob-meal.....	1	6
Oats, whole.....	1	12
Oats, ground.....	1	14
Wheat, whole.....	1	8
Wheat bran.....	1	2
Wheat bran, coarse.....	1	13
Wheat middlings.....	1	11
Wheat middlings, coarse.....	1	3
Gluten meal.....	1	2
Gluten feed.....	1	8
Linseed meal.....	1	10
Cotton-seed meal.....	1	10
Alfalfa meal.....	1	5
Sugar beet pulp, dry.....	1	
Cocoanut cake.....	1	

Another important consideration where fertilizers or manures have to be relied upon is the manurial value of a feeding-stuff. If the manure is carefully preserved a large proportion of the fertilizing constituents of the feed is recovered in the manure and goes to enrich the land. See FERTILIZERS.

With respect to some feeds—the coarser grain products, for instance—which could be eaten either by man or by farm animals, it should be borne in mind that their fertilizer value would commonly be lost in the former case and saved in the latter, since house sewage is seldom and farm manure generally used for fertilizer.

Feeding-Stuff Inspection.—About three-fourths of the States have passed laws requiring that the composition of certain classes of feeding-stuffs be guaranteed by the manufacturer, and providing an inspection of these goods to see that the guaranty is complied with. In most cases the laws require that each package be labeled to show the protein and fat content, and often the maximum content of fibre. These laws in general apply only to the so-called concentrated feeding-stuffs, especially the by-products and mixed feeds, and not the cereal grains sold as such. The inspection is usually in charge of the Agricultural Experiment Station or the State Department of Agriculture and is managed very similarly to the fertilizer inspection. The need for this inspection arises from the quite wide variation

in the composition of many of the by-products, the confusion of names, as in the case of the by-products from starch manufacture, the large number of mixed feeds which are put upon the market under proprietary names, and the occasional tendency to mix with the material substances of inferior value. The feeding-stuff inspection protects the farmer from fraud in the same way as the fertilizer inspection, and gives him the benefit of a guaranteed composition in buying. The result of this inspection, which has been in operation a number of years, has been quite marked in driving inferior grades of goods, like adulterated cotton-seed meal, out of the market, and tending to bring about greater uniformity in composition in the case of standard by-products.

The Federal Food and Drugs Act of 1906 specifically includes in its scope the food of animals. It thus constitutes an additional safeguard against the adulteration or sophistication of feeding-stuffs entering into interstate commerce.

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NUTRITION OF MAN. The term nutrition includes the sum of the processes by which an animal or plant absorbs and utilizes food substance. To be properly nourished, man must be supplied at suitable intervals with the foods which will best serve to build the body, maintain it in health and permit of the performance of the necessary amount of work. Food may, therefore, be defined as the nutritive material taken into the body for the purpose of growth and repair and for the maintenance of the vital processes. The body may be likened to an intricate engine which has to be built, kept in repair, supplied with fuel and operated. Food serves all these functions in the working machine, and in the intelligent selection of human food no function must be neglected.

Composition of Food.—A study of foods shows that they are made up of a few chemical constituents, namely, protein, fat, carbohydrate and ash, together with more or less water and in some cases with minute amounts of the newly-recognized vitamins. The first three of these constituents are organic compounds of carbon, hydrogen and oxygen, the proteins having in addition nitrogen, sulphur and occasionally other elements, such as phosphorus and iron. As regards the group *protein* the molecule is very complex and may vary within wide limits while still possessing certain common characteristics. It may be likened to a chain, longer or shorter, made of links which differ in number, kind or arrangement. There are 18 different kinds of links (amino acids) in most of the food proteins, but there are certain proteins which lack one, two or three kinds of links and are thus incomplete unless combined with others furnishing the lacking links. For convenience we may roughly divide the common proteins into two groups according to their make-up of amino acids. First, the complete proteins containing all essential amino acids, such as milk, eggs and meat, and certain vegetables, such as soy beans and peanuts; second, incomplete proteins including most of the vegetable proteins.

The group *fat* includes the fat of meat, such

as suet and lard, the fat of milk (butter), and true vegetable fats and oils like olive, corn and cotton-seed oil. Associated with these are the fat-like substances or lipoids, such as the phospholipins and phosphatids of egg yolk and of active animal and vegetable tissues. As the fats and fat-like substances differ from the other constituents of food in being soluble in ether, the term "ether extract" is often and quite properly applied to this group.

The group *carbohydrate* includes the sugars, starches, pentosans, celluloses, crude fibre, and other bodies of a similar chemical structure, all of which can more or less readily be broken down into the simple sugars. The group is usually divided according to the analytical methods followed in estimating it into nitrogen free extract" and "crude fibre," the former division including principally sugars, starches and most of the pentosans, and the latter cellulose, lignin and other woody substances which very largely make up the rigid structure of plants. The human body has the power of utilizing principally the sugars and starches as food, but the cellulose and other practically non-digestible carbohydrates may, however, serve a useful purpose in giving bulk to the food residues and thus facilitate their passage along the digestive tract. The carbohydrates occur chiefly in vegetable foods, although some are found in animal foods, such as the lactose, or milk sugar, in milk and glycogen in liver.

The group *mineral matter* includes the inorganic elements present in the form of salts or in combination with organic material in the juices and tissues of the different foods, the principal elements found being sodium, calcium, magnesium, iron, chlorine, fluorine, phosphorus and sulphur. The term "ash constituents" is often and very appropriately used for this group, since the mineral matter represents the incombustible portion which remains when any given food is burned. The ash constituents are present to some extent in all foods, with the exception of a few such as refined sugar, purified oils and pure starches. The proportion is much greater in milk, vegetables and fruits than in other foodstuffs.

The group of *vitamins*, or accessory factors, is composed, according to present knowledge, of two as yet unidentified substances, one soluble in fat and commonly known as fat-soluble A and the other soluble in water and known as water-soluble B. The water-soluble substance is present in nearly all common foods. It is not found, however, at least appreciably, in polished rice, commercial starch, pure sugar or in fat of either animal or vegetable origin. The fat-soluble substance is less widely distributed. It is found in the fats of milk, eggs and organs and in the green leaves of plants but is not found in seeds—save in or related to the germ—or in oils, such as olive oil and those from oil-bearing seeds, such as cotton seed. The occurrence of a third vitamin is claimed and the name water soluble suggested.

Water is present in practically all foods, predominating in fresh fruits and succulent vegetables.

Food as it is bought or even as served on the table contains more or less material which is not or cannot be eaten, such as the bones of meat and fish, the shells of eggs and the skins

and seeds of vegetables and fruits. In discussing the chemical composition of foods, such portions are usually spoken of as refuse, but they form an important item when the actual cost of the nutrients of food is considered.

Composition of the Body.—The human body is composed of the same general constituents as are the foods. Proteins are the most important constituents of body tissues, including the muscles and internal organs. Analyses of body tissues show that they are made up of the same links or amino acids as are the food proteins, but generally in a different form of linkage, so that it is necessary that the chains which are supplied by the food should be more or less completely unlinked and recombined in new form. The fat in the human body is found in adipose tissue, around certain organs, and joined with protein in complex combinations of still unknown composition in cellular protoplasm. Carbohydrates are present as glycogen in the liver and muscles and circulating as sugar through the blood. Mineral matter is found in the skeletal structure and active protoplasm and in the body fluids. The vitamins are present in the secretions of the mammary glands and the fat-soluble form in the fat of the active organs. Water is present in the body tissues and fluids.

Digestion and Absorption of Foods.—The similarity in composition of foods and of the human body shows that one important function of food is to furnish the necessary materials for the building and repair of the body. The food materials are made ready for this purpose by the process of digestion which consists in separating the useful portion of food from that useless to the body; breaking down complex substances into simpler forms, in dissolving and emulsifying and so making food capable of diffusion through the lining of the digestive tract. This is accomplished with the aid of digestive ferments or enzymes which are contained in the saliva, in the gastric juice of the stomach, and in the pancreatic juice of the intestines. The saliva has the power of changing starches into sugar. The gastric juice acts upon proteins and to a slight extent upon fats, and the pancreatic juice upon the proteins, fats and carbohydrates. The chemical change involved is in all cases hydrolysis, that is, the addition of the elements of water in such a way that simpler products are formed. Digestion is aided by the fine division of the food in chewing and by muscular contractions—the so-called peristaltic action of the stomach and intestine—which helps to mix the digestive juices and their enzymes with the food. The digested food passes through the walls of the alimentary canal into the blood. The heart pumps the blood containing the nutrients of the digested food and the oxygen which it gets in the lungs all over the body, and thus the organs and tissues are supplied with the materials which they need for their particular functions.

The protein materials have been broken down during digestion into the separate links or (amino acids), or simple combination of links of which they were composed, and the tissues now select the necessary links and rearrange them into new chains. The growth

of protein tissues, muscles, liver, kidney, blood, etc., is obviously dependent upon the supply of the proper amount of the required kinds of links, otherwise the needed protein chains cannot be formed. The processes of daily life cause the breaking down of a certain amount of the living tissue of the protein-rich type, and if the body is to be maintained this must be replaced or repaired from the protein which the food supplies. This renewal and repair process in the body tissue may be likened to replacing worn or broken links. The proper selection of food proteins thus involves the use of complete proteins or such a combination of incomplete proteins that the deficiencies of one are supplied by others.

The hydrolysis products of the fats are, upon absorption, recombined into neutral fat and pass from the blood into the tissues where a part is transformed into tissue lipid or enters into combination with proteins to form some of the chemically complex substances of cellular protoplasm, cell membrane, or the central nervous system. The greater part of the fat is either used as fuel or stored for later use.

The simple sugars, which are the digestion products of carbohydrate, pass from the portal vein into the liver where they are temporarily stored as glycogen. This is given up gradually to the blood in the form of the simple sugar glucose, the content of which in the blood remains small and nearly constant. The glucose, which is thus carried to the muscles and other tissues by the blood, is partly converted into fat but to a large extent used as fuel.

The mineral matter is used as bone constituents, giving rigidity and relative permanence to the skeletal tissues, as essential elements of the organic compounds which are the chief solid constituents of the soft tissues, and as soluble salts held in solution in the fluids of the body, furnishing the material for maintaining the elasticity and irritability of muscle and nerve, the acidity or alkalinity of digestive tissues and of secretions and the neutrality or slight alkalinity of the internal fluids.

The water present in the food is not a nutrient in the sense that it serves for building tissue or yielding energy, but it is essential, serving for carrying the food in the digestive processes, for diluting the blood and for many other physiological purposes.

The changes which the vitamins undergo and their exact function are not clearly understood, as their chemical nature is as yet unknown. A deficiency of fat-soluble A causes the failure of young animals to grow under otherwise suitable conditions, and its prolonged absence from the diet may lead to a peculiar eye disease, xerophthalmia. A deficiency of water-soluble B is the cause of the disease beri-beri, marked by a degeneration of the nervous tissues. A deficiency of a third vitamin, it is claimed leads to scurvy.

Fuel Value of Food.—The activities on which the life of the body depends involve a continuous expenditure of energy, and this energy is obtained by the oxidation of carbohydrate, fat and the non-nitrogenous fraction of protein, as in the form of digestion products they circulate in the blood, meeting the oxygen taken in through the lungs. They repre-

sent the fuel of the human engine, and their calorific, or heat-producing, power, may be measured as accurately as that of coal or any other fuel by the use of an instrument known as the bomb calorimeter which measures the heat produced in the burning of a given amount of material by means of the rise in temperature of a known volume of water surrounding the bomb in which the combustion takes place. The result is expressed in calories, the amount of heat necessary to raise one kilogram of water one degree Centigrade. One gram of carbohydrate or protein has been found to produce four calories of heat, while the same amount of fat furnishes nine. If then the percentage of each of these constituents in a given food is known, its fuel value can be easily calculated. The average composition of a number of common foods and the energy which one pound will furnish when burned in the body are shown in Table I.

In the selection of a fuel there are other things to be considered than the ultimate heat which can be produced. The carbohydrates, particularly the sugars, may be likened to a quick-burning fuel, while the fats act as a more concentrated fuel, burning more slowly. Only the non-nitrogenous portion of protein is available for fuel, and this, together with the fact that a certain amount of protein is indispensable as building material, makes the use of it as a fuel expensive and extravagant. In the body all three are used in varying amounts, a shortage of one kind being made up within limits at least at the expense of others, and if there is a general shortage the body has to call upon its own tissues for fuel. Carbohydrate is burned in largest quantities, but for the sustained effort a certain amount of fat has been found necessary.

Digestibility of Foods.—The digestion of food, the exercise of the functions of the various organs and the oxidation processes result in the formation of various excretory products. The parts of the food which escape digestion are periodically given off by the intestines. Such solid excreta or feces include not only the particles of undigested food but also the so-called metabolic products, that is, residues of the digestive juices, bits of the lining of the alimentary canal, etc. Other excretory products are the urine, respired air and perspiration. One of the most important considerations in fixing upon the value of any given food is its digestibility; in other words, the proportion of its nutritive ingredients which the body can retain and utilize. As frequently employed, the term digestibility has several other significations. Thus to many it conveys the idea that a particular food "agrees" with the user; in other words, that it does not cause distress when eaten. The term is also quite commonly understood to mean the ease or rapidity of digestion, and one food is called more digestible than another because it is digested more readily or in less time. However, the term digestibility, as most commonly used in scientific treatises, refers to the thoroughness of digestion. This can be calculated for the three organic constituents and ash by the analysis of the food consumed and of the resulting feces. The relation between the constituents of the food consumed and the corresponding con-

TABLE I.—AVERAGE COMPOSITION OF SOME COMMON AMERICAN FOOD PRODUCTS.

FOOD MATERIALS (AS PURCHASED)	Refuse	Water	Protein	Fat	Carbo- hydrates	Ash	Fuel value per pound
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Calories
ANIMAL FOOD							
Beef, fresh:							
Flank.....	10.2	54.0	17.0	19.0	.....	0.7	1,085
Porterhouse steak.....	12.7	52.4	19.1	17.9	.....	0.8	1,075
Sirloin steak.....	12.8	54.0	16.5	16.1	.....	0.9	955
Rib rolls.....	.....	63.9	19.3	16.7	.....	0.9	1,030
Corned beef.....	8.4	49.2	14.3	23.8	.....	4.6	1,230
Veal: Breast.....	20.3	52.7	15.6	11.0	.....	0.8	730
Leg cutlets.....	3.4	68.3	20.1	7.5	.....	1.0	670
Mutton: Leg, hind.....	18.4	51.2	15.1	14.7	.....	0.8	875
Loin chops.....	16.0	42.0	13.5	28.3	.....	0.7	1,400
Lamb, leg (hind).....	17.4	52.9	15.9	13.6	.....	0.9	845
Pork, fresh:							
Ham.....	10.7	48.0	13.5	25.9	.....	0.8	1,300
Loin chops.....	19.3	40.8	13.2	26.0	.....	0.8	1,300
Tenderloin.....	.....	66.5	18.9	13.0	.....	1.0	875
Pork, salted, cured and pickled:							
Ham, smoked.....	13.6	34.8	14.2	33.4	.....	4.2	1,620
Salt pork.....	.....	7.9	1.9	86.2	.....	3.9	3,555
Bacon, smoked.....	7.7	17.4	9.1	62.2	.....	4.1	2,705
Poultry:							
Chicken, broilers.....	41.6	43.7	12.8	1.4	.....	0.7	290
Fowls.....	25.9	47.1	13.7	12.3	.....	0.7	750
Turkey.....	22.7	42.4	16.1	18.4	.....	0.8	1,045
Fish:							
Cod, dressed.....	29.9	58.5	11.1	0.2	.....	0.8	210
Mackerel, whole.....	44.7	40.4	10.2	4.2	.....	0.7	355
Shad, whole.....	50.1	35.2	9.4	4.8	.....	0.7	365
Shellfish:							
Oysters, "solid".....	.....	88.3	6.0	1.3	3.3	1.1	220
Lobsters.....	61.7	30.7	5.9	0.7	0.2	0.8	140
Hen's eggs.....	11.2	65.5	13.1	9.3	.....	0.9	595
Dairy products:							
Butter.....	.....	14.5	0.7	81.8	.....	3.0	3,350
Whole milk.....	.....	87.0	3.3	4.0	5.0	0.7	3,350
Skim milk.....	.....	90.5	3.4	0.3	5.1	0.7	165
Buttermilk.....	.....	91.0	3.0	0.5	4.8	0.7	160
Cream.....	.....	74.0	2.5	18.5	4.5	0.5	880
Cheese, full cream.....	.....	34.2	25.9	33.7	2.4	3.8	1,890
VEGETABLE FOOD							
Flour, meal, etc.:							
Entire wheat flour.....	.....	11.4	13.8	1.9	71.9	1.0	1,635
Graham flour.....	.....	11.3	13.3	2.2	71.4	1.8	1,625
Wheat flour, patent roller process:							
High grade and medium.....	.....	12.0	11.4	1.0	75.1	0.5	1,610
Low-grade.....	.....	12.0	14.0	1.9	71.2	0.9	1,625
Wheat breakfast food.....	.....	9.6	12.1	1.8	75.2	1.3	1,655
Corn meal.....	.....	12.5	9.2	1.9	75.4	1.0	1,615
Oat breakfast food.....	.....	7.7	16.7	7.3	66.2	2.1	1,800
Rice.....	.....	12.3	8.0	0.3	79.0	0.4	1,590
Tapioca.....	.....	11.4	0.4	0.1	88.0	0.1	1,610
Bread, pastry, etc.:							
White bread.....	.....	35.3	9.2	1.3	53.1	1.1	1,185
Whole-wheat bread.....	.....	38.4	9.7	0.9	49.7	1.3	1,115
Crackers.....	.....	5.9	9.8	9.1	73.1	2.1	1,875
Molasses.....	.....	25.1	2.4	.....	69.3	3.2	1,300
Honey.....	.....	18.2	0.4	.....	81.2	0.2	1,480
Sugar, granulated.....	.....	.....	.....	.....	100.0	.....	1,815
Vegetables:							
Beans, dried.....	.....	12.6	22.5	1.8	59.6	3.5	1,565
Beans, lima, shelled, green.....	.....	68.5	7.1	0.7	22.0	1.7	555
Cabbage.....	15.0	77.7	1.4	0.2	4.8	0.9	120
Corn, green (sweet), edible portion.....	.....	75.4	3.1	1.1	19.7	0.7	460
Lettuce.....	15.0	80.5	1.0	0.2	2.5	0.8	70
Onions.....	10.0	78.9	1.4	0.3	8.9	0.5	200
Peas, green, shelled.....	.....	74.6	7.0	0.5	16.9	1.0	455
Potatoes.....	20.0	62.6	1.8	0.1	14.7	0.8	305
Sweet potatoes.....	20.0	55.2	1.4	0.6	21.9	0.9	445
Tomatoes.....	.....	94.3	0.9	0.4	3.9	0.5	105
Turnips.....	30.0	62.7	0.9	0.1	5.7	0.6	120
Fruits, berries, etc., fresh:							
Apples.....	25.0	63.3	0.3	0.3	10.8	0.3	215
Bananas.....	35.0	48.9	0.8	0.4	14.3	0.6	290
Grapes.....	25.0	58.0	1.0	1.2	14.4	0.4	330
Oranges.....	27.0	63.4	0.6	0.1	8.5	0.4	170
Pears.....	10.0	76.0	0.5	0.4	12.7	0.4	255
Raspberries.....	.....	85.8	1.0	.....	12.6	0.6	245
Strawberries.....	5.0	85.0	0.9	0.6	7.0	0.6	170
Fruits, dried:							
Dates.....	10.0	13.8	1.9	2.5	70.6	1.2	1,420
Figs.....	.....	18.8	4.3	0.3	74.2	2.4	1,435
Raisins.....	10.0	13.1	2.3	3.0	68.5	3.1	1,405
Nuts: Almonds.....	45.0	2.7	11.5	30.2	9.5	1.1	1,615
Chestnuts, fresh.....	16.0	37.8	5.2	4.5	35.4	1.1	920
Cocanuts.....	48.8	7.2	2.9	25.9	14.3	0.9	1,370
Hickory nuts.....	62.2	1.4	5.8	25.5	4.3	0.8	1,125
Pecans.....	53.2	1.4	5.2	33.3	6.2	0.7	1,565
Peanuts.....	24.5	6.9	19.5	29.1	18.5	1.5	1,875
Walnuts, English.....	58.1	1.0	6.9	26.6	6.8	0.6	1,335
Chocolate.....	.....	5.9	12.9	48.7	30.3	2.2	2,770
Cocoa.....	.....	4.6	21.6	28.9	37.7	7.2	2,255

stituents of the feces is known as the coefficient of digestibility. From a large number of experiments, it has been calculated that on an average the different groups into which foods may for convenience be divided have the following coefficients of digestibility:

comparatively thick walls on which the digestive juices have little effect. The heat of cooking, especially with the aid of water, ruptures these cell walls and also makes the starch more soluble. In the case of breads, cakes, pastry and other foods prepared from flour, the aim

TABLE II.—COEFFICIENTS OF DIGESTIBILITY OF NUTRIENTS AND THEIR FUEL VALUE PER POUND IN DIFFERENT GROUPS OF FOOD MATERIALS.

FOOD MATERIAL	Protein		Fat		Carbohydrates	
	Digesti- bility	Fuel value per pound	Digesti- bility	Fuel value per pound	Digesti- bility	Fuel value per pound
	Per cent	Calories	Per cent	Calories	Per cent	Calories
Fish and meats.....	97	1,940	95	4,040	98	1,730
Eggs.....	97	1,980	95	4,090	98	1,730
Dairy products.....	97	1,940	95	3,990	98	1,730
Animal food (of mixed diet).....	97	1,940	95	4,050	98	1,730
Cereals.....	85	1,750	90	3,800	98	1,860
Dried legumes.....	78	1,570	90	3,800	97	1,840
Sugars.....					98	1,750
Starches.....					98	1,860
Vegetables.....	83	1,410	90	3,800	95	1,800
Fruits.....	85	1,520	90	3,800	90	1,630
Vegetable foods (of mixed diet).....	84	1,840	90	3,800	97	1,820
Total food (of mixed diet).....	92	1,820	95	4,050	97	1,820

As a general rule, it may be said that carbohydrate is more completely digested than proteins or fats, and that the protein of animal foods, as supplied by meat, milk, fish and eggs, is more digestible than that supplied by vegetable foods. It will be seen, however, that the coefficients differ less for the different types of food than might be expected from popular impressions of digestibility and indigestibility. The coefficients of digestibility are also less influenced by the conditions under which the food is eaten and vary less with individuals than is generally supposed.

Preparation of Food.—The preparation of food has much to do with its nutritive value. Thus, many articles which are unfit for nourishment when raw are nutritious and palatable when cooked. It is also a matter of common experience that well-cooked food is appetizing and wholesome, while the same material, if badly cooked, is unpalatable. Cooking is of importance for at least three reasons. It changes the mechanical condition so that the food material may be acted upon more freely by the digestive juices; it makes it more appetizing by improving the appearance or flavor or both; and it kills by heat disease germs and parasites if such be present. Food which is attractive to the taste quickens the flow of saliva and other digestive juices and thus aids digestion. The cooking of meats develops the pleasing taste and odor of extractives and that due to the browned fat and tissues, and by softening and loosening the protein of the connective tissues makes the meat more tender. Extreme heat, however, tends to coagulate and harden the albuminoids of the lean portions and also to weaken the flavor of the extractives. Heating often changes the structure of food materials very materially so that they may be more easily chewed and more easily and thoroughly digested. In many vegetables the valuable carbohydrates, chiefly microscopic starch grains, are contained in tiny cells with

is to make a palatable, light and porous food more easily broken up in the alimentary canal than the raw materials. Sometimes this is accomplished simply with the aid of water and heat. In cooking, the heat changes part of the water in the dough into steam, which in trying to escape forces the particles of dough apart. The protein (gluten) of the flour stiffens about the tiny bubbles thus formed in the dough, and the mass remains porous even after the steam has escaped. More often yeast or baking-powder is used to "raise" the dough. The baking-powder when wet gives off the gas, carbon dioxide, and the yeast causes fermentation in the dough by which the same gas is produced. This gas acts as the steam does, only much more powerfully. When beaten eggs are used to lighten dough, the albumin encloses air in bubbles which expand, and the walls stiffen with heat and thus render the food porous.

Quite generally foods lose weight in cooking. The principal loss is water, but if food, such as vegetables or meat, is boiled in water considerable nutritive matter, principally soluble salts and water-soluble vitamin is lost unless the water in which the food is cooked be utilized. Cooking in alkaline medium destroys water-soluble vitamins. The process of desiccation which is now so extensively employed in the preservation of fruits and vegetables renders the watery foods much more concentrated.

Food Requirements and Dietary Standards.—The information gained from a study of the composition and nutritive value of foods may be turned to practical account by using it in planning diets for different individuals or classes of individuals. There are four important methods of studying the food requirements under different conditions and obtaining the so-called dietary standards: (1) By observing the amount of oxygen consumed and carbon dioxide evolved (respiration experiments), (2) by de-

termining the balance of intake and output (carbon and nitrogen metabolism experiments), (3) by direct measurement of heat given off by the body (calorimeter experiments) and (4) by observing the amount of food consumed (dietary studies). The most direct and convincing way of ascertaining the energy metabolism is the third of these methods, known as the method of direct calorimetry. This consists in measuring the total energy expenditure of the body as heat, or as heat and mechanical work, by confining the subject in a chamber permitting of actual measurement of the heat produced. The results obtained by all methods

From results of many investigations by the methods described above, a number of so-called dietary standards have been suggested which are designed to show the amount of nutrients and energy which are required by persons of different occupations and habits of life. These standards represent reasonable amounts rather than maximum or minimum quantities and are to be thought as guides for home and institution management, rather than exact expressions of food requirement. The European dietary standards proposed by Voit and the American standards proposed by Atwater follow:

TABLE III.—DIETARY STANDARDS.

INDIVIDUAL AND OCCUPATION	Actually eaten			Digestible			Fuel value
	Protein	Fat	Carbo-hydrates	Protein	Fat	Carbo-hydrates	
	Gms.	Gms.	Gms.	Gms.	Gms.	Gms.	Calories
Man at hard work (Voit).....	145	100	450	133	95	437	3,270
Man at moderate work (Voit).....	118	56	500	109	53	485	2,965
Man with very hard muscular work (Atwater).....	175	(*)	(*)	161	(*)	(*)	5,500
Man with hard muscular work (Atwater).....	150	(*)	(*)	138	(*)	(*)	4,150
Man with moderately active muscular work (Atwater).....	125	(*)	(*)	115	(*)	(*)	3,400
Man with light to moderate muscular work (Atwater).....	112	(*)	(*)	103	(*)	(*)	3,050
Man at "sedentary" or woman with moderately active work (Atwater).....	100	(*)	(*)	92	(*)	(*)	2,700
Woman at light to moderate muscular work or man without exercise (Atwater).....	90	(*)	(*)	83	(*)	(*)	2,450

(*) Fat and carbohydrate in sufficient amounts to furnish, together with the protein, the indicated amount of energy.

are strikingly consistent, and by means of them it has been possible to tabulate hourly factors from which the day's energy metabolism and, therefore, the day's food requirement in terms of energy may be computed.

By means of the first and third methods, not only can the energy be calculated, but the proportion of fat and carbohydrate oxidized can be determined. The so-called balance or metabolism experiments are used to determine as nearly as possible the protein requirement and have also been applied to the determination of the calcium, phosphorus and iron requirements on the assumption that with an adequate supply of these essentials a balance will be maintained between the intake and output. The plan followed in the fourth method, or dietary studies, is as follows: Exact account is taken of all the food materials (1) on hand at the beginning of the study, (2) purchased during its progress and (3) remaining at the end. The difference between the third and the sum of the first and second figures is taken as representing the amounts used. The amounts of nutriment and energy furnished by the total quantity of each food material are calculated through the aid of figures obtained from analysis of samples of the different foods or from tables of average composition. From the total food eaten by all the persons during the entire period, the amount eaten per man per day can be calculated, using the so-called man value coefficients for the various members of the family. The following coefficients were adopted by the Interallied Food Commission in 1918: From 0 to 5 years, 0.5 man value; from 6 to 10 years, 0.7; 11 years and over, males 1, females 0.83.

With the recognition of differences in the quality of proteins and of the importance of the unidentified fat-soluble and water-soluble vitamins, for which we have as yet no direct quantitative measurements, a fifth method of studying the food requirements has come into extensive use, namely, biological studies of maintenance and growth under different dietary conditions. These are of necessity conducted on laboratory animals, and the interpretation of results in the light of human nutrition is more or less theoretical. They serve to indicate, however, that too much weight must not be attached to any attempt to state the requisites of an adequate diet in terms of exact quantities of certain nutrients. At best such standards should serve only as an indication and not as a rule.

Selection of Food.—We may summarize the material requisites of an adequate diet under the following heads: It must (1) provide sufficient amounts of digestible organic nutrients to yield the necessary number of calories or energy; (2) furnish proteins in ample amount and of suitable sorts; (3) supply adequate amounts and proper proportions of ash constituents; (4) furnish sufficient vitamins, and (5) it must include a sufficient amount of material of such physical character as to ensure the proper handling of the food mass in the digestive tract.

As a simple means of ensuring these requisites, the diet should be so arranged that it contains in reasonable amounts representatives of each of the following groups into which foods may for convenience be divided: (1) Green and succulent vegetables; (2) milk, eggs, meats and other typically protein foods; (3)

cereal grains and their products; (4) sugars, including those naturally occurring in sweet fruits, fresh and dried; and (5) fats, including milk fats and organ fats. The first group supplies mineral building material in a proportion large in comparison with its energy value. The second group supplies in its protein, in a proportion large as compared to its energy value, nitrogen in the right form for body-building material. The fourth group supplies little except body fuel in a quickly available form. The fifth group is like the fourth, an energy-yielding group, but is set apart because the amount of energy supplied per unit weight of fat is so much greater than that supplied by a unit weight in any other group. The third or middle group shares the properties of the groups which precede and those which follow, being valuable sources of mineral and nitrogenous body-building materials and also important sources of energy. If representatives of each group be used, the diet will not lack in vitamins, for the fat-soluble A is found in the leafy vegetables of group 1, in milk, eggs especially in meat of group 2 and in butter and organ fat of group 5, and water-soluble B in representatives of at least the first three groups.

These groups should also be kept in mind in the economic use of food. A considerable choice of selection on the basis of cost can be made among foods of each group. If the group system or some equivalent is not adhered to there is danger in the economic selection of food of limiting too much the choice of foods to those of high calorific value, such as the cereal products. There is economic justification for the purchase of certain foods, particularly vegetables and fruits, which would appear expensive if considered simply as sources of energy. When economy demands the diminished use of meat, other protein foods should replace it in proper proportion. The greatest factor of safety in the human diet is the regular use of milk because of the high quality of its proteins, its mineral content and its richness in fat-soluble A.

In order that one may partake of a truly varied diet in which the various groups are rationally represented, proper dietary habits are very important as are also wise food selection and good cookery. Good food habits should be taught in youth. If they have not been acquired then, a special effort should be made to acquire them in later life.

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NUTS, hard-shelled fruits, indehiscent, with a hard, dry pericarp, growing on certain trees and bushes in most temperate and tropical regions. The shell, which is often enclosed by woody or leathery husks, does not open of itself when the nut is ripe. Common examples are hazel and hickory nuts. Peanuts and other ground nuts properly belong to another class of fruits. The more important nuts may be divided into two classes: (1) those used for food, and (2) those used for oil, dyeing and other purposes, medicinal, ornamental and commercial.

The principal kinds of edible nuts are sweet and bitter almonds (*Amygdalus communis*), native to Asia Minor, northern Africa, southern Europe, and successfully cultivated in Cali-

fornia; Brazil-nuts, or nigger-toes, the seeds of a majestic tree (*Bertholletia excelsa*), whose habitat is Venezuela and northern Brazil; bread-nuts growing on a tree (*Brosimum alicastrum*) of Jamaica; several varieties of chestnuts, the American (*Castanea americana*) in the Eastern and Southern States, the Spanish (*Castanea sativa*) in southern Europe, northern Africa, and western Asia, also species found in Australia and Tahiti; cocoanuts, the fruits of the cocoanut palm (*Cocos nucifera*) in the East Indies, West Indies, Florida, South America, and Oceania; cola, or kola nuts, the seeds of a tree (*Cola acuminata*) native to West Africa and cultivated in tropical America; hazelnuts, filberts, or cobnuts (*Corylus avellana*) in England, Spain, Sicily, and other parts of Europe, also the American hazel (*C. americana*) and the California hazel; hickory nuts (*Carya alba* and other species) in the United States (from Maine to Texas) and Mexico; pecans (*Carya olivæformis*), in Indian Territory, Texas, Louisiana, and other southern States; pistachios or green almonds (*Pistacia vera*), found in southern Europe, southwestern Asia, and northern Africa; souari or suwarrow nuts (*Caryocar nuciferum*), also called the butternut of Demerara, native to Brazil and Guiana; walnuts (*Juglans regia*), commonly named English or Persian walnuts and Madeira-nuts, in Asia, Europe, Chile and California, also the black walnut (*J. nigra*) and the white walnut (*J. cinerea*) or butternut of the United States.

Certain edible nuts are used as sources of oil. The principal kinds are the almond (sweet and bitter), the ben nut of the East Indies, the candle nut of the South Sea Islands, the cashew-nut of the West Indies, the cocoanut of the East Indies, the dika nut of West Africa, the palm nut of West Africa, the pine nuts of Europe and Asia, the physic nut (*Curcas purgans*) of tropical America, the English walnut and the American butternut.

Of nuts having medicinal qualities are the seeds of *Strychnos nux-vomica*, of southern Asia and the East Indies, from which the poisonous drug nux-vomica is obtained, and the betel nuts, fruit of the areca palm (*Areca catechu*), in the East Indies and the Philippines, used as a vermifuge, also said to have stimulant and tonic properties. Some kinds of nuts are turned to account for various practical and ornamental purposes. The boomah nut (*Pycnocoma macrophylla*), of Africa, is used for tanning; soap-nuts (*Sapindus saponaria*), of the West Indies, in washing. The horse chestnut (*Æsculus hippocastanum*), of Europe, contains starch. The cumara nut (*Dipterix odorata*), of Brazil, is valuable for its perfume. The sassafras nut (*Nectandra puchury*), of Brazil, is used in flavoring chocolate. Ravensara nuts, also called the Madagascar clove nutmeg, are useful for seasoning. Many species of nuts are prized as ornaments. Betel nuts are utilized as coat buttons; bladder nuts (*Staphylea pinnata*), of Central Europe, are worn as beads in necklaces; also the bonduc nut (*Guilandina bonduc*), of India, and the grugru nut (*Acrocomia schlerocarpa*), of South America, are used as beads. The corozo nut or vegetable ivory, of Brazil and Colombia, is made into toys, and the coquilla nut (*Attalea funifera*), of Brazil, is valuable for decorative turnery.

The demand for nuts as an article of commerce is constantly growing. The consumption of home-grown nuts cannot be accurately estimated. The yearly exports of domestic nuts amount to \$398,312, of which pecans (the most important of native nuts) form a considerable item. Imports during the fiscal year 1914 amounted to nearly \$19,782,924, the bulk being of three kinds: almonds (\$4,678,000), walnuts (\$4,492,000), and cocoanuts (\$3,292,000). The most popular varieties of almonds are from Tarragona and Ivica, Spain, and from Formigetta, France. Shelled almonds, which are largely used by confectioners, for the most part come from Spain, Sicily and Italy. The walnuts from Grenoble, France, are said to be the best, and those from Naples have a fine flavor. Importations of cocoanuts are chiefly from South America and the West Indies. Of other nuts, filberts or hazels come principally from Italy, Sicily and Spain, chestnuts from France and Italy, and Brazils from South America.

Recent experiments tend to show that the food value of nuts is much greater than was formerly supposed. Many savages and wild animals depend largely upon nuts for sustenance through long periods of the year. According to a missionary of the Kongo, the natives subsisted almost entirely upon cola nuts during a famine lasting months. Among civilized people nuts have been looked upon as accompaniments to a feast, promoting cheerfulness and pleasant talk. They serve this purpose and more, for as sources of protein and fat they furnish considerable nutritive material and energy. Where other provisions are deficient in protein or albuminoids and fat, almonds and walnuts supply this lack. The chestnut may be used as a substitute for the cereals, because of its high proportion of starch, sugar and dextrin. In some parts of Asia nut oil is used considerably in cooking.

Almonds, Brazil-nuts filberts, hickory nuts, pecans, walnuts, chestnuts and other nuts contain in concentrated form a great deal of nourishment. When bought at ordinary prices, they should not be considered luxuries but fairly economical articles of diet. Investigations carried on at the Agricultural Experiment Station of the University of California in 1901-02 emphasize the fact that nuts are to be regarded as true foods rather than food accessories.

Samples are selected from various analyses of nuts. The edible portion of almonds contains: water, 4.8 per cent; protein, 21; fat, 54.9; carbohydrates, 7; ash, 3.9; fuel value per pound, 3,030 calories. Almonds are generally eaten as dessert, as is the Brazil-nut, whose edible portion contains: water 5.3; protein, 17; fats, 66.8; carbohydrates, 7; ash, 3.9; fuel value per pound, 3,329. The chestnut (Spanish, dry) contains: water, 5.9; protein, 10.7; fat, 7.0; carbohydrates, 74.2; ash, 2.2. The chestnut is widely grown in France, where large quantities are used as food by both poor and well-to-do classes. Dried chestnuts are ground to flour and baked in cakes. In Italy the chestnut is eaten fresh, boiled and roasted, also in the form of porridge. Chestnut cake is a common delicacy among the peasants of the Apennines. In Korea the chestnut practically serves as a substitute for the potato, being cooked in several ways. In some countries chestnuts are used for fattening hogs

and other animals. The edible portion of the filbert contains: water, 3.7; protein, 15.6; fat, 65.3; carbohydrates, 13; ash, 2.4; fuel value per pound, 3,432. The filbert is eaten chiefly as a dessert in England and America. In some countries of Europe it is often roasted, and it is sometimes ground to a flour and made into bread. It is grown in enormous quantities about Trebizond. The fruit of the shag-bark hickory is a great favorite with Americans. The edible portion of the hickory nut contains: water, 3.7; protein, 15.4; fat, 67.4; carbohydrates, 11.4; ash, 2.1; fuel value, 3,495. The pecan (*Hicoria pecan*) is the most popular of American nuts. The edible portion of the pecan contains: water, 3; protein, 11; fat, 71.2; carbohydrates, 13.3; ash, 1.5; fuel value per pound, 3,633. The English walnut ranks next to almonds in popularity. In Korea it is a regular article of diet. The edible portion of the walnut (Italian, *J regia*) contains water, 2.5; protein, 27.6; fat, 56.3; carbohydrates, 11.7; ash, 1.9; fuel value per pound, 3,100. As there is practically no refuse in the composition of nuts, other food substances having bulk should be eaten with them. Vegetarians point to the lithe, active squirrel and recommend the eating of nuts for reducing the abdomen and increasing agility. The fact that Americans do not appreciate the food value of nuts as much as Europeans and Asiatics do is attributed to the abundance of fruits and cereals in this country. The increasing demand, however, is encouraging nut culture in California and other States. The quantity and value of nut products in the United States as reported by the 13th census was as follows:

Almond.....	6,793,539 lbs.
Pecan.....	9,890,769 lbs.
Persian English walnut.....	22,026,524 lbs.
Miscellaneous nuts.....	23,617,178 lbs.
Value of all nuts.....	\$4,447,674

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NUTT, nüt, Alfred Trubner, English folklore and Celtic scholar: b. London, 22 Nov. 1856; d. 1910. His education was obtained at University College School and the Collège de Vitry François. After serving from 1874 a three-years' apprenticeship in the book publishing business on the Continent, in Leipzig, Berlin and Paris, he succeeded to that of his father, David Nutt, in London, in 1877. He joined the Folk Lore Society soon after and was elected its president in 1897. He founded the English Goethe Society in 1886 and was one of the founders of the Irish Texts Societies in 1898.

He has written 'The Legend of the Holy Grail with Especial Reference to the Hypothesis of its Celtic Origin' (1888); 'The Voyage of Bran' (1895-97); 'Celtic and Mediæval Romances' (1899). He founded the '*Folk-Lore Journal*,' the title of which was afterward shortened to '*Folk-Lore*'; and contributed extensively to it and other magazines.

NUTTALL, nŭt'al, **George Henry Falkner**, American biologist: b. San Francisco, Cal., 5 July 1862. He is the son of Dr. Robert Kennedy Nuttall and the brother of Zelia Nuttall, the Mexican archæologist. He was graduated in medicine at the University of California in 1884 and took a Ph.D. at Göttingen in 1890. In 1890-91 he was assistant and associate at Johns Hopkins University, Baltimore; in 1894-99 he was a member of the staff of the Hygienic Institute, Berlin, and university lecturer in bacteriology and preventive medicine; and in 1900-06 he was lecturer in bacteriology and reader in hygiene in the University of Cambridge, England, where since 1906 he has been Quick professor of biology. He has been examiner for diplomas in public health and tropical medicine and hygiene at Cambridge, at the University of Liverpool and for the Royal Army Medical Corps; director of the Quick Laboratory, University of Cambridge, a member of Advisory Committee for Plague Investigations in India and of the Imperial Bureau of Entomology (Colonial Office, London). In 1892 Dr. Nuttall found the *Bacillus aerogenes*. In 1905 he demonstrated that bacteria in the alimentary canal are unnecessary for a perfect digestion in healthy animal life. In 1899 he showed the important part played by insects, the spider family and centipede family as transmitters of bacterial and parasitic diseases. Dr. Nuttall is an authority on tropical diseases and tropical medicines and is a member of various medical societies that specialize on these subjects. He is an officer and member of numerous medical and scientific societies. He was founder and editor of the *Journal of Hygiene* (1901) and of *Parasitology* (1908). He has published over 150 articles on American, British, German and other journals since 1886, dealing with research work in bacteriology, entomology, protozoology, hygiene and physiology and also 'Hygienic Measures in Relation to Infectious Diseases' (1903); 'Blood Immunity and Blood Relationship' (1904); 'The Bacteriology of Diphtheria,' with Graham Smith and others (1908); 'Ticks,' with C. Warburton and others (1908); 'The Drug Treatment of Canine Piroplasmiasis' (1910); 'Russian Ixodoides' (1912); and 'The Training and Status of Public Health Officers in the United Kingdom' (1913).

NUTTALL, nŭt'al, **Thomas**, English-American naturalist: b. Long, Preston, Settle, Yorkshire, England, 5 Jan. 1786; d. Nutgrove, near Saint Helens, Lancashire, England, 10 Sept. 1859. He learned printing, came to the United States in 1807; traveled widely; made numerous discoveries in botany; ascended the Missouri River in 1811, the Arkansas in 1819, and in 1825-34 was professor of natural history and curator of the botanic gardens at Harvard. In 1834 he joined an exploring party headed by Captain Wyeth to the Oregon and Upper California. From there he went to the Sandwich Islands, returning home by way of Cape Horn.

From 1842 he resided in England. Among his publications were 'The Genera of North American Plants' (1818); 'A Journal of Travels into the Arkansas Territory' (1821); 'Introduction to Systematic and Physiological Botany' (1827); 'A manual of the Ornithology of the United States and Canada' (1834); 'Narrative of the Pacific Expedition' (1839); and 'The North American Sylva: Trees not Described by F. A. Michaux' (1842-49).

NUTTALL, Zelia, American archæologist: b. in San Francisco, Cal., in 1864; d. in Mexico in 1915. She was the daughter of Dr. Robert Kennedy Nuttall and the sister of Dr. George Henry Falkner Nuttall the biologist. She was educated in Paris, Germany, Italy and at Bedford College, London. She made a special study of languages and turned her attention to the antiquities of Mexico. Her researches in Mexican archæology, ancient picture-writing and history made her famous and she took her place among the leading authorities on these questions. She first attracted attention by a contribution to the *American Journal of Archaeology* (1886) on 'The Terra Cotta Heads of Teotihuacan.' The following year she became assistant of the Peabody Museum and in 1908 was made honorary professor of the National Museum in Mexico. When the discoveries of mysterious old ruins in Mexico made that country a second Greece for archæologists Mrs. Whitelaw Reid and Mrs. Crocker of San Francisco gave the University of California funds to pursue archæological researches there. Zelia Nuttall was appointed field director of the Reid-Crocker mission. She then established herself in Coyoacan, one of the historic suburbs of Mexico City, in an ancient palace built by Alvarado, one of Cortez's aides. In her explorations of the Pyramids of the Sun and Moon near Teotihuacan, 27 miles from Mexico City plans for a local museum were made. She was a member of the scientific mission sent to Russia in 1894 by the University of Pennsylvania; a member of the jury of awards in all of the great American expositions beginning with the Columbian, and was the recipient of many medals from foreign countries. She was a member of American and foreign scientific societies. She prepared a facsimile edition of an ancient Mexican Codex (original owned by Lord Zouche at Harynworth, England) which is published as the 'Codex Nuttall' (1902), and published, in addition to numerous papers; 'The Fundamental Principles of Old and New World Civilization' (1901); 'Book of the Life of Ancient Mexicans' (1903); 'Penitential Rite of the Ancient Mexicans' (1904); 'New Light on Drake: Documents Relating to his voyage of Circumnavigation 1577-1580' (1914). Consult sketch (with portrait) by Danenbaum, R., 'Archæologist of Mexico' in *World To-day* (Chicago, April 1908).

NUTTING, Charles Cleveland, American zoologist: b. Jacobsonville, Ill., 25 May 1858. He was graduated from Blackburn University, Illinois, in 1880 and received the degree of M.A. in 1882. In that year he engaged in zoological explorations for the Smithsonian Institution, visiting Central America in 1882-84, and Florida in 1885. In 1886 he became curator and professor of zoology in the Museum of Natural History of the University of Iowa which he

held till 1890 and then became head of the department of zoology in the State University of Iowa. He was engaged in important scientific researches onward. He went to the Saskatchewan River in 1891, to the West Indies in 1893, Plymouth, England, and Naples in 1895, California in 1895 and 1909 and to the Barbadoes in 1917. He was a member of the civilian scientific staff of the United States ship *Albatross* during the Hawaiian cruise of 1902. Mr. Nutting is a member of various scientific societies and has been president of the American Society of Zoologists, central branch, since 1907. He collaborated in the reports of the Siboga Expedition (1909-11). His most important publications are 'Narrative of Bahama Expedition from University of Iowa' (1893); 'American Hydroids,' which appeared in the reports of the United States Commission of Fisheries and elsewhere (1900-04); report on 'Gorgoniacea of the Siboga Expedition' (1910). He is also the author of numerous articles published in scientific magazines in the United States and England.

NUTTING, Mary Olivia, American writer: b. Randolph Centre, Vt., 1 July 1831; d. 1910. She was graduated from Mount Holyoke Seminary (now College) in 1851, taught there 1853-70, was librarian of the institution 1870-1901, and from the last-named date to her death librarian emeritus. She wrote under the name of Mary Barrett until 1894. She has published 'Steps in the Upward Way' (1867); 'Our Summer at Hillside Farm' (1867); 'The Story of William the Silent' (1869); 'The Days of Prince Maurice' (1894), etc.

NUX VOMICA, the popular name for the seeds of a tree (*Strychnos nux-vomica*) of the natural order *Loganiaceæ*. The tree is a native of Ceylon, Coromandel and other parts of southern Asia. It is of medium size, bears oblong, entire smooth leaves, and flowers in terminal corymbs, followed by one-celled berries as large as oranges. They have brittle shells, white gelatinous pulp, and flat, disc-like hairy gray seeds which are tough, odorless and very bitter. The pulp is a favorite food of many birds. The seeds have long been used in pharmacy and medicine, and are of great value, being the source of the alkaloids strychnin and brucin. Under the name false Angostura bark the bark of this tree has been used to adulterate the true Angostura bark, from which it differs in its properties.

NYACK, nī'āk, N. Y., village in Rockland County, on the Hudson River, where the expansion is called Tappan Bay, and on a branch of the Erie Railroad. It is connected by ferry with Tarrytown on the opposite side of the Hudson, and it is about 26 miles from the Grand Central Station in New York. It was settled in 1700, incorporated as a village in 1873, gave up its charter in 1876, and was again incorporated in 1883. It is a beautiful residential village, but has some manufacturing. The chief industrial establishments are boot and shoe factories, wagon, carriage and sleigh factory, yacht, boat-building, and cloth finishing works. For many years it has been an educational centre; it is the seat of the Nyack Military Academy, the Hudson River Military Academy and the Rockland Military Academy. It has public and par'sh

schools, a public library and several good church buildings, notably Saint Ann's (Roman Catholic), the interior of which is beautifully decorated. The village owns and operates the waterworks. Pop. 4,444.

NYAM-NYAM, nyām-nyām', **NIAM-NIAM**, **AZANDE**, or **ZANDEH**, an African people of Negro-Hamite race, composed of numerous petty tribes dwelling in the basins of the Shari and Welle rivers. They number upward of 2,000,000. The men devote themselves to hunting and war; the women cultivate the fields and eleusine, manioc, sweet potato, gourds, yam, banana, etc. These with game are the chief food, though a portion of the people are notorious cannibals. They have no cattle. Considerable manual and artistic skill is shown in the forging of iron, making of pottery and baskets, and the carving of wood. They are passionately fond of music, and play a kind of mandolin. Polygamy prevails. Their weapons are spears, knives, a species of iron boomerang and shields. The petty tribes of which they are composed are partially independent and partly dependent to the Belgian Congo. Consult Schweinfurth, Georg, 'The Heart of Africa' (New York 1874); Stanford, 'Africa' (London 1895).

NYAN, nī-ān', a large wild sheep (*Ovis hodgsoni*) of the Tibetan Mountains, with great spiral horns on the head of the ram, and yielding excellent mutton. It is called argali by British sportsmen, and is one of the prizes of the chase in the Himalayan region.

NYANGWE, nyāng'wě, Africa, a trading station in the Kongo Free State, on the Kongo River; lat. 4° 15' S.; long. 26° 20' E. In 1871 it was visited by Livingston, and in 1876 Stanley made the place his headquarters while exploring the Upper Kongo. It is connected by road with Albertville on Lake Tanganyika. By caravan route, rivers and steam cars from Leopoldville connections exist with the Atlantic.

NYANZA, nyān'zā, a Bantu word meaning "great water." It is used as the English word "lake" in connection with the names of three large bodies of water in Central Africa: as, Albert Nyanza, Victoria Nyanza and Albert Edward Nyanza.

NYASA, nyās'sā or nyās'sā (from the Bantu word *nyanza*, that is, "great water"), a lake in southeastern Africa, nearly 400 miles from the Indian Ocean, and west of German East Africa, discovered by Livingston in 1858. It extends north and south about 350 miles, and east and west from 20 to 50 miles; area, about 14,300 square miles. It is about 700 feet deep at its southern point, but to north, or its source, it is quite shallow. Toward the south the bed sinks below the level of the Indian Ocean, and at its head the surface is over 1,000 feet above the ocean level. The outlet is Shiré River, which flows south into the Zambesi. With the exception of Murchison Falls and Rapids, 70 miles long, in the Shiré River, there exists unbroken water communication between the head of Nyasa and the Indian Ocean. The African Lake Company have launched steamers on the lake, investigated the coast, and made a road from the north end of the lake up the heights to the plateau between Nyasa and Tanganyika (q.v.). Another road has been made

around the rapids in the Shiré River. On the west and east coasts are mountains, those on the east are from 4,000 to 11,000 feet in height. In some places low sandy land extends between the water and the mountain, and in other parts, as at the north, the mountains come down to the water. A number of rivers flow into the lake from the west; they have broken through the mountain barrier.

NYASALAND PROTECTORATE, Africa, a portion of British Central Africa, lying around the shores of Lake Nyasa, and extending to the banks of the Zambezi, known from its constitution 14 May 1891 until the change to the present name in 1907, as the **BRITISH CENTRAL AFRICA PROTECTORATE**. It includes all British Nyasaland, as well as the Shiré Highlands, and the greater part of the basin of the river Shiré. The expenses of administering the Protectorate are partly met out of revenue locally raised, and further by an annual grant from the Imperial government. The administration is in the hands of a governor, assisted by an executive and legislative council. The area of the Protectorate is about 40,000 square miles; the European inhabitants number about 800, the Asiatics, 400, the native inhabitants about 1,060,000.

The principal occupation of the European settlers is planting; and many thriving plantations of coffee, sugar, cinchona and tobacco have been established. Ivory, tea, ground nuts and rubber are also raised. The principal imports are soft goods, provisions and hardware. The chief towns, Blantyre, Zomba, Fort Johnston (the principal port on Lake Nyasa, and naval depot), Karonga (north end of Lake Nyasa), the starting point for Tanganyika and Kotakota (west coast of Lake Nyasa). The Protectorate is divided into 12 districts, managed by a number of collectors and assistant collectors, judicial officers, etc. There is at least one judicial officer, and in some cases two or three, in each district. Almost the entire trade of British Central Africa is with the United Kingdom. Steamers ply on Lake Nyasa and on the Zambesi and Shiré rivers. A railway, 113 miles in length, now connects Port Herald with Blantyre, and is projected to Lake Nyasa. The Protectorate is connected by telegraph overland with the Cape; and, with the Portuguese rivers, to Chinde its port of outlet at the mouth of the Zambesi, and with Quilimane.

Consult Duff, H. L., 'Nyasaland under the Foreign Office' (London 1906); Johnston, Sir H. H., 'British Central Africa' (London 1897); Rankin, D. J., 'The Zambezi Basin and Nyasaland' (London 1893).

NYAYA, nyá'ya. See **HINDUISM**.

NYCTIPITHECUS. See **DOUROUCOULI**.

NYDIA, a character in Bulwer's 'Last Days of Pompeii.' She is a blind flower girl, of good birth, rescued from slavery by the hero.

NYE, nī, Edgar Wilson, American humorist: b. Shirley, Me., 25 Aug. 1850; d. near Asheville, N. C. 22 Feb. 1896. He removed when a young man to Wyoming Territory; studied law, and was admitted to the bar in 1876. He served as postmaster and was elected to the legislature. Subsequently he made his home in New York (1886), having already become widely known as a humorous lecturer and

writer under the pseudonym of 'Bill Nye.' His humor, which was very largely his own, consisted of daring puns and a hitherto unheard of free use of the English language. He treated, in a familiar way that caught the public fancy, kings and princes and men in high places. He was the author of 'Bill Nye and Boomerang' (1881); 'Forty Liars' (1883); 'Bill Nye's Blossom Rock' (1885); 'Remarks' (1886); 'Chestnuts' (1887); 'Fun, Wit and Humor' (1889); with J. W. Riley; 'Comic History of the United States' (1894); 'Comic History of England' (1896); 'Baled Hay,' etc.

NYEZHIN, nyě'zhēn. See **NIZHAN**.

NYIREGYHÁZA, nyě-rěd-y-hă'zō, Austria-Hungary, town in the district of Szabolcs, on the Nyir River, and at the junction of two railroads, about 170 miles by rail northeast of Budapest. It is in a productive agricultural region in which wheat, grapes and a variety of fruits grow luxuriantly. It is in the vicinity of the Tokay wine region. There are a number of manufacturing industries, among which are the manufacturing of matches, soda and saltpeter. Pop. about 40,000.

NYKÖPING, nü'hē-ping, Sweden, seaport, on a bay of the Baltic Sea, about 60 miles southwest of Stockholm. In the 13th century this was one of the most important places in Sweden. The castle, now a ruin, ranked in strength with those of Stockholm and Calmar. In 1719 the town was captured and nearly destroyed by the Russians. It has regular steamer communications with Stockholm and other ports, and is of considerable manufacturing and commercial importance, its business in spun goods and grain being very active. Pop. about 11,000.

NYLGHAU. See **NILGAI**.

NYM CRINKLE. See **WHEELER, ANDREW CARPENTER**.

NYMPH. See **PUPA**.

NYMPHÆACEÆ, an order of aquatic plants the water-lilies. They are generally large, floating on the surface of the water, and having a stem which forms a subterranean creeping shoot. The flowers are very large, solitary, with cylindrical peduncles as long as the petioles of the leaves; the perianth is colored, petaloid, composed of a great number of petals, arranged in several rows, and often inserted, as well as the stamens, in the lower part of the sides of the ovary; the outermost of these petals seem to constitute a calyx, while those within form a kind of corolla. The stamens are very numerous; the anthers are turned toward the centre of the flower. The ovary is simple, covered almost throughout by the perianth-segments and by the stamens; it is globular, with several cells, each containing a great number of ovules; the stigma is radiated, peltate, sessile. The fruit is globular, resembling externally a poppy capsule, indehiscent, fleshy within, divided into a great number of cells containing seeds immersed in a fleshy pulp. This order furnishes one of the best examples of the gradual passage of petals into stamens and of sepals into petals; the transition is so insensible that many intermediate bodies are neither precisely petals nor precisely stamens, but part of both. The principal genera of the order are *Euryale*, *Victoria*, *Nymphæa* and

Nuphar. See LOTUS; VICTORIA REGIA; WATER-LILY.

NYMPHS, in Greek mythology, youthful goddesses of inferior rank to the other divinities who dwelt in Olympus. Begotten by Oceanus, or by Zeus and others, they preserve and nourish the woods, rivers, springs and mountains. They are, therefore, distinguished according to their offices, as Oceanides, nymphs of the ocean, regarded as daughters of Oceanus; Nereides, or nymphs of the Mediterranean, who were regarded as daughter's of Nereus; Leimon-iades, or nymphs of the meadows; Dryades or Hamadryades, or nymphs of trees, whose lives were regarded as beginning and ending with those of the trees with which they were associated; Melides, or nymphs of fruit-trees; Oreades or Orestiades, or nymphs of mountains and grottoes: these, dressed lightly, as huntresses, were the companions of Artemis (Diana), who was herself originally an Arcadian nymph; there were also Naiades, who presided over fountains, Potamides over rivers, and Limniades over lakes. The nymphs hold a middle station between gods and mortals, and, without being immortal, yet live longer than is permitted to man. At their death the substance which they have supplied with nourishing moisture perishes also. This first notion of nourishment, which is supposed in the very idea of a nymph, seems to have given origin to the second representation of them as nurses of young children entrusted to their care.

NYORO, or **BA NYORO**, Bantu tribe living on the shores of Lake Albert Edward, in Africa. As a race they are well built, tall and good-looking. They live in cone-shaped, thatched huts and make dugout canoes, bur and rafts. They lived principally on sweet potatoes, fish and game, and are good weavers, potters and workers in iron. They are said to number about 125,000.

NYRÉN, nü-ran', **Magnus**, Swedish astronomer: b. Wernland, Sweden, 21 Feb. 1837. He was educated at Upsala and became an instructor in the Pulkova Observatory in 1868. His astronomical researches have been of great value and he was made vice-director of the Observatory at Pulkova in 1890, a position which he retained until 1908. In 1888 he was appointed Councilor of State; and in 1899 he was awarded the Valz prize by the Académie des Sciences, Paris. He has published 'Détermination du coefficient constant de la précession au moyen d'étoiles de faible éclat'; 'Bestimmung der Nutation der Erdachse' (1873); 'Variations de la latitude de Poulkova' (1893); 'L'Aberration des étoiles fixes' (1883), etc.

NYS, nüs, **Desiré**, Belgian philosopher: b. Saint Léger, Belgium, 21 Nov. 1859. He was educated at Tournai and at the universities of Louvain and Leipzig. In 1883 he was ordained a priest of the Catholic Church and from 1893

to 1906, served as director of the Séminaire Léon XIII at Louvain. He was made its president in 1906 and in the same year was appointed to the chairs of cosmology, psychology and chemistry in the University of Louvain. He is knight of the Order of Leopold II and member of the Philosophic Society of Louvain. He has published 'Le problème cosmologique' (1888); 'La notion detemps d'après S. Thomas d'Aquin' (1898); 'La notion d'pace au point de vue metaphysique et psychologique' (1900); 'La cosmologie' (1900; 2d ed., 1906); 'Les theories sur la nature de l'espace depuis Descartes' (1907). He is a contributor to 'The Catholic Encyclopedia' and to *La Revue Néo-Scholastique*.

NYS, **Ernest**, Belgian lawyer: b. in Contrai, Belgium, 27 March 1851. He was educated at the universities of Ghent, Heidelberg, Leipzig and Berlin and practised law in Antwerp and in Brussels, in both of which cities he held judicial posts. He became professor of international law in the University of Brussels and was made a member of the permanent court of arbitration at The Hague. He was also one of the editors of the *Revue de Droit International*. He is professor of international law at the Brussels University. The degree of honorary doctor of laws was given to him by the universities of Oxford, Edinburgh and Glasgow. His books include 'La guerre maritime' (1881); 'Le droit de la guerre et les précurseurs de Grotius' (1882); 'Les origines du droit international' (1894); 'Recherches sur l'histoire de l'économie politique' (1898); 'Le Droit international,' 3 vols. (1904-6, new ed., 1912); 'Idées modernes; 'Droit international et franc-maçonnerie' (1908); 'Les Etats-Unis et le Droit de gens' (1909); 'Le Droit romain, le droit des gens et le Collège, des docteurs en droit civil' (1912).

NYSSA, nīs-täg'müs, a genus of trees. See TUPELO.

NYSTAD, nü'stat, Finland, town in the Län of Abo-Björneberg, on the Gulf of Bothnia, 40 miles southeast of Abo. At Nystad was concluded in 1721 the treaty between Sweden and Russia, by which the territory conquered by Peter I along the Gulf of Finland and the Baltic was conceded to Russia. Pop. 4,500.

NYSTAGMUS, involuntary motion of the eyeballs. The movement is usually lateral, but is sometimes rotatory, and in rare cases vertical. It may be induced by inflammation and other disorders of the eyes, and in miners is not infrequently caused by long-continued work underground in obscure light. Very little in the way of cure is possible.

NYX, nīks, in Greek mythology, the goddess of night or darkness. She was the daughter of Chaos. Her brother was Erebus.

O

O the fifteenth letter and the fourth vowel of the English alphabet. It is derived, through the Latin and Western Greek alphabets, from the Phœnician letter ayin, of the same shape, corresponding to the Hebrew *ע* and pronounced as a heavy glottal catch. It is called the labial vowel because of the part the lips have in its pronunciation: for analogous reasons the third vowel *i* (ee) is called the palatal and *a* (ah) the guttural vowel. In the Greek alphabet, as we now have it, there are two characters to represent this vowel, namely, great *o* (omega, Ω, ω) and little *o* (omicron, Ο, ο), but these characters were not differentiated in early times. The vowel sounds in our language which are represented by *o* are numerous, namely, (1) The sound it has in *oh*, *lo*, *cone*: this is the regular, long sound of *o*, and it is common to English with most other languages. Curiously, English seems to lack the short vowel sound corresponding to this long *o*: what is usually called the short *o*, the vowel sound in *on*, *odd*, *log*, is not the *o* of *lone* shortened, but rather the sound of *a* in *all* shortened. But though orthoepists hold that the true short open vowel sound of *o* is unknown in English, natives of New England almost invariably in many words shorten the open *o* (as in *go*) without changing its quality; in their pronunciation of *bone*, *home*, *coat*, *toad*, etc., the vowel is the true *o* shortened. This short *o* is not recognized by Alexander J. Ellis as an English vowel sound. The editors of Webster's Dictionary (edition of 1879) remark of this local pronunciation that "its rise and growth are interesting facts, and its final prevalence is a thing he (the theoretic phonologist) would rather desire than deprecate." The long *o* sound is variously represented in English; by *o* (*lo*), by *ow* (*low*), by *au* (*hautboy*), by *eau* (*beau*), by *eo* (*yeoman*), by *ew* (*sew*), by *oa* (*roam*), by *oe* (*hoe*), by *oo* (*door*), by *ough* (*dough*), by *ou* (*shoulder*), and by *owe*. (2) The vowel sound commonly called short *o*, as in *odd*, *cob*, is really, as we have seen, the shortened vowel sound represented by *a* in *all*, *fall*. (3) The obscure short vowel sound heard in *dcne*, *son*, *ton*; this sound is usually represented by *u*, as in *dun*, *sun*, *tun*. (4) The sound of *u* in *rune*, for example, *move*, *prove*. (5) The same sound shortened, as in *wolf*, *woman*; the vowel sounds four and five are the sounds of the fifth vowel in a standard alphabet. (6) The sound usually rendered by broad *a* in *all*, *call*: examples, *order*, *former*, *north*.

O', in Irish proper names, a patronymic prefix corresponding to the Mac of the Highlands of Scotland; thus O'Connell means "the son of Connell." It is supposed to be a cor-

ruption of the Irish *ua* (Gaelic, *ogha*), meaning a grandson.

OAHU, ō-ä'ho or ō-wä'hoo, the northernmost large island of the Hawaiian group; length 38 miles, average width about 20 miles. It has an irregular coast line, several small harbors, one excellent harbor on the west coast, upon which Honolulu (q.v.), the capital of Hawaii, is situated. Two mountain ranges cross the island, and between is a large dry plain which is productive when irrigated. Mount Kaala, 3,890 feet, is the highest point on the island.

OAK APPLE, any large gall (q.v.) on an oak; specifically, in England, a spongy excrescence on the twigs of *Quercus pedunculata*.

OAK CROWN, ORDER OF THE. See ORDERS AND DECORATIONS.

OAK GROVE, BATTLE OF. After the battle of Fair Oaks or Seven Pines (q.v.) 31 May-1 June 1862, General McClellan remained inactive astride the Chickahominy, his advance but five miles from Richmond. In the last week of June Fitz-John Porter's corps of two divisions, with McCall's division, temporarily attached, was on the left bank of the Chickahominy and held the right of the line. Next on the left, across the stream, was Franklin's corps of two divisions and on Franklin's left, in the order named, Sumner's and Heintzelman's corps, of two divisions each. Keyes' corps, of two divisions, was in reserve. The effective strength of the army was 92,500 and McClellan was daily calling for more. Lee, including Jackson's command, which was near, stood between him and Richmond with 80,000 men. The bridges being repaired and the ground firm, McClellan, 25 June, determined to advance the left of his picket-line preparatory to a general forward movement. Immediately in front of the most advanced redoubt on the Williamsburg road was a large open field, beyond which was a swampy belt of timber of some 500 to 700 yards, which had been disputed ground for many days. Further in advance was an open field, crossed by the Williamsburg road and the railroad and commanded by a Confederate redoubt and rifle-pits. It was McClellan's intention to push his lines through these woods in order to ascertain the nature of the ground and to place Heintzelman and Sumner in position to support an attack to be made by Franklin on the 26th, on the rear of Old Tavern and which, if successful, would force Lee from the heights overlooking Mechanicsville and clear the way for a general advance on Richmond. The movement began about 9 A.M. by the advance of Hooker's division of Heintzelman's corps on both sides of the Williamsburg road, where a

mile separated the Union and Confederate works. Hooker was supported by Kearny's division on the left, and on the right by Richardson's division of Sumner's corps. The Confederate pickets were driven in, and Hooker struck Wright's and Armistead's brigades of Huger's division, which, with a part of Ransom's brigade, made a stubborn resistance and at 11 A.M., after Hooker on the right had advanced some 800 yards and Kearny nearly a mile, the entire Union line was ordered to fall back; Kearny, however, held on to the ground won. At 1 P.M. McClellan came upon the field and ordered a renewal of the advance. Hooker was reinforced by a brigade of Couch's division and advanced; Kearny joined in on his left. Mahone's brigade and the rest of Ransom's reinforced the Confederates and a severe fight ensued, lasting until dark. McClellan says he accomplished his object. The Confederates claim that McClellan was repulsed and gained no material advantage and that at night they occupied their old positions. This battle also known as that of Kings school-house, French's Fields and the Orchards, was the beginning of the Seven Days' Battles (q.v.). The Union loss was 67 killed, 504 wounded and 55 missing. The Confederate reports show a total loss of 441. Consult 'Official Records' (Vol. XI); Webb, 'The Peninsula'; Allan, 'History of the Army of Northern Virginia'; 'The Century Company's 'Battles and Leaders of the Civil War' (Vol. II).

OAK PARK, Ill., village in Cook County, nine miles west of Chicago (of which it is a residential suburb) on the Chicago and Northwestern Railroad. Formerly a part of the town of Cicero, it was incorporated as a separate village in 1902. Oak Park owns its waterworks and contains, in addition to handsome residences, several fine buildings. These include the Scoville Institute, the hospital of the Sisters of Misericordia, a public library and several schools. An annual horse show is held here. It is also a thriving manufacturing centre with at least 47 establishments whose products are estimated at \$1,555,000 annually. Pop. (1920) 39,830.

OAKELEY, Sir Herbert Stanley, English composer: b. Ealing, 22 July 1830; d. November 1903. He was educated at Rugby and at Christ Church, Oxford, studied music in England and at the Leipzig Conservatory under Moscheles and Plaidy and later devoted himself to the organ, working with Breidenstein in Bonn and with Schneider in Dresden. In 1858-68 he was musical critic to the 'Guardian,' in 1865-91 professor of music at Edinburgh and for many years composer to the Queen in Scotland, where he furthered orchestral and organ music and established Students' Choral Associations in the universities. His compositions are principally religious, including anthems, cantatas, hymn tunes, chants and service-music; but he also wrote some pieces for the pianoforte. He was knighted by Queen Victoria in 1876. Consult Oakeley, E. M., 'The Life of Sir Herbert Stanley Oakeley' (London 1904).

OAKEN CROWN, ORDER OF THE. See ORDERS, ROYAL.

OAKES, òks, Urian, American colonial scholar and clergyman, 4th president of Har-

vard College: b. England, 1631; d. Cambridge, Mass., 25 July 1681. He was brought to America in 1634, showed himself an able mathematician and astronomer when a mere boy, was graduated at Harvard in 1649, studied theology, preached for several years in England and in 1671 became pastor of the church in Cambridge and fellow of Harvard College. He became acting president of Harvard in 1675 and was inaugurated in 1680 as president. He wrote much Latin verse and a famous 'Elegy upon the Death of Thomas Shephard,' selections from which may be found in Tyler, 'History of American Literature.'

OAKLAND, òk'land, Cal., city, county-seat of Alameda County, on the eastward side of San Francisco Bay, opposite San Francisco, the Pacific Coast terminus of Southern Pacific, Western Pacific and Santa Fé railroads; port for trans-Pacific and coastwise steamship lines and for California River boats, connected with the State capital, Sacramento and with cities and towns up and down coast and in interior by a number of electric railways; chief cities and villages of county reached by interurban trolley lines. The city has 15 miles of waterfront, of which seven miles comprises a landlocked harbor along the southern boundary, known as the "estuary." This is navigable throughout for ocean-going vessels of the deepest draft. To the westward, the city has eight miles of waterfront along the bay shores already developed and in process of development. Here more than 400 acres has been reclaimed from the bay by dredging and moles and this land is much sought after for sites of factories desiring contiguous deep water. Jutting out from this western waterfront are three moles for railroad traffic to ferriesboats. These moles have been further reinforced by rubble stone jetties constructed by the Federal government. The army engineers have recommended the construction of an immense dike all along the western bayshore just outside of the pierhead line to divert the flow of the Sacramento River and provide a safe harbor of constant depth for deep sea shipping. Topographically, Oakland is set in an immense amphitheater, bounded on the north and east by the foothills of the Coast range, which rise almost to the height of mountains. These hills maintain an equable climate, shutting off the fogs and cold trade winds from the ocean and the heat from the interior valleys. The hills slope down to the bay in a series of benches, on which have been constructed streets and contour boulevards. These benches have been utilized for homesites, thus providing one of the most beautiful cities in the United States. The hills also provide an almost perfect natural drainage. That portion of the city next to the bay, about one-half its area, is practically level. The mean temperature for 1914 was 57.5°. In the same year the thermometer went as low as 35° in December and as high as 86° in March and September. Winter is the rainy season but it is not a disagreeable rain. Sometimes a light frost falls. In 1915 the number of clear days was 143, of fair days 118 and of cloudy days 104.

Though the county-seat of a great agricultural county, Oakland has forged rapidly to the front in the last few years as a manufacturing centre. This is largely due to its numerous in-

OAKLAND, CALIF.



Oakland as seen from Lake Merritt

Courtesy of Oakland Chamber of Commerce

OAKLAND, CALIF.



614684 - CITY HALL SQUARE, OAKLAND, CALIF.

City Hall Square

dustrial sites, easily accessible to both water and rail lines, the contiguity of a cheap, unlimited fuel source in the crude petroleum pipelines at Richmond, 10 miles to the north and to the open climate which permits of industrial operations every day in the year. Oakland's principal industries are, fruit and vegetable canning, cotton spinning, shipbuilding, iron working, gas engine manufacturing and lumbering. A recent government census of Oakland manufacturing showed, capital invested, \$36,411,000; wages, \$5,966,000; value of products, \$28,522,000. The increases from 1909 were, capital, 90.5 per cent; wages, 12.2 per cent; value of products, 27.7 per cent. It is believed that since 1914 the manufactures have increased by a conservative estimate about 60 per cent.

There are 15 banks, with an aggregate capital on 1 Jan. 1915, of \$4,676,290, surplus, \$2,393,088 and deposits, \$55,340,000. Clearings in 1915 totaled \$181,471,320.

Some of the prominent buildings are, the City Hall, completed in 1914 at a cost of \$2,000,000; the Municipal Auditorium, completed in 1915 at a cost of \$1,000,000; the Hotel Oakland, \$1,125,000; the Claremont Hotel, \$1,000,000; the Athenian Club, \$200,000; the First Methodist Church, \$150,000; Saint Paul's Episcopal Cathedral, \$100,000; the Y.M.C.A. building, \$400,000. Oakland has 50 public schools, five high, of which one is polytechnic, 41 grammar and four evening. The city was the pioneer in outdoor schools and its recently constructed school buildings are so arranged as to be made into practically open-air classrooms. Saint Mary's College (Roman Catholic) for young men and Mills College for young women are accorded the highest rank among educational institutions of the Pacific Coast. There are also business colleges, music conservatories, engineering schools, etc. As a part of the public high school system is maintained Chabot Observatory, equipped with one of the largest telescopes on the Pacific Coast. There are 28 parks and nine playgrounds, totaling 500 acres. The park system centres around Lake Merritt, the largest salt-water lake inside a municipality in the world. Oakland has numerous scenic drives and boulevards, chief of which are the Skyline boulevard, along the crests of the hills back of the city; the Foothill boulevard, along the bases of the same hills; the Diamond Canyon road, leading to the "Hights," the home of the late poet, Joaquin Miller; the Tunnel road, running through the hills to the interior valleys. The Pacific Coast terminus of the Lincoln highway is at Oakland.

The \$50,000 Carnegie library, erected on a \$20,000 site, contains more than 125,000 volumes. The municipal reference library in the city hall is open to the public for obtaining information on technical subjects.

Oakland was settled in 1820 by Don Luis Maria Peralta and other Spaniards. It was incorporated in 1852 and chartered as a city in 1854. The commission form of government was adopted on 1 July 1911, providing for a mayor, who is president of the city council and commissioner of public affairs and commissioners of public health and safety, public works, streets and revenue and finance. Pop. (1920) 216,361.

OAKLEY, Violet, American mural painter: b. New York City in 1874. She studied at the

Art Students League in New York and also under Cecilia Beaux; at the Pennsylvania Academy of Fine Arts under Howard Pyle, the illustrator; and in Paris under Aman-Jean, Collin and Lazar. She first devoted her talent to illustration, but soon turned to mural painting and the designing of stained-glass windows. Her first important commission was for 13 panels depicting the 'Founding of the State of Spiritual Liberty,' for the governor's reception room of the State Capitol at Harrisburg, Penn., and nine panels, 'Creation and Preservation of the Union' for the senate chamber. Among her most important achievements are a series called 'Building of the House of Wisdom,' in the house of Charlton Yarnall in Philadelphia; a window, 'Divine Comedy of Dante Alighieri,' in the house of Robert Collier, New York City; a panel called 'The Constitutional Convention,' in the Court House, Cleveland, Ohio; and decorations in the church of All Souls and the church of All Angels, both in New York City. Miss Oakley has received gold medals from the Saint Louis Exposition (1904), the Pennsylvania Academy of Fine Arts (1905) and the Architectural League of New York (1916). A medal of honor was given to her at the Panama Exposition (1915) and also at the San Francisco Exposition (1915). She resides in Philadelphia and is a member of the Society of Mural Painters, the Society of Illustrators, the New York Water Color Club, the Philadelphia Water Color Club and a Fellow of the Pennsylvania Academy of Fine Arts. Consult Armstrong, R., 'Work as Illustrator,' *Critic* (June 1900); Morris, H. S., 'Work of Violet Oakley,' *Book Buyer* (May 1902); Morris, H. S., 'Violet Oakley's Mural Decoration,' *Century Magazine* (June 1905); Morris, H. S., 'New Motive in Decoration,' *Century* (1911); Coleman, C., 'Mural Decoration in the Pennsylvania Capitol,' *Architectural Record* (December 1897); Sturgis, R., 'Pictures in Harrisburg State House,' *Scribner's* (May 1907); 'Divine Comedy: Studies in Red Chalk,' *Century* (December 1912); and Portrait in *World's Work* (April 1912).

OAKMONT, Pa., borough in Allegheny County, 10 miles northeast of Pittsburgh, on the Pennsylvania Railroad. It is situated on the Allegheny River. A Carnegie library and a high school are the chief buildings. The industries are glass, iron and powder-works, tools of many kinds, pipes and fittings, hot-water boilers and structural steel. Pop. (1920) 4,512.

OAKS, a genus (*Quercus*) of trees and shrubs of the family *Fagaceæ*. The species, of which there are about 400, are characterized by alternate, simple, deciduous or evergreen leaves, inconspicuous monœcious flowers, the staminate usually in slender pendulous catkins, the pistillate usually nearly sessile and generally solitary or in groups of two or three and developing into "acorns" which are more or less globular or oblong nuts set in the hardened, scaly involucre (cup) which sometimes nearly surround them. Nearly all the species are natives of the northern hemisphere, especially the temperate and colder portions. Some species are natives of the warmer parts of the temperate zone, but few are actually tropical. Most of the oaks are noted for strength, durability, longevity and striking individuality of

appearance; and on account of these qualities they have been used as symbols by many races and enter into literature and tradition. Some of the species reach maturity only when 50 to 100 years old, and others even exceed this maximum before reaching a size suitable for lumbermen's purposes. Specimens are known which have reached nearly 1,000 years, and others of half that age are common.

Oaks are generally propagated by seeds planted as soon as mature in the autumn; choice varieties are grafted or budded; and evergreen species are often increased by means of cuttings or layers. In general they thrive best upon well-drained, fairly moist, loamy soils, especially such as are well supplied with lime. They are, however, found in all kinds of habitats, including almost pure sand, clay, rocky mountain sides and the mucky soils of undrained swamps. With few exceptions the valuable species are easily grown and readily transplanted while young.

Among the oaks are some of the most valuable trees of the temperate zone. Their acorns furnish a valuable food for swine, and in some instances are used for human food; their bark is one of the most important barks used in tanning; and their timber, which is noted for its solidity, strength, resistance to moisture and durability, is one of the most important woods of the world. It is used largely in shipbuilding, but less now than before the introduction of iron and steel vessels; in railroad and mill construction, bridge building, etc.; and, because of its handsome graining and its ability to receive polish, it is extensively employed in interior finish of houses, in furniture, etc. The galls which grow upon certain species and the bark are widely used as a source of tannin for ink manufacture. Some of the more rapidly growing species are planted largely in Europe in copses, the stems being cut every few years for fuel and for the bark. Few trees are more highly prized by horticulturists and landscape gardeners; but usually the specimens must be in place before the gardener lays out the ground, because with most species little effect can be expected under 10 years. For this reason other trees of quicker growth are planted with oaks and are removed when the oaks need the space.

About 50 species and half as many hybrids and varieties are natives of the United States, some extending from Nova Scotia to Minnesota and southward to the Gulf States, others being limited to very restricted localities. In general these species belong to two groups, the black oaks and the white oaks. Those of the first group have leaves with pointed tips and acorns that require two years to reach maturity; those of the second have leaves with round lobes and acorns which reach maturity the first year. The most important species is probably the white oak (*Quercus alba*), which has the full range mentioned above. It attains a height of 100 feet, has broadly-spreading branches which form an open rounded head, and the light gray bark which gives it its name. It is one of the handsomest of its genus, and being of rather quick growth for an oak, and remarkable for its statelyness, it is often planted in parks. Its timber being compact and remarkably handsome, is one of the most prized for furniture. The mossy-cup or bur oak (*Q. macrocarpa*) re-

sembles the white oak in size, appearance and distribution, but its timber, being of coarser grain, is less valued. The chestnut-oak (*Q. prinus*) is a smaller tree, with a broad irregular head and dark brown bark deeply furrowed and with leaves like those of the chestnut. It ranges from Maine to southern Michigan and Pennsylvania. It is especially valued for its bark, which is exceptionally rich in tannin. The live oak (*Q. virginiana*) is a broadly spreading tree, seldom more than 60 feet tall. It is noted throughout its range, which extends from Virginia southward, for its glossy, dark green leaves and its dense shade, for which it is widely planted in the South for ornament. It is usually draped with Spanish or Florida moss, which also adds to its striking appearance. The red oak (*Q. rubra*) which has a range similar to the white oak, is a rapidly-growing, handsome tree, sometimes reaching 150 feet and forming a broad round head. Its timber is very heavy, durable and hard, but is coarse-grained. It is less used for the finer work than the white oak. A close relative, the scarlet oak (*Q. coccinea*), is smaller than the preceding, but is similar in range, uses, etc. Both kinds are remarkable for their autumn colors. The water-oak (*Q. aquatica* or *nigra*), popularly known as the black or dyer's oak, is common from Delaware southward to the Gulf States. It attains a height of 80 feet, and being of rapid growth it is frequently planted as a street tree in the South. In the North it is not hardy.

The European or British oak (*Q. robur*) is a native of western Asia and northern Africa as well as of Europe. About 50 horticultural varieties of this species are in cultivation for ornament, some being introduced into America for this purpose. This is the oak of legendary lore, under whose branches the ancient Druids held their religious ceremonies. It is also the oak used by the navies of Europe for more than a thousand years. The cork-oak (*Q. pseudo-suber*) is a native of the Mediterranean region and is noted for its bark which furnishes the cork of commerce. The gall-oak (*Q. lusitanica*) is a shrub, native to western Asia, and is chiefly useful for its nut-galls (q.v.), which occur upon the leaves as the result of insect attack. The Valonia oak (*Q. agrilops*), common in the same region, is noted for the astringency of its acorns, which are largely used in tanning. The holm, holly or evergreen oak (*Q. ilex*) is a native of southern Europe and bears acorns used for food.

A very large number of insects live upon the oak, its timber and its decaying wood. One estimate for the United States places this at 1,000; the number actually recorded being between 500 and 600. In Germany, according to Kaltenbach, there are 537. These belong to all orders and include borers, leaf-chewers, sap-suckers and fruit-eaters. Among the most noted are the oak-tree pruner (*Elaphidion villosum*), a beetle which lays its eggs in the twigs, in the pith of which the larvæ feed until nearly mature, when they chew out a ring of wood nearly to the bark, retire to the semi-severed twig, plug up the burrow and pupate. The wind snaps the twigs, hence the name. Many gall-forming insects, plant-lice, leaf-miners, scale-insects and leaf rollers feed upon the leaves, which are also often attacked to a

damaging extent by the larvæ of numerous lepidopterous insects. Some of the curculios are frequent pests upon the acorns, which are rendered useless for stock food, because their contents have been eaten by the larvæ. Perhaps the most serious pests, however, are the borers, of which there are a large number. These may retard the development of the trees or may so injure the wood by their burrows as to make it unfit for purposes where strength and appearance are necessary. Consult Packard, 'Fifth Report, United States Entomological Commission' (Washington 1890).

OAKUM, in shipbuilding, threads of hempen ropes picked to pieces, to be used when mixed with pitch for caulking the seams of wooden vessels. Until recently old men, women and children were employed to pick oakum, but this is now chiefly done by machinery. The rope or junk is old rigging and cables bought up for this purpose. It is first cut by a powerful knife into short lengths, and these are thoroughly steamed to dissolve out the tar. The strands being then pulled apart, they are spread in the sun to dry. After this they are torn in pieces and cleaned of dust in carding machines, a succession of which are used, until the oakum is obtained in clean light fibres. Since the passing of the wooden ship oakum is very little in demand.

OAKVILLE, Canada, town in Halton County, Ontario, 21 miles southwest of Toronto, on Lake Ontario and on the Grand Trunk Railroad. Appleby School for Boys is situated here. An electric railway connects Oakville with Hamilton. The town owns its waterworks and electric-lighting plant. The industries are planing-mills, boat-building, tanning, aluminum ware, evaporators, baskets and leather. Oakville is a favorite summer resort. Pop. (1914) 2,972; in summer 3,500.

OANNES, ō-ān'nēz, in Babylonian mythology, a god of the sea, described as having the head and body of a fish, to which were added a human head and feet. In the daytime he lived with men to instruct them in the arts and sciences, but at night retired to the ocean.

OAR FISH, or **BAND-FISH**, one of the ribbon-fishes (*Regalecus banki*), a peculiar deep-sea fish, 12 to 20 feet or more in length, with a narrow and extremely compressed body of a silvery color. The dorsal fin extends the whole length of the back and the anterior part is like a mane. The ventral fins are thoracic and are much reduced in width. The fish is found in all oceans and is probably responsible for most reports of sea-serpents. It is only rarely met with and usually in a dying condition, as its proper home is in the depths of the sea.

OÁS, ō-ās', Philippines, a town in the province of Albay, Luzon, situated in the Inaya River, 15 miles northwest of Albay, the provincial capital. It is on the main road between Ligao and Polangui, has a considerable river trade and is the centre of one of the finest hemp-growing districts of the province. Pop. 17,200.

OASIS, a fertile place in a desert, usually found where lack of vegetation is caused by lack of moisture. Some of the mountains in the Sahara are of sufficient height to cause

condensation of moisture and rainfall; and as much of the soil has all the ingredients necessary for productiveness, an oasis is formed. Springs sending out enough water to moisten the soil aid in the formation of fertile spots; and artificial means are now used; the artesian wells are assisting in making productive places in the Sahara. See SAHARA.

OASTLER, ōst'lēr, Richard, English reformer: b. Leeds, England, 20 Dec. 1789; d. Harrogate, England, 22 Aug. 1861. In 1820 he succeeded his father as steward of the Fixby estates at Huddersfield, Yorkshire. In 1830 his attention was called to the evils of child labor in the factories and he started a campaign against the conditions by a vigorous letter to the Leeds *Mercury*, entitled 'Yorkshire Slavery.' After many years of agitation the Ten Hours Bill and other acts ameliorating factory conditions were passed. Oastler's energetic work gave him the title of 'The Factory King.' Owing to his opposition to the new poor law he was dismissed from Fixby and in 1840 being unable to repay his employer a loan of £2,000 the latter had him imprisoned for debt in the Fleet. Here he remained nearly four years, meantime publishing the *Fleet Papers*, a weekly journal discussing the factory and poor law questions. The working-men of England and Oastler's personal friends raised the money to pay his debt and he was released in 1844. He was triumphantly received on his return to Huddersfield. In 1869 a statue to his memory was erected at Bradford. In 1851-55 he edited a weekly newspaper called the *Home*.

OAT GRASS. See GRASSES OF THE UNITED STATES.

OATES, ōts, Titus, notorious English perjurer, the fabricator of the story of the Popish Plot: b. Oakham, 1649; d. London, 12 July 1705. The son of a clergyman of the Church of England who had become an Anabaptist preacher and in 1654 was expelled from a chaplaincy in the Parliamentary army, he was turned out of successive schools and took no degree at Cambridge, but was ordained and became vicar of Babbing in 1673. Soon after he was vicar to his father, with whom he circulated such outrageous stories against a schoolmaster of the parish that they were expelled from the living. After various ups and downs, about 1676 he conceived the idea of informing against the Roman Catholics; he became a Roman Catholic in 1677, studied at Valladolid and Saint Omer, but was expelled from both, and 1678 gave information as to a Popery Plot against Charles II, intended to seat upon the throne James, Duke of York, and turn the country over to the Jesuits. He received a large governmental pension and his story was implicitly believed, resulting in the judicial murder of 35 innocent persons. But in two years the excitement somewhat subsided; and upon the accession of James II, Oates' pension was withdrawn and he was put on trial for perjury, was found guilty, fined, condemned to stand in a pillory, and be imprisoned for life after a terrible flogging, which he survived as by a miracle. His sentence was reversed after the accession of William and Mary; he was set free and received an annual pension of £300. In 1693 he

married a rich widow and a few years later joined the Baptist congregation and preached among them, but was soon expelled. Consult North, Roger, 'Examen,' and 'Lives of the Norths'; Seccombe, Thomas, 'Lives of Twelve Bad Men' (1894); Burnet, 'History of My Own Time' (1883); and the English histories of Hallam, Lingard and Macaulay.

OATH, Military, a solemn or formal appeal to God (or to any deity), in witness of the binding character of the promise, made by each recruit at the time of his enlistment. Among ancient nations and races the oath also imprecated divine vengeance if the swearer should be guilty of a falsehood or violate his promise. When the law took his most solemn oath he laid his hand on the book of the law and swore by the God of Israel. The ancient Scandinavians and Teutons swore by their gods and laid their hands on some special object of veneration—a bloody ring held by the priest, or touched their swords or beards as they took the oath.

The Roman term for the military oath of allegiance was originally the preliminary engagement entered upon with the general by newly-enlisted troops (Cicero Off. 1, 11, 36; Livy, XXII, 38, 2). The oath was taken first by the legates and tribunes. Officers then administered it to the soldiers in the following manner—one soldier in each legion recited the formula of the oath, and the rest were called off by name; and coming forward one by one swore to the same oath *idem in me*, i.e., "The same holds good for me." The oath remained in force only till the next campaign; and whenever there was a new general a new oath was taken. After the introduction of the 20-years' service by Marius (about 100 B.C.), the men raised for service took the oath, not one by one, but all together and for the whole time of service, in the name of the state, afterwards in that of the emperor. In early Christian times oaths were administered in chapels and other holy places at the altars which were occasionally rendered more sacred by placing upon them holy relics. William the Conqueror, when he made his prisoner Harold swear to aid him in ascending the throne of England, secretly conveyed under the altar on which Harold had agreed to swear the relics of some of the most revered martyrs; and when Harold had taken the oath he was admonished to observe religiously an engagement which had been ratified by so awful a sanction.

Military knighthood in the days of chivalry—that originated between the time of Charlemagne and the Crusades—was subject to much form and ceremony. Many arms were never received without a regular investiture, which became a general practice in the 11th century. Many of the orders of knighthood had their own special oaths.

The military oath of the present day consists of an enlistment contract, which is signed by the recruit. In the United States army the enlistment contract signed by the recruit is as follows: "I, N, born in — in the State of —, aged — years and — months, and by occupation a —, do hereby acknowledge to have voluntarily enlisted this — day of — 19—, as a soldier in the Army of the

United States of America, for the period of — years in active service and in the Army of Reserve for the periods and under the conditions prescribed by law, unless sooner discharged by proper authority; and do also agree to accept from the United States such bounty, pay, rations, and clothing as are or may be established by law. And I do solemnly swear (or affirm) that I will bear true faith and allegiance to the United States of America; that I will serve them honestly and faithfully against all their enemies whomsoever; and that I will obey the orders of the President of the United States and the orders of the officers appointed over me, according to the rules and articles of War." A somewhat similar formula is subscribed by the recruits of foreign armies. An oath is also administered to officers at the time of their being commissioned and also in some cases where the performance of special duty is assigned them. It is not so picturesque as the verbal oath, but it is no less binding. See KNIGHTHOOD; LAW, MILITARY; ARMY; NAVY; UNITED STATES.

OATHS AND AFFIRMATIONS (Judicial). A judicial oath is a solemn declaration made in some form warranted by law, before a court of justice or some officer authorized to administer it, by which the person taking it promises to tell the truth, the whole truth and nothing but the truth, in relation to his knowledge as to the matter then under consideration, and appeals to God to witness his sincerity. It is distinguished from an extra-judicial oath in the fact that the latter is not made under any warranted form of law, and has no binding force, except in the conscience of the one taking the oath. An affirmation is made in place of an oath by a person conscientiously opposed to an oath, and it is a declaration which is equivalent in law to an oath. Oaths are of extremely ancient origin, and are not peculiar to Christianity, having been used by many nations of the world. Affirmations in place of oaths were the result of a statute first enacted in England for the benefit of those to whom the invocation of the Deity was objectionable. Generally under the present laws, only those persons included within the statutes permitting an affirmation to be made in place of an oath have such right. Authority to administer oaths is an incident to judicial officers. All persons having sufficient intelligence to appreciate the nature of an oath and believing in the existence of a Supreme Being, who demands a moral obligation to speak the truth when under oath, are competent to take an oath.

In nearly all of the United States, through statutory enactment, it is provided that every person believing in a religion, not the Christian religion, may be sworn according to such ceremonies as his religion may have; a substantial compliance with the provisions of the statute as to the form of an oath is usually sufficient, the test generally being as to whether or not the person taking the oath would be liable for punishment for perjury in the event that such oath had been violated. Any person lawfully required to depose the truth, and making a wilful false oath on any material point, whether he believes it or not, is subject to be held for perjury, and punishment therefor in accordance

with the statutes under which he may be indicted. See also EVIDENCE; LAW, CRIMINAL; WITNESS.

OATS, various grasses of the genus *Avena*. The best known species is often subdivided into Tartarian oats (*A. orientalis*) and common oats (*A. sativa*). In the former variety the panicles are one-sided and somewhat contracted; in the latter they are loose and spreading. The origin of common oats is in doubt, but many writers suppose that they are derived without hybridizing from a Tartarian species now unknown to botanists. The numerous varieties of this species vary greatly in color, size of grain, height, etc., and more or less in composition. Other species are cultivated to a small extent but are mostly considered weeds. The best known of these are probably animated oats (*A. sterilis*) whose seeds move with varying amounts of moisture; wild oats (*A. fatua*) valued in some places, for example, California, for pasturage, but generally regarded as a noxious weed; bristle-pointed oats (*A. strigosa*) used sometimes like the preceding but also considered a weed; and short oats (*A. brevis*) cultivated at high altitudes for its seed which matures where other cereals fail.

Oats succeed well upon a great variety of soils if these are well supplied with moisture. They will not do well in wet soil nor in hot countries, though in warm regions they succeed if the soil is moist enough. They thrive best in temperate climates, in many of which they rank as one of the most important cereal crops. The land is plowed and harrowed usually in spring and the seed either sown broadcast or drilled in at the rate of about three bushels to the acre. In the western United States the seed is commonly sown broadcast upon cornland which has been prepared only with the harrow. In the eastern States the ground is usually plowed previous to sowing. Since the plants are very hardy the seed may be sown as soon as the ground can be worked in spring, a practice which insures an early development of the plants under favorable conditions. In about three months the harvest usually occurs in northern countries; in southern regions a somewhat longer time is necessary because of the shorter days and usually drier conditions. Though the average yield per acre in the United States was, during the last decade of the 19th century, 26.14 bushels, yields of more than 50 bushels are common under good management, especially in Europe. The world production is about 4,600,000,000 bushels per annum. The 1914 production of the United States was 1,141,060,000 bushels; the production of Europe is about 2,700,000,000 bushels. Russia, Germany and France, in order named, are the largest European producers.

Oats are rather exempt from the attacks of specific insect enemies; and the means of combating the general cereal enemies are the same as for wheat, barley and other grass and grain insects. They are subject to the attacks of several so-called plant diseases, of which the best known are rust and smut. Since these are less troublesome upon early maturing varieties, these are chosen in regions which seem to be infested. They also have another advantage in that they are less likely to lodge than taller and later growing varieties.

The oat has long been considered one of the most valuable of cereal grains. Treated as a grass it makes an excellent forage, fodder or hay; and as a grain it is one of the standard feeds for domestic animals, particularly the horse, and is widely used as human food, especially for making porridge. In the manufacture of what are called "breakfast foods" the oat takes an important part, and the by-products, such as hulls (the outer covering), bran, middlings, and "oat dust" are largely sold to stockmen for mixing with other feeds. The whole grain has the following average composition: Nitrogen-free extract, 59.7; protein, 11.8; water, 11.0; crude fibre, 9.5; fat, 5.0; ash, 3.0. Since analyses have failed to reveal the presence of a supposedly stimulating principle called "avenin," chemists and other investigators have concluded that such a principle does not exist.

Consult Morrow and Hunt, 'Soils and Crops of the Farm' (1892); Hunt, 'The Cereals in America' (New York 1904), and *Farmers' Bulletins* Nos. 424 and 426 of the United States Department of Agriculture and books upon general farming.

OAXACA, wā-hā'kā, Mexico, state, bordering on the Pacific Ocean, and bounded on the north, east and west by the states of Puebla, Vera Cruz, Chiapas and Guerrero. Area about 28,778 square miles. The principal mountain ranges are the Sierra Madre, which crosses the whole state, and Sierra del Sur, near the coast. See MEXICO—THE STATES OF.

OAXACA, or **OAXACA DE JUÁREZ**, dā hoo-ā-réz, Mexico, capital of the state of the same name. The situation, in the midst of a fertile valley, the rivers Atoyac and Jalatlaco flowing through it out into the Oaxaca valley, is most attractive. It is 288 miles southeast of Mexico City, by railway, and is 5,067 feet above sea-level. It enjoys an unlimited supply of pure water, by means of two aqueducts, one of which was built in 1755 and the other in 1880. Transportation facilities are supplied by the Mexican Southern and Oaxaca and Ejutla railways. There is a local bank,—the Bank of Oaxaca,—which, together with branches of the National Bank and the United States Banking Company, and an agency of the Bank of London and Mexico, supply the financial needs of the community. Within the last few years the city has assumed much prominence as a base of supplies and headquarters for the many and rapidly developing mines of the State. The streets are laid out somewhat like those of Washington, are lighted by electricity and are well paved and clean. The general style of architecture is Spanish, and the most notable edifices of interest are the Government Palace, the Palace of Justice, the Municipal Palace, Federal Building, Museum and Institute of Science and Art, the Normal School, State Hospital, Charity Hospital and the Municipal Necropolis. The educational institutions include a number of primary schools, the State Institute of Science and Art, in which are taught jurisprudence, medicine, obstetrics, pharmacy, telegraphy and business methods; the Normal School for Men and the Normal School for Women, in which both primary and advanced instruction is given. Two museums—the Oaxaqueño and the Fernando Sologuren—are

devoted to the investigation and study of archaeology and the natural sciences. The cathedral of the city, founded in 1553 and rebuilt in 1730, is an imposing edifice of gray stone. There are many public gardens or parks—among them the Zocolo, Guadalupe, San Francisco, Netzahualcoyotl and the Constitution. The city is believed to have been an important place long before its discovery by the followers of Cortez, by whom it was occupied in 1521. It was constituted a city by royal charter in 1532 and given its present name, Oaxaca de Juárez, in 1872. Here were born and reared several of the greatest men of Mexico; among them being Porfirio Díaz; Ignacio Mariscal, Mateos Romero, many years Minister of Mexico to the United States; and in a poor little hamlet not far distant, Benito Juárez. Pop. about 42,000.

OAXACA, Ruins of. Architectural remains found on the mountain tops around the city of Oaxaca in southern Mexico, which was founded by the Zapotecs in 1486 under the name of Huaxyacac and occupied by the Spaniards in 1522 who named it Antequera. Oaxaca is noted for two of the most noted ruin-groups in Mexico. The principal ruins are those of Mitea, the burial city of the priests and kings of the ancient Zapotecs, which show quite a distinct character, although presenting certain analogies to the Mexican. One of the chief structures is a step-pyramid rising in three steps to a height of 130 feet. Another is a pyramid of brick. Besides these there are courts surrounded by palaces which were necropolises, dwellings of the priests, chief priest and of the king. The latter's dwelling has an audience hall. The wall paintings of the palaces are remarkable. The deities are those of the Mexican pantheon.

Mitla, once a marvelous city, is now built over by a modern Indian village and, with the exception of half a dozen of its greatest temples, is practically destroyed. Mitla is 29 miles by stage to the southeast of Oaxaca on the Tehuantepec highway.

The other ruin group is situated upon Monte Alban (6,245 feet), a few miles west of Oaxaca. Monte Alban is a mountain ridge about a thousand feet high, one mile long and a quarter of a mile wide, which has been remodeled by the hand of man into terraces, plateaus and pyramids. As it stands to-day it is in its outlines an artificial mountain and an astonishing monument to the energy and culture of the ancient races.

The ruins of Monte Alban were explored by Garcia in 1855, by the German traveler Müller in 1857 and by Charnay in 1858-59. W. H. Holmes, who made a careful study of Monte Alban in 1896, came to the conclusion that it was originally a hill-top city occupied by people who made use of the valley and mountain slopes for their crops and gardens.

"About Oaxaca," this archaeologist writes, "many of the important architectural remains are found on the mountain tops, and one soon comes to recognize the notched profiles of the ridges and peaks that border the valley as being due to the strangely directed enterprise of the ancient inhabitants. The feeling of surprise induced by this discovery is followed by one of amazement as the real nature and extent

of the work dawns upon the mind. As the explorer climbs the slopes and picks his way from summit to summit, he is fairly dazed by the vast array of pyramids and terraces, which not only crown the heights but overspread the steep slopes, destroying traces of natural contour and making the mountains actual works of art." The greatest of the works covers an area of about 3,400 feet by 1,200 feet and consists of a vast series of level courts inclosed by terraces and flanked by pyramids. The corners of the quadrangles are ornamented by pyramids and in the centre rises a mound. Some of these pyramids are 400 feet square and rise to a height of 40 feet to the summit, which is 300 feet square. The builders not having large stone used a mixture of adobe and small stones, faced with rough blocks, sometimes with dressed masonry, and covered with cement on the outside. Cement floors are observed in the ruins and much interesting sculpture. "The chain of pyramids," says Mr. Holmes, "extending from north to south along the middle of the great square, constitutes one of the most interesting features of these remains. How striking must have been the effect when these pyramids were all crowned with imposing temples, when the great level plateau about them, 6,000 by 1,000 feet in extent, was brilliant with barbaric displays, and the enclosing ranges of terraces and pyramids were occupied with gathered throngs. Civilization has rarely conceived anything in the way of amphitheatric display more extensive and imposing than this.

The museum of Oaxaca has a large collection of objects taken from Monte Alban. The American Museum of Natural History has carried on explorations in this region and owns a valuable collection of antiquities from the valley and Oaxaca, Mitla and Monte Alban illustrative of Zapotecan culture. On Monte Alban have been found pottery similar to the ware now sold in the Oaxaca market; amulets of jadeite and other hard stone and a few gold and silver objects. It is supposed that the Monte Alban ruins are older than those of Mitla and that Mitla flourished in the 6th century A.D. Consult Charnay, 'Les Anciennes Villes du Nouveau Monde' (Paris 1885); and 'Cités et ruines américaines' (Paris 1863); Seler, E., 'Wandmalereien von Mitla' (Berlin 1895); 'Führer von Mitla' (Berlin 1906); Bandelier, A. F., 'Report of an Archaeological Tour in Mexico in 1881' (Boston 1884); Holmes, W. H., 'Archæological Studies among the Ancient Cities of Mexico' (Chicago 1897); Saville, M. H., 'Exploration of Zapotecan Tombs in Southern Mexico' (Washington 1899).

OB, öb, or OBI, õ'bë, Siberia, a great western river with its head-streams, the Biya and the Katun rising in the Altai Mountains within the frontiers of the Chinese dominions. The river flows northwest and north for 2,500 miles through level country to the Arctic Ocean, which it enters by three mouths at the great Gulf of Ob, an inlet of the Kara Sea, between Nova Zembla and the mainland. It extends between lat. 64° 30' and 72° N., and long. 68° and 77° E., and is ice-bound from October to June. The chief tributaries of the Ob are the Irtysh, Tcharysh, Tom and Tchulym, all navi-

gable. On the banks of the Ob are the towns of Barnaul, Tomsk and Tarym. At present only a few steamers ply on the great water-system of the Ob, of which over 9,000 miles are navigable.

OBADIAH (Hebrew, "Obadyah," meaning "servant" or "worshipper" of Yahweh, a prophet and poet of Israel, author of 'The Vision of Obadiah,' the fourth book of the minor prophets in the Jewish canon. Nothing is known of the prophet, except this short composition. A single chapter contains the whole utterance which is distinguished by its lyrical point and symmetry. It was probably written between the destruction of Jerusalem in the year 588 B.C., and the Conquest of Idumea about five years later, by Nebuchadnezzar. The Edomites, the progeny of Esau, were the great enemies of Israel. Noted for sagacity and worldly learning they imagined themselves quite secure in their hill fastnesses and rocky strongholds. Hebrew prophets often anathematized them as the type of earthly powers that defy God and his kingdom. As described in Psalm cxxxvii, 7, they had proclaimed their malicious joy over the destruction of Jerusalem, and the sufferings of their Hebrew brethren carried into captivity to Babylon. The remembrance of their insults and cruelty rankled and Obadiah in a poetic vision, with dignified protest earnestly warns them to cease from this unfeeling persecution, urging that Jehovah's punishment on all nations is at hand. When the day of wrath comes Judah will unite with Joseph, bring Edom to destruction and regain possession of its hereditary domain, a prophecy which was remarkably fulfilled. See OBADIAH, BOOK OF.

OBADIAH, Book of. Several verses of this book stand in some close relation with a portion of Jeremiah. The following verses of Obadiah are largely identical with the corresponding verses in the 49th chapter of Jeremiah, but with some variations: Obadiah v, 1-4, 5, 6, 8 = Jeremiah xlix, 14-16, 9, 10a, 7. The possibilities are that Obadiah has quoted from Jeremiah, that the quotation is in the reverse order, or that both have quoted from an older oracle. A careful comparison makes it exceedingly probable that Jeremiah has quoted from Obadiah, principally because the arrangement is more natural in Obadiah and the material much more condensed. Hence, so far as Obadiah is concerned, the relation to Jeremiah may be dismissed. If chapter 49 belonged to the actual oracles of Jeremiah that might help to fix the date of Obadiah. But it is generally agreed that the oracles concerning the nations in Jeremiah xlv-li are considerably later than Jeremiah. Hence the date of Obadiah is to be fixed quite irrespective of Jeremiah.

It is evident, however, that Obadiah quotes an older oracle, introduced by the statement in verse 1, "we have heard tidings from Yahweh." This older oracle consists of verses 1-4. This was a prediction of destruction to Edom, given by an unknown prophet. It was delivered, doubtless, before the destruction of Jerusalem in 586, for there are no allusions to the activity of Edom in connection with that event.

There seems no reason to doubt that substantially the remainder of the book is by Obadiah, although some have questioned this. The prophet in verses 5-9 indicates that the

older oracle is now being fulfilled. He goes on later to predict further destruction for this nation, in connection with the general judgment upon the nations in the day of Yahweh, verses 15-16. The outcome will be that Israel will come to possess the land of Edom, verses 19-21.

The date of Obadiah is evidently after the destruction of Jerusalem in 586, for that is the event described in verse 11. It was also, evidently, when disaster had begun to come upon Edom. This was doubtless the series of disasters at the hands of the Nabateans. In 312 B.C. the Nabateans had occupied the Edomite capital, Petra, and driven the Edomites northward, this being the culmination of a movement begun quite a long time before. It is probable, therefore, that the date of Obadiah was in the 5th century B.C.

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OBALDIA, José Domingo de, President of Panama: b. David, province of Chiriqui, 1845; d. 1 March 1910. He was the son of the President of Colombia, was educated at the Institute de Christo in Bogotá and completed his education in the United States at French's School, New Haven, and in New York. Returning to Panama, he became interested in agriculture and stock-raising and accumulated a fortune. In 1900 he was elected to the Colombian Congress and in 1903 was made senator and also in that year was made governor of the province of Panama, then under the rule of Colombia. He joined in the revolution of 1903 which achieved the independence of Panama and was made second vice-president of the new Republic. In 1904 he was appointed minister to the United States, where as a member of the governing board of the Pan-American Union he labored for the cause of Pan-Americanism. Returning to Panama he was elected first vice-president of Panama and served as acting president during the absence of President Amador in Europe. Two years later (1908) he was made President, the candidate of the Liberal party. He died during his term of office. He endeavored to give the country a good administration. Obaldia was a man of wealth, owned ranches in Panama and large interests in Costa Rica and other Spanish-American countries.

OBAN, Scotland, seaport, fashionable watering place and municipal and police borough of Argyllshire, 20 miles northwest of Inveraray and 113 miles northwest of Glasgow by the Caledonian Railway and by the Crinan Canal. It is situated on the Bay of Oban, an arm of the Firth of Lorne, whence it takes its name Obe-an, "little bay." The island of Kerrera (four miles long and two miles wide) screens it from the Atlantic gales and makes it almost a land-locked harbor. Moreover, as it nestles at the foot of mountains of Mull, which rise picturesquely north and east of the town, an exceptionally mild climate for the latitude is

enjoyed here. Oban is, therefore, a favorite resort for tourists in the west highlands. From the constant influx of visitors arriving by rail, yacht and steamer the place is called the "Charing Cross of the Highlands." When Dr. Johnson visited this place during his tour through the Hebrides Oban was a tiny village. To-day it is a bustling little seaside town containing hotels, banks, shops, churches, piers and public park. At the north end of Oban Bay, on a high bluff looking over the sea, stands the ruin of Dunolly Castle. It dates from the 12th century and was the stronghold of the MacDougalls, Lords of Lorn. It still belongs to the family whose modern house occupies a sheltered nook below it. The chief exports are sheep products and whisky. Pop. 5,600.

OBANDO, ō-hān'dō, **José Maria**, Colombian general: b. in García, 1797; ; d. 27 June 1861. At the age of two years he was abducted and carried to Popayan where he was adopted by a gentleman named Obando. His origin is unknown. At first he served in the Spanish army as a guerilla and obtained the rank of lieutenant-colonel. In 1822 he joined the Revolutionists and rendered great service under Bolivar in the province of Pasto. In 1828 he opposed Bolivar and headed a Liberal revolt against the dictatorship of Urdaneta and defeated the dictator at Palmira (1831). He then formed a constitutional government for the Republic of New Granada, was secretary of war and marine, and in 1832 went to Ecuador to negotiate a treaty of peace. In 1838-41 he led a rebellion against Marquez but was defeated and exiled. When his party was restored to power in 1849, he became a member of the congress and secretary of the chamber of deputies. In 1850 he was made governor of Cartagena and in 1852 President of the republic. In 1854 he was overthrown and exiled. In 1860 he was recalled and commissioned to suppress a revolution in Cauca and in defense of the federation against the Revolutionists or Centralists, died on the battlefield of Cruz Verde.

OBEAH. See FETISH; OBI.

OBDIANCE, from the Latin *obedire*, to obey, is submission to the rule of another; the action of doing what one is bidden to do; the compliance with or the performance of a command. Obedience is also abstaining from what is prohibited in compliance with a command or prohibition. "Obedientia est legis essentia" (obedience is the essence of the law) says Coke. Obedience (ecclesiastical) in canon law, means the duty by which the various gradations in ecclesiastical organization are held subject, in all things consistent with the law of God or of the Church, to the several superiors placed immediately above them, respectively in the hierarchical scale. Thus priests and inferior clergy owe canonical obedience to the bishop; and bishops, by the present law of the Roman Catholic Church, take an oath of obedience to the Pope.

In ecclesiastical history the word obedience has a special signification and is applied to the several parties in the Church who during the great western schism adhered to the rival popes. The "Roman obedience" in those days designated all those who adhered to the Pope chosen at Rome and the "Avignon obedience" meant

the supporters of the Avignon Pope. Historians speak of the "obedience of Gregory XII," the "obedience of Benedict XIII" and so on. Applied to a monastic institution the word obedience signifies the voluntary submission which all members of religious orders vow to their superiors and to the rules and constitutions of the order.

The word obedience is also used to designate a place or office with the estate and profits belonging to it, in a monastery subordinate to the abbot and corresponding to a dignity in a cathedral or collegiate church. The "obedientiales" were usually the sub-prior, precentor, cellarer, sacristan, chamberlain, kitchenier, infirmarer, keeper of annals, hostler, almoner, pitanciar, lumberer and master of the lady chapel. The obediences varied according to the size of the monastery. Sometimes the gardener, fruiterer or keeper of the orchard was included.

The word obedience is also given to the written precept or formal instrument by which a superior of a religious order communicates instructions to a subject, for example an instruction to undertake a certain mission, to relinquish an appointment.

The word obedience is also the name given to those rooms containing the materials for the different kinds of works which the nuns executed. There were a great many of these obediences at Port Royal, for example "obediences for the linen, the robbery, the mattresses, the bedding, the furniture, the drugs, the apothecary's shop." An archaic definition of obedience is a salutation, bow or curtsy—*obeisance*. People "made obedience" to the throne; they "made obedience" on entering a room; and they "made obedience" on meeting each other.

OBELISK (Greek *ὀβελίσκος*,) *obeliskos*; diminutive of *obelos*, "a pointed instrument," "a spit"; Egyptian  *teken*, possibly related to the Hebrew *תָּקַן* *tokan*, "to make even," "level"; Arabic, *Misallat*, "a darning needle"; hence Cleopatra's needle. The Obelisk represents the Sun. The ancient Egyptians were sun-worshippers: they regarded the great luminary as the creator of the universe, the maker of all the gods above and below, and even as the author of himself. The sun as *Ra*, the great god of the Egyptians, was represented upon the monuments by the solar disc. In time several other names and attributes were applied to him. The rising sun was called *Har-em-khu*, "Horus on the horizon." During his daily course he was *Ra*, "the life-giver" representing day, light, etc. The setting sun, the symbol of night, darkness and death, was worshipped as *Tum* or *Temu*. When the number of deities in the Egyptian pantheon multiplied, *Ra* appeared upon the monuments and in the papyri under different forms and names, and is represented alike by animate and inanimate objects. The two most striking and characteristic monuments which represented him on earth were the obelisk and pyramid. The obelisk symbolical of light and life, represented his daily course; the pyramid, symbolical of darkness and death, the setting sun.

Ra was praised as "the Double Obelisk" and the "Double Sphinx" deity (Budge, 'The Gods of the Egyptians,' Vol. I, p. 348). The double

sphinx is the symbol of his early rising, and is called *Har-em-khu*, and according to the 'Book of Dead' (q.v.) is the symbol of resurrection. The obelisk is the technical figure of one ray or pencil of light emanating from the sun.

The material chosen for the obelisk was generally red granite, or syenite—a few, however, being of hard sandstone. The former was procured from the granite quarries at Syene (the modern Assouan). Red granite, some Egyptologists think, was chosen for two reasons: First, as being the most durable material, fitly representing the eternal sun. Secondly, on account of its red hue, suggesting the color of the solar disc at his rising and setting.

There were many obelisks throughout Egypt, but *An*, the city of the Sun (Heb., *On*; Greek, *Heliopolis*, the Beth-shemesh of the Bible), was the centre of sun worship and undoubtedly contained several obelisks, but one only now remains. It was erected, according to Petrie, by Usertesen I, a Pharaoh of the 12th dynasty (between 2758–2714 B.C.).

Of the numerous obelisks erected by Usertesen I, Thothmes III, Rameses II, only 48 are still in existence; 10 of which, including the one at Assouan, are prostrate, and 38 are found distributed in the following places: 9 in Egypt, 2 in Constantinople, 12 in Rome, 6 in Naples and other parts of Italy, 2 in France, 4 in England, 2 in Germany and 1 in United States. These monuments have always excited the cupidity and envy of Egypt's conquerors. Even as early as Augustus Cæsar the work of removing the beautiful monoliths as trophies had begun. According to Rollin (*Oeuvres Complètes de Rollin par M. Latronne*. Nouvelle ed., Vol. I, p. 14) that emperor removed two of those obelisks and made an unsuccessful attempt to remove a third.

The largest of the Egyptian obelisks was removed to Rome and now adorns the piazza of Saint John Lateran. It was brought from Thebes to Alexandria (about 330 A.D.) by Constantine the Great; thence to Rome by Constantius, who placed it in the Circus Maximus. Its present height is 108 feet and 7 inches. According to Cooper its weight is 455 tons. "On the fall of Rome the obelisk was thrown down and broken into three pieces, and it was suffered to remain unnoticed and indeed forgotten, save by a few antiquaries, amidst the ruins of the ancient circus till Pope Sixtus V caused it to be excavated, restored and re-erected in the present state (1588 A.D.)." Cooper, 'Egyptian Obelisks,' p. 35.

The obelisk in Central Park, New York, and the one on the Thames Embankment, London, are commonly known as "Cleopatra's needles." They were removed from Alexandria. The latter lay prostrate, half buried in sand, and was removed in 1877 to England. Our obelisk was brought over to this country at the expense of the late Mr. W. H. Vanderbilt in 1880. Both originally adorned the temple of *Ra* at Heliopolis and were erected by Thothmes III (1503–1449 B.C.). The hieroglyphic inscription on our obelisk bears the legends of two Pharaohs, Thothmes III and Rameses II. The central column on each side speaks of the achievements and triumphs of Thothmes III over the hereditary enemies of Egypt, the *Khetta* (the Hittites). The two lateral columns were engraved

about 300 years later by order of Rameses II. The legend treats of the same subject. He also fought the *Khetta*.

Commander Gorringe ('Egyptian Obelisks,' p. 115) gives a comparative table of the measurements and weight of these interesting monoliths. According to him the exact measurement of the obelisk in Central Park is 69 feet 6 inches in height, 7 feet 9 inches thick at the base and 448,000 pounds in weight. The London obelisk is 68 feet 5 inches in height, 7 feet 8 inches thick at the base and its weight is 418,000 pounds. The hieroglyphic inscriptions upon the south and west sides of our obelisk are deteriorated. But those on the east and north sides are in good condition. The inscription upon the pyramidions are almost obliterated.

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OBER, ò'bér, Frederick Albion, American author: b. Beverly, Mass., 13 Feb. 1849; d. 1913. He was educated in the public schools and made a study of ornithology, traveling extensively in the pursuit of his studies in the West Indies (1876–80), Mexico, Spain, South America and northern Africa. He discovered 22 new species of birds. He has written 'Camps in the Caribbees' (1880); 'The Silver City' (1882); 'Travels in Mexico' (1883); 'Montezuma's Gold Mines' (1885); 'Porto Rico' (1892); 'Josephine, Empress of the French' (1895); 'Under the Cuban Flag' (1896); 'History of the West Indies' (1900); 'The Cacique's Treasure Cave' (1901); 'The Last of the Arrawaks' (1901); 'Tommy Foster's Adventures' (1902); 'Hernando Cortés, Conqueror of Mexico' (1905); 'Two Boys with Columbus' (1905); 'Pizarro and the Conquest of Peru' (1906); 'Heroes of American History' (12 vols., 1907); 'A Friend of King Philip' (1907); 'A Guide to the West Indies and Bermudas' (1908).

OBERAMMERGAU, ò'bér-àm"mèr-gow, Bavaria. See AMMERGAU; PASSION PLAY.

OBERHAUSEN, ò'bér-how-zèn, Germany, a town of Rhenish Prussia, in the Rhine valley, a few miles northeast of Duisburg, an important railway centre and seat of industry, having blast-furnaces, rolling-mills, forges, railway shops, extensive chemical works, porcelain, tinware, soap, wire-rope, glass factories and productive coal mines, etc. Pop. over 100,000.

OBERHOFFER, ò'bér-hôf'ér, Emil, German-American musician: b. near Munich in 1867. He received his early musical education from his father, a capable organist, and played the organ and violin extremely well at the age of 10. He studied the piano and musical composition under Carl Kistler in Munich and in Paris under Isidore Philip. He settled in the United States and became conductor of the Apollo Club at Saint Paul. In 1901 he directed the Philharmonic Club in Minneapolis and through his efforts the Minneapolis Symphony

Orchestra was organized and endowed. Of this Mr. Oberhoffer has been the conductor since its creation in 1903 and has raised it to a high standard of excellence that ranks it with the leading symphony orchestras of the United States. He also holds the chair of music in the University of Minnesota.

OBERHOLTZER, ô-bër-hol-ser, **Ellis Paxson**, American historian; son of Mrs. S. L. Oberholtzer (q.v.): b. Philadelphia, 1868. He was educated at the University of Pennsylvania (Ph.D. 1893), and at Berlin, Heidelberg and Paris; was on the editorial staff of the *Philadelphia Evening Telegraph* (1889-96); editor of *The Manufacturer* (1896-1900), literary and dramatic editor of the *Philadelphia Public Ledger* (1902-08). He has published 'The Referendum in America' (1893, 3d ed., 1908); 'Die Beziehung zwischen dem Staat und der Zeitungspressen' (1895); 'The New Man' (1897); 'Robert Morris, Patriot and Financier' (1903); 'Abraham Lincoln' (1904); 'The Literary History of Philadelphia' (1907); 'Jay Cooke, Financier of the Civil War,' (2 vols., 1907); 'Henry Clay' (1909); 'Philadelphia, a History of the City and its People' (4 vols., 1911), and edited 'American Crisis Biographies' (20 volumes).

OBERHOLTZER, Sara Louisa (**Vickers**), poet, author and philanthropist: b. Uwchlan, Chester County, Pa., 20 May 1841. She was educated at Friends Boarding School, Millersville Normal, and by private tutors. From 1890 Mrs. Oberholtzer devoted much of her time to the introduction of the school savings banks system into the public schools of the United States and Canada. Mrs. Oberholtzer was one of the speakers at the first meeting of the National Council of Women in Washington, D. C., 1890; at the World's Congress of Women in Chicago in 1893; at the Geneva (Switzerland) meeting in 1903, etc. Her bulletin on 'School Savings Banks,' written for the United States Bureau of Education, and printed by the government in 1914, has been widely distributed. Files of her *Thrift Tidings*, the quarterly she issued regularly for the public since 1907, will be found in most of our State and public libraries. Mrs. Oberholtzer is the acknowledged leader of the school savings banks movement now established in public schools in nearly every State in the Union and some schools in Canada. Her published books are 'Violet Lee,' 'Come for Arbutus,' 'Hope's Heart Bells,' 'Daisies of Verse,' 'Souvenirs of Occasions,' 'Dialogues,' 'Letters of Travel.' Her songs and hymns set to music by different composers are in hymnals and many of them in sheet form.

OBERLÄNDER, ô-bër-län'dër, **Adolf**, German caricaturist and artist: b. Regensburg, 1 Oct. 1845. In 1861 he entered the Munich Art Academy and later became a pupil of Pilotys, making brilliant progress under his instruction. He found that historical painting did not suit his particular talent, which he early revealed in a humorous cartoon published in 'Fliegende Blätter' (1863). He subsequently abandoned painting and devoted his entire time to humorous and satirical designs, which showed such striking virtuosity that he became the leading artist on the staff of 'Fliegende Blätter.' He is strong as a caricaturist and exquisitely deli-

cate as a draughtsman, and his use of satire and ridicule is good-natured and avoids the coarseness and brutality sometimes too apparent in the pages of the comic papers. The majority of his cartoons have been collected and published in the 'Oberländer Album' (Munich 1879-1901). Oberländer's subjects are taken from mythology, fairy lore, fables, animal life and the customs and habits of the German middle class. He is also a painter of some note; and pictures of his are in the galleries of Munich, Berlin, Dresden and other cities of Germany and in private collections.

OBERLIN, Jean Frédéric, ô-bër-län, Alsatian clergyman and philanthropist: b. Strassburg, 31 Aug. 1740; d. Ban-de-la-Roche, 1 June 1826. He was educated at Strassburg and in 1767 became pastor at Ban-de-la-Roche. There he spent the rest of his long life in labor for the material and spiritual improvement of his degraded parishioners. He practised medicine among them, founded a loan and savings bank, introduced cotton manufacture, helped the people build better roads, and brought in modern agricultural methods. His orphan asylums were the beginning of the many 'Oberlinvereine' for the protection of children. Beside all this he was a man of rare spirituality, being frequently styled "a saint of the Protestant church," and an excellent pastor, who preached each month three sermons in French and one in German. Oberlin College (q.v.), Ohio, was named in his honor. Consult the biographies by Butler (English, 1882); Luttheroth (French, 1826; a German version, 1890); and Hackenschmidt (German, 1902); and the life and works of Oberlin as edited by Hilpert and Stoeber (German, 1843).

OBERLIN, Ohio, village in Lorain County; on southern division of New York Central main railway system, east and west; Lorain and Ashland and the Lorain and West Virginia north and south; also the Cleveland, Columbus and Southwestern interurban electric railway, 33 miles west by south of Cleveland, on the State highway. It was settled in 1833 as a college town, and Oberlin College was founded the same year, and has grown to be one of the largest colleges in the United States. Oberlin was incorporated as a village in 1846 and has always been noted for its beautiful shady streets and fine homes, it has never had any saloons, it is an ideal residence town. It is in a fertile agricultural region and its industries are chiefly connected with farm products. Besides the college and its fine system of public schools, there is a business college and a kindergarten training school. Pop. 4,365, without the students numbering 2,000.

OBERLIN COLLEGE, at Oberlin, Ohio; coeducational, founded in 1833 under the name of the Oberlin Collegiate Institute. In 1850 the name was changed to Oberlin College, although from the beginning the work offered was of college grade. The preparatory was the first department opened, but within two years the collegiate department and the theological school were organized and in operation. It was the first college in the United States to adopt coeducation, and in 1835 admitted students "without respect to color." Oberlin College was a noted centre from which emanated strong anti-slavery sentiments, and in the vicinity was the

"Underground Railroad" (q.v.), so much used in slavery days by the Abolitionists (q.v.). In addition to the regular courses in the College of Arts and Sciences, there is a department of music and a graduate school of theology (undenominational). Courses are also given in physical education for both men and women. There is a summer school (offering work of college grade only). There is an average of 190 teachers and officers connected with the college, and a total student enrolment of 1,700. The attendance in the College of Arts and Sciences is limited to 1,000. The college has 5,280 living alumni. The library contains 232,600 bound volumes and 213,000 unbound volumes and pamphlets. The property of the college in 1922 was valued at \$6,444,867. The productive endowment amounts to \$3,808,643. For 1922-23 the total income of the institution was \$752,663. The faculty in the same year numbered 163, professors, assistants and instructors, while the student body numbered 1,798 of whom 1,054 were women.

OBERLIN THEOLOGY. This term is applied to a system of doctrine inculcated at Oberlin College by the teaching of the Rev. Charles Grandison Finney (1792-1875), who became professor of theology at Oberlin College in 1835 and president in 1851-66. Finney was an impressive teacher and preacher, who broke away from Calvinism and modified its tenets. Finney carried on revival services in New York, Philadelphia and Boston during the years 1828-57, and in London in 1849-50, and traveled through England and Scotland in 1858, expounding his theories and holding revivals.

The general type of doctrine is the "New School Calvinism," of which the characteristic thought is that all responsible character pertains to the will in its voluntary attitude and action, and that each moral agent determines for himself, in the exercise of his own freedom, whatever is morally praiseworthy or blameworthy in his character and life; that sin is a voluntary failure to meet obligation, and that nothing else is sin; and that righteousness, or holiness, is a voluntary conforming to obligation such as is always in the power of every moral agent. Neither sin nor holiness can be transmitted, inherited or imputed, in the sense of being reckoned to the account of one in whose will it has not originated. As punishment can be inflicted only as an expression of blameworthiness, no one can be liable to punishment for Adam's sin, because no one can be blameworthy for any sin but his own. It is just as impossible that one should be forgiven any sin but his own. The ethical philosophy of Finney and his associates makes the well-being, or blessedness of the sentient universe the *Summum bonum*, or ultimate good; and the voluntary regard for this good, which is called benevolence, the grand element of all virtue. It is a peculiarity of the Oberlin Theology to regard virtue (or righteousness) and sin as in their own nature antagonistic to one another, each being contradictory of the other, and necessarily exclusive of it. Virtue being benevolence, and sin the refusal to be benevolent, they cannot coexist in the same will.

The Oberlin doctrine of sanctification first promulgated at Oberlin by Mr. Finney and

others was based upon the prevalent idea that some sin still remains in the character and action of the converted man, coexisting with his obedience. The problem of sanctification is to eliminate this remnant of sin and make the obedience entire and permanent. On this view there would be two classes of Christians: the simple converted rendering a partial consecration and obedience; and the entirely sanctified whose consecration and obedience are entire. The theoretical and practical views of the Oberlin theology may be gathered from the following: *The Oberlin Evangelist* (24 vols., Oberlin 1839-62); *The Oberlin Quarterly Review* (4 vols., Oberlin 1845-49); Finney, Charles G., 'Systematic Theology' (2 vols., Oberlin, 1845-46); Fairchild, 'Moral Philosophy' (New York 1869); Foster, F. H., 'Genetic History of New England Theology' (Chicago 1907). The modern theological ideas of Oberlin College are set forth in King's 'Reconstruction in Theology' (1901); 'Theology and the Social Consciousness' (1902); 'The Seeming Unreality of Spiritual Life' (1908), and 'The Laws of Friendship: Human and Divine' (1909).

OBERON. Of all the works of the once fashionable, facile and wildly piquant senior member of the poetical galaxy which made the court of Karl August of Saxe-Weimar the literary centre of Germany, his romantic epic 'Oberon' (1780), is the only one universally read to-day in Germany. However, it is difficult for our age to appreciate Goethe's enthusiastic reception of the poem with the prophecy that "as long as poetry remains poetry, gold and crystal, 'Oberon' will be loved and admired as a masterpiece of poetic art."

It transplanted the manner and form of Ariosto's 'Orlando furioso,' though the stanzas are not so regularly built as the Italian. Based on Count de Tressan's (1778) narration of the *chanson de geste* of "Hun de Bordeaux" (12th century) and influenced by Shakespeare's 'Midsummernight's Dream' and Pope's version of Chaucer's 'The Marchantes Tale,' it mingles the fairy lore of Brittany and of 'The Arabian Nights' to celebrate exploits of the king of the fairies, Oberon (Old French Alberon, derived from the German Alberich—'Elf-prince'). For the slaying of Karl the Great's despicable son, Charlot, Hun duke of Guienne, is condemned to go to Babylon (or Bagdad) and demand four molars and a tuft of the beard of the kalif after kissing the latter's daughter and slaying her intended. This feat is accomplished through the friendship of Oberon and the magic power of his horn, a blast of which causes all wicked persons to dance, and of a certain ring, which had been abstracted from its owner, Titania, and to which all the spirit world was subject. Commanded to go to the Pope at Rome before consummating marriage with the kalif's daughter, Hun yields to temptation and the couple are thrown on a desert isle by Oberon, who had deserted his Titania with the vow never to return to her unless a human couple should be found who were absolutely faithful, since she had championed the faithless girl wife of an aged dotard. About the invented quarrel of Oberon and his queen, Titania, is centred the whole conception of Wieland's poem. Thrown by the instrumental-

ity of Titania into captivity in Tunis, Huon and Rezia withstand the first test of temptation and, reunited, return to Paris and reconcile Karl. C. M. von Weber based his opera 'Oberon' on Wieland's poem. Consult Köhler, Reinhold, 'Oberon' (Leipzig 1868); Wieland, C. M., 'Gesammelte Werke' (Franz Muncker, Vol. I, Stuttgart and Berlin); id., 'Werke' (Prussian Academy of Sciences, Erich Schmidt and others, 1909; English trans., William Sotheby, London 1805).

CARL E. EGGERT.

OBERON, OR THE ELF-KING'S OATH, romantic English opera in three acts by Carl Maria von Weber, libretto by James R. Planché, first represented at Covent Garden, London, 12 April 1826. The libretto is founded on Villeneuve's romance, 'Huon of Bordeaux' and Sotheby's translation of Wieland's poem, 'Oberon.' It was Weber's last work. The keynote of the whole is the picture of the mysteries of elf-land and the life of the spirits of air, earth and water, and through the hazy atmosphere of elves and spirits are discerned the outlines of two contrasting themes—Western chivalry and Oriental life.

Reiza's aria, 'Ocean thou Mighty Monster,' in the second act is frequently sung on the concert stage by dramatic sopranos. The charming overture beginning with a horn solo also has frequent independent performance. Mendelssohn, Gade, Schumann and Wagner have all drawn inspiration from this sublime and dreamy work.

The original autograph score is in the Royal Library, Petrograd, having been presented by Max von Weber to Alexander II in 1855.

The opera was translated into German by Theodor Hell and given in Leipzig in December 1826; in Vienna, 20 March 1827, and in Berlin, 2 July 1828. It was given in Paris in German without success in 1830 and in French with success in 1857. Oberon was first sung in New York, 9 Oct. 1829. It was given in Italian at Her Majesty's, London, 3 July 1860, with recitatives by Sir Julius Benedict, and this version was given in Philadelphia, 9 March 1870. 'Oberon' was revived in London, 7 Dec. 1878 and in New York at the Metropolitan Opera House, 28 Dec. 1918, in a new revision by Arthur Bodansky, who conducted the work. Consult Upton, *Standard Operas* (Chicago 1897), and *Musical America* (New York), 4 Jan. 1919.

OBESITY, a bodily state characterized by excessive collections of fatty tissues beneath the skin and within the tissues and organs of the body. In states of health the skin is provided with a layer of fat, which ordinarily increases and decreases as the state of health, amount of food or amount of exercise varies. Obesity becomes a disease when the increase of fatty tissue interferes with the functions of the body in its various parts. The condition may be inherited or acquired. The producing cause of most but by no means of all cases of obesity is the ingestion of more food than is required by the body. This is particularly true of the foods that are readily converted into fatty tissue—the carbohydrates (starches and sugars), fat and alcohol. In those who lead sedentary lives or are naturally indolent these substances, unless sparingly indulged in, cause the fatty

accumulations. There is also an interrelation between the sexual life and obesity, as seen at the time of puberty and at the menopause in many women, and by the deposition of fat in animals after castration. In ordinary cases of obesity the fat accumulates in the form of tiny droplets in the tissue-elements; in fatty degeneration the tissue elements are changed into fat. Fatty degeneration is found in the organs of those not afflicted with obesity, but in the late stages of the disease under consideration this very serious morbid change may come about.

The mechanisms by which fat is formed in the human body are by no means clearly understood. Physiological chemistry teaches that the synthesis of fat begins with glucose which on oxidation forms pyruvic acid. A hormone action, or enzyme, converts this into an acetaldehyde and carbon dioxide. Condensation then forms ketone acids which by the processes of condensation and polymerization builds up fatty acids. This is all under the control of the vegetative nervous system.

The underlying causes of these disturbances in metabolism are not always clear; while the excess of food consumed to the amount used in physical and mental labor is frequently accountable for the trouble, there are in many instances undiscovered factors. It is possible that deficiencies in the internal secretions from the thyroid and other glands may be in some way connected with the trouble. In myxoedema (q.v.) there is a disorderly deposit of fat through the body, and this disease is apparently due to atrophy of the thyroid gland. A number of glandular interactivities are related to different types of obesity. There is a marked hypopituitary type of obesity following pressure on the infundibulum with marked fatty developments particularly seen in young children or young adults. These are frequently seen after mild grades of hydrocephalus, which causing pressure on the pituitary, causes a partial atrophy of this gland and obesity becomes pronounced. It may persist unless another glandular activity compensates for it. The gonadal—i.e., genital—obesity of the eunuch and eunuchoid states have been mentioned. In later life pancreatic obesity is a frequent type. Hypothyroid states lead to the myxoedematous types. Hypoovarian types are also frequent.

Various plans of dietary treatment, most of which are unscientific, have received their originators' names. Among the first was that practised by William Banting (q.v.) on himself at the advice of Harvey. According to "Bantingism" the patient partakes of only 20 ounces of dry food in 24 hours and over half of this allowance is meat, while the fluid is reduced to 35 ounces. This plan, while it removes the food most likely to form fat, gives to the individual a large amount of nitrogenous matter difficult of digestion and assimilation, and deprives the body of heat-producing substances. Furthermore, the normal fat-supply of the brain is seriously reduced. A small proportion both of fat and carbohydrate must be combined with nitrogenous matter in order to ensure normal metabolism.

The Ebstein treatment recognizes the fact that fat is more easily disposed of in the body than starches and sugars, and that meat sub-

stances may be converted into fatty tissue when in excess. He, therefore, allows some fat, a moderate amount of meat, and almost entirely eliminates carbohydrates from the dietary. He also greatly restricts water and forbids alcohol. An ordinary diet-list made up according to this system is as follows: Breakfast, tea without sugar and dry buttered toast; dinner, meat soup or roasted fat meat with fat gravy, one or two fresh vegetables in moderation, salads and dried fruits; supper, an egg, moderate allowance of ham or fat meat and an ounce of thin well-buttered toast or dry bread.

The Oertel plan is much like the Ebstein, but the fats are not so freely given, and the carbohydrates not so sparingly. Great reliance is placed on graduated exercise to strengthen the heart's action, and thus the condition of the patient is improved and the fat oxidated. Patients under this system are made to climb carefully graded mountain paths for specified distances, which increase as the heart becomes stronger. Patients showing respiratory embarrassment are allowed only about 25 grams of fat, 90 grams of carbohydrate and 150 grams of proteid; those showing no respiratory embarrassment are allowed less proteid and more fat and carbohydrate.

The table prepared by Yeo contrasts these dietaries with the normal average:

	Albuminates grams	Fats grams	Carbo- hydrates grams
Normal average.....	130	84	404
Banting.....	170	10	80
Ebstein.....	100	85	50
Oertel.....	155-179	25-40	70-110

Schweinger's system is practically the same as Oertel's, differing in withholding all fluid until two hours after meals, allowing very little then. Germain See allowed a diet of proteid and fat, and required his patients to take large amounts of fluid. This plan seems to be well suited to individuals afflicted with gout and rheumatism. Others rely on rest and passive exercise, in the form of Swedish movements, etc., with a skimmed-milk dietary gradually replacing the ordinary food until the skimmed milk becomes the only article allowed. The patient is confined to a single room and for 10 days is allowed to walk but little. Careful watch must be kept that the patient's strength be not overtaxed. Many "eat and grow thin" diets have had their day; they chiefly are valuable in that they permit stomach satisfaction without offering too much food convertible into sugar. A properly selected opotherapy in the hands of a competent neurologist offers the best general treatment for excessive obesity.

OBERSTEIN, Germany, town of the principality of Birkenfeld, in the state of Oldenburg, 32 miles southwest of Kreuznach on the railroad to Münster-am-Stein, and on the Nahe River, a tributary of the Rhine at Bingen. With the adjacent township of Idar on the Idar Bach, it has been famous since the 16th century for the cutting and setting of agates and other precious stones, formerly found in abundance in the amygdaloidal melaphyre of the district in the Galgenberg or Steinkaulenberg overlooking Idar, and which is reputed to have furnished many of the Cinque Cento and Roman gems. By the middle of the 18th century the local deposits were almost exhausted,

but the important industry has been continued and increased by the importation of agates and other ornamental stones from all parts of the world, chiefly from Uruguay. Steam and electricity have largely supplanted the abundant water-power, operating the jewel-mills lining the Nahe River for over 30 miles from above Kreuznach to below Idar. Pop. 10,000.

OBI, ō'bē, a river in Siberia. See **OB**.

OBI, ō'bī, **OBE**, or **OBEAH**, a species of witchcraft practised among the native African and the West Indian negroes. The law of Jamaica, enacted in 1760, which prohibited under severe penalties the practice of obi, enumerates among the materials used for fetishes or spells, blood, feathers, parrots' beaks, dogs' teeth, alligators' teeth, broken bottles, grave dirt, rum and egg shells. Balls of earth or clay mixed with hair, rags or feathers and bound with twine, or in some cases blended with the upper section of the skulls of cats or stuck round with cats' teeth and claws, or with human or dogs' teeth and with glass beads were also used. In 1762 the influence of the obi men produced a formidable insurrection among the slaves in Jamaica and several of these sorcerers were hanged by the authorities. See **FETISH**; **WITCH-CRAFT**.

OBIDOS, Narrows of, Brazil, a contraction of the Amazon River, near the town of Obidos, 400 miles from the sea, where the river is compressed into a single course a mile wide and over 200 feet deep, through which the water rushes at the rate of four to five miles an hour. In the rainy season the flood-level near Obidos rises 35 feet above normal low river.

OBIT, ō'bīt or ōb'īt (Lat. *obitus*, decease), the service in the Church at the solemn interment of the dead; in the Roman Catholic Church, an annual religious service, founded for celebrating the memory of a deceased person and for the expense of which an endowment was left in many European countries. It is also called an annual or a year's memory. The institution of obits is said to be an ancient one in the Church. It is attributed to the practice in the primitive church of commemorating the martyrs, on the anniversary of their deaths. During the period of prosperity following the persecutions similar commemorations were extended to benefactors of the Church and to private individuals by friends and relatives. A like institution, called the commendation of benefactors, is observed in the English universities.

OBITER DICTUM, *in law*, an opinion by a judge on a legal point not in issue or forming no part of the grounds of the decision. *Obiter dicta*, while having no commanding authority, are nevertheless of some weight, particularly when uttered by eminent judges. Distinguishing between the law of a case and the dicta is sometimes very difficult, even for the jurist, but it is important, as the dicta have not the binding authority of law. The United States Supreme Court has held (16 How. 287) that to make an opinion a decision "there must have been an application of the judicial mind to the precise question necessary to be determined to fix the rights of the parties, . . . and, there-

fore, this court has never held itself bound by any part of an opinion which was not needful to the ascertainment of the question between the parties." Where appeals are frequent, it is usual for judges to fortify their decision by statements of merely collateral principles and hence obiter dicta have become common. Speaking generally, it may be said that dicta of eminent judges have approximately as much legal weight as would be attached to the utterances of eminent legal writers.

OBJECT, Philosophical. See **METAPHYSICS**.

OBJECT-GLASS, or OBJECTIVE. See **LENS; MICROSCOPE; TELESCOPE**.

OBJECT TEACHING, a model instruction in which the teacher makes use of objects, pictures, charts and other aids to concrete presentation of the ideas to be taught. The claim of the advocates of purely objective teaching for young pupils is that the development of the child naturally proceeds from concrete to concrete and that the recognition of this fact is essential for successful teaching of the young. Objective teaching is the means toward an end. Young children live a life of concrete things. They have all the concrete world about them to learn and nature has so fitted them that they readily learn everything that they can handle, feel, touch, taste or experiment with in any way with the senses. Childhood is the age of experiment and concrete investigation. Objective teaching takes advantage of this fact and it proceeds to teach children through the senses. They are made acquainted with more or less abstract ideas by sensual knowledge of objects. Forms, sizes, shapes, colors, numbers, qualities and attributes the child learns by actually coming into contact with them and making them a part of the daily experiences of his young life, in a way that seems no different to him from his general and natural manner of acquiring knowledge.

Object teaching is extended to the teaching of sciences, languages, mathematics and other subjects. In fact there is not a branch of education in which the principles of objective teaching have not made the presentation of the subject matter more concrete; hence, more comprehensible. The aim of object teaching is to train the senses, to increase the interest, to improve the power of judgment and to aid the expression of ideas through the development of languages. That these objects may be attained all matter must first be presented to the perception of the child in a concrete form and with such associations as at once to interest and thus cause a reaction in his mind. In other words, he is taught to think in his childish yet natural way. The teacher's business, therefore, in proper object teaching, is so to direct the activity of the child, through the use of natural objects about him, that he may learn not only to know them but also to compare them with other things and to reason about them.

Object teaching is as old as the teaching of the race. All primitive peoples have had some system of teaching generally suited to their social and racial advancement. Thus teaching and schools preceded the actual knowledge of letters. At the time of the discovery of America all the cultured races of the New World had extensive systems of indigenous education,

which for all, except the priestly class and the interpreters of the hieroglyphic manuscripts, was taught in a purely objective manner. In other words, the pupils learned to do by doing and their doing was done in order to learn. Here, therefore, in America, there existed object teaching in that early period of education when the means of recording the ideas of man were so imperfect that they had still to remain in the hands of professional interpreters and, hence, entered very little into the life of the nation as a whole. Under these conditions, objective teaching was the only possible method. In the lives of all the peoples of Europe and the other countries of the Old World there existed also a period in which writing, if used at all, was in such an undeveloped state that it was in the hands of professional interpreters, who were generally of the priestly class because the rituals of religion, of charms and medicines, which were a part of religion, were those which the tribe or nation valued most and so made most efforts to preserve. It was only after society became more complex and printed books came into use that object teaching was superseded by printed information, which often conveyed information in a manner far from the spirit of the old oral and objective method of imparting knowledge through experimental contact.

Long after the direct method of teaching had practically disappeared from the schools of Europe, it retained its hold where it had begun, that is in the teaching and imparting of knowledge of trades and, to a certain extent, of professions; pupils even being apprenticed to doctors, lawyers, druggists and other professional men to learn professions experimentally and practically. Even in Greek and Roman times efforts were made to make teaching more practical and many of the teachers taught almost altogether objectively. It was in the Middle Ages, when teaching fell almost altogether into the hands of the Church and practically only the priests and the members of the learned professions were educated, that object teaching was replaced by book teaching. Very early in this period there were gropings toward more concrete teaching. Among the first of the advocates of more objective presentation of knowledge was Comenius (1592-1670), who definitely formulated the principles of object teaching and organized and applied them to the work of the schoolroom. He proclaimed his gospel in words that sound very familiar to day; "Since the beginning of knowledge must be with the senses the beginning of teaching should be made by dealing with actual things. The object must be a real useful thing capable of making an impression on the senses." He wrote and published textbooks illustrated with pictures to be used in objective teaching; and he advocated the use of pictures of things to make concrete the words relating to them. Comenius had many imitators in his day and his idea of picture charts is still followed, especially in the teaching of modern languages, in several European countries. The natural successor of Comenius was Rousseau (1712-78). He made a great step in advance when he insisted in taking into consideration the experience of the child in his relation to the facts of life around him. He proclaimed his gospel: "Never substitute the sign for the thing itself save when it is impos-

sible to show the thing; for the sign absorbs the attention of the child and causes him to forget the thing represented." Pestalozzi (1746-1826) got his first ideas of object teaching from the writings of Rousseau. He attempted to put objective teaching on a scientific basis. Starting with the idea of "sense impression," he proclaimed that it was the "only true foundation of human instruction, being the only true foundation of human knowledge. All the rest results from this sense impression and the process of abstraction made through it."

In Germany the teachings of Pestalozzi took root; and his pupils carried his pedagogical ideas to their logical conclusion. They studied the child and his surroundings and proceeded to teach him in conformity with these surroundings and his own natural tendencies, and they evolved a practical working system and built up about it a complex structure of the theory of object teaching which is being added to daily in all parts of the civilized world. So thoroughly was this work done that early in the latter half of the 19th century object teaching had been introduced into most of the primary schools of Germany. As early as 1854 the importance of object teaching had been recognized by the kingdom of Prussia; and in 1872 the German government, through the Minister of Education, placed itself on record as favoring object teaching in the schools of Germany.

After the Franco-Prussian War object teaching began to come into its own in France, and it was gradually but rapidly introduced into all the primary schools of the republic. Many expounders and defenders of the system sprang up and France came rapidly to the fore as the prophet of object teaching and the use of the natural method in the imparting of foreign languages.

As early as 1809 Joseph Neef established various Pestalozzian schools in the United States; in Philadelphia, 1809; Village Green, Pa., 1813; Louisville, 1816; New Harmony, Ind., 1825; Bar Harbor, Mass., 1839; Westfield, Mass., 1844. Westfield introduced object teaching and claimed that all branches of study could be taught objectively. In 1860 Edward A. Sheldon (q.v.) became acquainted with a collection of pictures, models and appliances made use of by the English Home and Colonial School Society. These he found in the National Museum (of Education) in Toronto, Canada. On his return to Oswego, N. Y., he introduced object teaching into the public schools. In 1863 Sheldon read a paper on object teaching before the National Teachers' Association held in Chicago, which so interested that body that a committee was appointed to inquire into the subject and to report to the association. Two years later the committee reported favorably; advocating the establishment of object teaching in the elementary schools of the United States. Prof. H. H. Straight gave to the movement system and organization and applied object teaching to science, and W. T. Harris followed along the same lines and introduced object teaching into the schools of Saint Louis. His influence carried the movement to most of the schools of the United States. Out of these and other efforts for the establishment of object teaching in primary schools grew the wider embracing "nature study," which has now become general in all modern, up-to-date schools, not alone in the

United States, but in Canada, the Latin-American countries and Europe. (See KINDERGARTEN; NATURE STUDY; PEDAGOGY; PESTALOZZI; SHELDON, E. A.). Consult Barnard, 'Pestalozzi and his Educational System'; 'Object Teaching'; Calkins, 'Primary Object Lessons'; 'Manual of Object Teaching'; Ricks, 'Object Lessons'; Salmon, D., 'Longman's Object Lessons'; Sheldon, E. A., 'Manual of Elementary Instruction.'

J. H. CORNYN,

Editorial Staff of The Americana.

OBLATES. See ORDERS, RELIGIOUS.

OBLIGATION, the binding power of a contract, promise, law or the like; also, a written instrument creating an obligation, as a deed or bond. This term dates back to Roman law (*obligatio*). In English law it is restricted in meaning to the duty of the party who is bound to perform, whereas in Roman law it signified also the right of the party who could enforce performance. A party who is bound to perform an obligation is to-day known as an obligor or debtor, while the party who can enforce performance is known as an obligee or creditor. The Roman law, like the English law, to-day, held that obligations may arise *ex contractu* (from contract) or *ex delicto* (from tort). The Romans further divided obligations into those quasi *ex contractu* and those quasi *ex delicto*. These classifications are retained by many codes in Europe to-day. An example of an obligation quasi *ex contractu* is one which arises in case of an unauthorized agency or when one party is enriched unjustly at the expense of another. An example of an obligation quasi *ex delicto* is one which arises when a party is held to be liable for a tort which he did not commit or authorize.

Obligations are extinguished by performance, by the creditor accepting something in lieu of performance, by confusion (which arises when the debtor becomes heir to the creditor, or the reverse), by novation, by set-off, by release, by limitation, by death of one of the parties (usually only in obligations *ex delicto*), by bankruptcy, etc.

OBLÓMOF, by Iván Alexksándrovitch Goncharóf, is regarded as one of the masterpieces of Russian literature. The character of its hero so completely stands for a type common in the old days of serfdom, that it has given rise to a term, *oblómovshchina* or *oblomovism*, signifying something more than mere indolence, though indolence is its root. It is outlined in the very first glimpse that we get of Oblómov as he lingers in bed while all the rest of the world is busy with pleasures or affairs: "He was a pleasant-looking man of two or three and 20, of medium stature, with dark gray eyes; but his face lacked any definite idea or concentration of purpose. A thought would wander like a free bird over his features, flutter in his eyes, light on his parted lips, hide itself in the furrows of his brow; then entirely vanish away, and over his whole countenance would spread the shadeless light of unconcern. This indifference extended even to the attitudes of his body, even to the fold of his dressing-gown. Occasionally his eyes would darken with a shade of weariness or disgust, but neither weariness nor disgust could for an instant dispel from his face the indolence which was the

dominant and habitual expression not only of his body but also of his very soul. Oblómov was good, honorable, tender and generous. Hence he had many friends and they tried to cure him of the terrible disease that possessed him. They tried to get him to ride or to walk or to go with them into the society which he ought to adorn; but energy was lacking even to dress. Scholtz, his boyhood friend, made him promise to join him in a trip abroad. Oblómov went so far as to procure his passport, order an expensive coat and buy a cap. But days passed and he kept postponing it. For a little there was some improvement: he met Scholtz's pretty friend Olga and her aunt. It would have been an admirable match. Olga loved him and did her best to stir him into energetic action; but he let her go and when Stoltz returned from Europe he found their engagement broken and married Olga himself. He took hold of Oblómov's neglected estate Oblómovka and brought it back to a paying basis; but Oblómov let himself fall into the clutches of a designing widow, his landlady, and married her. Then he had apoplectic strokes and died, still loved and regretted. Scholtz and Olga took his little son and brought him up with their own children. Oblómov is, therefore, the story of a pathetic broken career depicted relentlessly, with wonderful skill. A charming and quite original feature of it is the use of Oblómov's dreams to relate the story of his early life and abortive education. These day dreams are a sort of psychoanalysis, explaining how he came to be the man he was and also what sort of a man he was. Serfdom, which removed from the landed aristocracy the necessity of even such a simple task as putting on its own boots, was responsible for many cases of oblomovism, a term, by the way, applied by Oblómov to himself, recognizing it as a hopeless disease. The first draught of the story appeared under the title 'Son Oblómov' ('Oblómov's Dream') in 1848-49 in the *Illustrated Album*. In its complete form, in four parts, it has enjoyed popularity ever since. Extended passages from it translated by N. H. Dole first appeared in English in 'The Library of the World's Best Literature' in 1897; in 1915 it was published complete in the version of C. J. Hogarth.

NATHAN HASKELL DOLE.

OBOE, ō'bō-ě, an Italian musical wind instrument resembling a clarinet in shape, and sounded through a double reed. It consists of three joints besides the mouthpiece, and like many other wind instruments produces a series of overtones.

OBOLUS, a Greek coin of silver or copper, the sixth part of a drachm, about 21 cents in value.

OBONGO, ō-bŏng'gō, or **ABONGO**, a tribe of pigmies who live in different parts of French Kongo in West Africa. See **PIGMIES**.

OBRADOVICH, ō-bră'dō-vich, **Dositéy**, Serbian author: b. Csákovar, Hungary, in 1739; d. Belgrade, 7 April 1811. At the age of 15 he entered the monastery of Hoppovo in south Hungary, but he soon found the life of a monk distasteful and abandoned it for a life of travel with a view to acquiring a knowledge of classical and modern languages and literatures. He studied philosophy and natural theology in

the universities of Leipzig and Halle and brought out his first book in Leipzig in 1783. After visiting France and England he returned to Leipzig and then spent several years in Vienna and Trieste. As an ardent Serbian patriot he proclaimed the principle that books ought to be written for the people in the language that they understand and speak. He therefore wrote his first book, which was called 'The Life and Adventures of Demeter-Obradovich — a monk named Dositéy' (Leipzig 1783), partly autobiographic and partly fantastic, in the Serbian language. It immediately made a great impression and was continued in a work called 'Home Letters' (1785). This was followed by a translation into Serbian of 'Æsop's Fables' (Leipzig 1789), which was even more warmly welcomed. These books created a reading public and mark the beginning of the modern period of Serbian literature. Obradovich, or "Dositéy," as he is popularly called, was so highly appreciated as patriot and author that in 1807 Karageorge invited him to Serbia to be a senator and minister of public education, in which capacity he established in Belgrade the first Serbian college (Velika Shkola), which ultimately became the University of Belgrade. Obradovich also wrote 'Wise Counsel' (1784) and a work on morals (1793), both having Serbian titles. His complete works were published by Vozarovich (10 vols., Belgrade 1833-45). Consult Serviċ, 'Dositheus Obradović' (Neusatz 1889), and Léger, 'Serbes, Croates et Bulgares' (Paris 1913).

OBREGON, ō'brā-gŏn', **Alvaro**, Mexican general: b. in the district of Alamos, Sonora, in 1880. He came of a wealthy family, owning large tracts of land in Sonora, and after receiving a good education devoted himself to scientific farming and stock-raising on his inherited estates. He also invented several pieces of agricultural machinery. Yet, although a man of wealth, he early became an advocate of reform laws that would give the common people of Mexico a share in the land; showed much sympathy for the peons and Indians and became interested in the problem of their education. His career as a military leader began in 1912 when he recruited a force of 400 Indians, with which, as lieutenant-colonel, he entered into the service of Madero to put down the revolt of Pascual Orozco (1881-1915). His early history has been well told in a small sketch by Allene Tupper Wilkes in *Harper's Weekly* (1914) as follows: "When in the early months of Madero's term of office Pascual Orozco and his Reds became a terror in the state of Chihuahua, Obregon collected a band of 400 Maya Indians and volunteered to help drive the Reds from the country. Obregon and his Indians were put under the command of Huerta, who had been sent by Madero to quell the Orozco rebellion. In the battle of Ojito Obregon's command gained for themselves the title of "Invincibles." His fame spread to Sonora and so many of his fellow-citizens came to join him in Sonora that he rode home again at the head of a revolutionary army of 4,000 men.

"He was made colonel in the Sonora State Militia and held this rank when Felix Diaz started the military uprising in Mexico City, which resulted in the death of Madero. Obre-

gon again gathered his band of Indians, between 400 and 500 of them, and offered his services to Governor Pascaras of Sonora. He was ordered to Nogales, where he routed the garrison that, under the command of Colonel Costerlisky and Colonel Rangel, had gone over to Huerta. Soon after this he fought a successful battle at Cananea. Governor Carranza of Coahuila had by this time been declared first chief of the Constitutional army, and he now raised Obregon to general of division with the Army of the West, a rank equal to that held by Villa, who commanded the Central army. Then followed Obregon's unpronounceable victories, an unbroken record until he laid siege to Mazatlan." His successful attack of Sinaloa and Culiacán and the capture of Guadalajara, 9 July, opened the way for his advance on Mexico City; and he led the Constitutional army into Mexico City on 15 Aug. 1914. He attacked and defeated Zapata in his stronghold in Puebla, driving him into the state of Morelos. The battle of Puebla (January 1915) was the death-knell of Zapata's hopes. He re-occupied Mexico City in January 1915, but evacuated it on 10 March. In April he undertook a campaign against Villa for the control of central Mexico and shattered Villa's hopes completely at the battle of Celaya (15-19 April 1915). He defeated Villa in the battle of León (31 May-4 June 1915), where he was severely wounded. He lost an arm in battle. In 1920 he was elected President of Mexico.

OBRENOVITCH, ô-brên'ô-vich, Serbian princely family, rivals of the Karageorgevitches, who hold the throne since the assassination of Alexander I (q.v.). See **SERBIA**.

O'BRIEN, Cornelius, Roman Catholic archbishop: b. New Glasgow, Prince Edward Island, 4 May 1843; d. March 1906. He was educated at Saint Dunstan's College, Charlottetown, Prince Edward Island, and at the Propaganda College in Rome, and was for some time professor in Saint Dunstan's College and rector of Saint Dunstan's Cathedral. In 1882 he was consecrated archbishop of Halifax. Among his published works are 'After Weary Years,' a novel; 'Aminta,' a book of dramatic verse.

O'BRIEN, Fitz-James, Irish-American short-story writer, journalist and poet: b. Limerick, Ireland, 1828; d. Cumberland, Md., 6 April 1862. After study at Dublin University he went to London, where he soon got rid of a fortune, became a journalist and in 1852 came to the United States. He wrote for Brougham's *Lantern* and became also one of the valued contributors to *Harper's Monthly* and *Weekly*. His imaginative short stories, 'The Diamond Lens' and 'The Wonder-mith,' first printed in the *Atlantic*, were of a series notable for originality and effective ingenuity. He was also one of the most popular dramatists of his day. His 'A Gentleman from Ireland' kept the boards for a generation. In 1861 he entered the 7th New York regiment and was sent to the defenses of Washington. Later he was appointed to the staff of Gen. F. W. Lander, won praise from McClellan, and on 26 Feb. 1862 received in a skirmish the wound from which he died. He was a true, if a minor, poet, and wrote some very striking prose fiction. William Winter, poet and critic, collected his most worthy work (1881). Consult Winter,

William, 'Brown Heath and Blue Bells' (New York 1895), and also the introduction to Winter's collection, O'Brien's poems and stories mentioned above.

O'BRIEN, Jeremiah, American patriot: b. Scarborough, Me., 1744; d. Machias, Me., 5 Oct. 1818. He was in the lumber business at Machias at the outbreak of the Revolution. Shortly after Lexington, the British cruiser *Margaretta* appeared in Machias harbor, seeking lumber for the defenses at Boston. Sixty volunteers soon set out in a lumber-sloop, under the leadership of O'Brien, to capture the British vessel. In the following hand-to-hand encounter, the first sea-fight of the war, they were completely victorious. The sloop took on board the *Margaretta's* armament, and, renamed the *Machias Liberty*, coasted about, with O'Brien as captain, for 18 months, and took several prizes. O'Brien was later in command of the privateer *Hannibal*, was captured and was for some months imprisoned in the Mill Prison, England, but made his escape. On his return to the United States he was appointed collector of the port of Machias.

O'BRIEN, Lucius Richard, Canadian painter: b. Shanty Bay, Ontario, 15 Aug. 1832. d. 1899. He began life as an architect and civil engineer and spent much time sketching in the open air as an amateur. In 1872 he joined the Ontario Society of Artists; in 1880 was appointed president of the Royal Canadian Academy of Art, and in 1895 president of the newly-formed Provincial Guild of Sculpture. He is pre-eminently a portrayer of Canadian scenery and the two pictures of Quebec which he painted by order of Queen Victoria, his views of the Rocky Mountains and Seikirk Range and his 'Sunrise on the Saguenay' (Art Gallery, Ottawa) are the most characteristic of his works.

O'BRIEN, Richard Barry, Irish historical writer and biographer: b. Kilrush, County Clare, 1847; d. London, 17 March 1918. He was educated at the Catholic University, Dublin, and in his student days advocated an Irish republic. He went to London in 1869 to complete his legal studies, and while there he gathered experience which, according to his own confession, softened his sentiments toward England, though he remained an uncompromising Nationalist throughout his life. As personal friend and adviser to Parnell and John Redmond he for many years exerted considerable influence in Irish politics. He possessed a profound knowledge of Irish history and parliamentary procedure, combined with sound judgment and literary ability. At the outbreak of the European War he strongly supported John Redmond's declaration in Parliament that it was the duty of Ireland to take her stand with England in defense of liberty. Three of his sons immediately volunteered and entered the army. At the time of his death O'Brien was a director of the National Bank. Among his numerous writings the best known are the biographies of Parnell (1898), Lord Russell of Killowen, Lord Chief Justice of England (1901), and John Bright (1910).

O'BRIEN, William, Irish journalist: b. 2 Oct. 1852. He was for several years a contributor to various journals, and in 1875 he joined the staff of the *Freeman's Journal*, and

in 1880 founded *United Ireland*. He was prosecuted nine different times for political offenses and spent over two years in prison. He entered Parliament as a Nationalist in 1883, retired in 1895 and was re-elected in 1900 and 1909. In 1898 he started a new agrarian movement, called the United Irish League, with the *Irish People* as its organ. Among his works are 'When We Were Boys' (1890); 'Irish Ideas' (1894); 'A Queen of Men' (1897); 'Recollections' (1906), and 'An Olive Branch' (1910).

O'BRIEN, William Smith, Irish politician: b. Dromeland, County Clare, Ireland, 17 Oct. 1803; d. Bangor, North Wales, 17 June 1864. He was educated at Harrow and Cambridge, in 1826 entered the House of Commons as member for Ennis and in 1835 was returned for Limerick and retained his seat for 13 years. He was for some time an ardent supporter of O'Connell; but on O'Brien becoming the head of the Young Ireland party the friendship was broken. He was active in the insurrection of 1848 and was arrested, tried for high treason and sentenced to imprisonment for life at Tasmania. He was pardoned in 1856. He was the author of 'The Principles of Government' (1855). Consult Sullivan, A. M., 'New Ireland' (London 1877); Duffy, 'Young Ireland' (2d ed., 1883).

OBSCENITY, *in law*, that which offends modesty, delicacy or chastity. It is a misdemeanor by English law to give an obscene exhibition or to publish obscene matter, as is also the use of obscene language in public places. By the Federal law of the United States it is an offense to send obscene matter through the mails, and it is also a statutory offense in England. It is held usually that a publication is obscene if it is likely to corrupt those whose minds are open to immoral influences and into whose hands a publication of this sort may fall. It is no defense that it was done to accomplish a good purpose or that it is an accurate report of a judicial proceeding. There has been much criticism of the law in this direction in recent years, to the effect that many works of medical or sociological importance have been kept from the market owing to the legal contention that they violate the laws of obscenity.

OBSERVANTINES. See FRANCISCANS.

OBSERVATORY. An observatory may be defined as a station or institution for the observation of phenomena of nature. The principal kinds of observatories are astronomical, meteorological, magnetic and seismological; dealing respectively with observations of celestial objects, of the weather, of the earth's magnetism and of earthquakes. In some cases all of these kinds of observations are made at the same astronomical observatory. The term astrophysical observatory is applied to an institution which specializes in spectroscopic work, solar physics or other applications of physics to astronomy. Astronomical observatories are of very ancient origin, and they have developed in complexity as new instruments and improved methods of research have gradually been discovered.

Location and Equipment.—The proper location of an astronomical observatory is of great importance, as is now better recognized

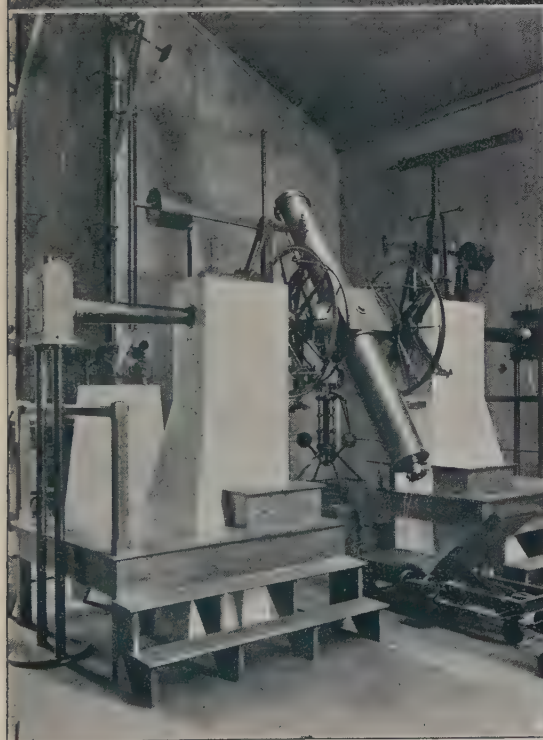
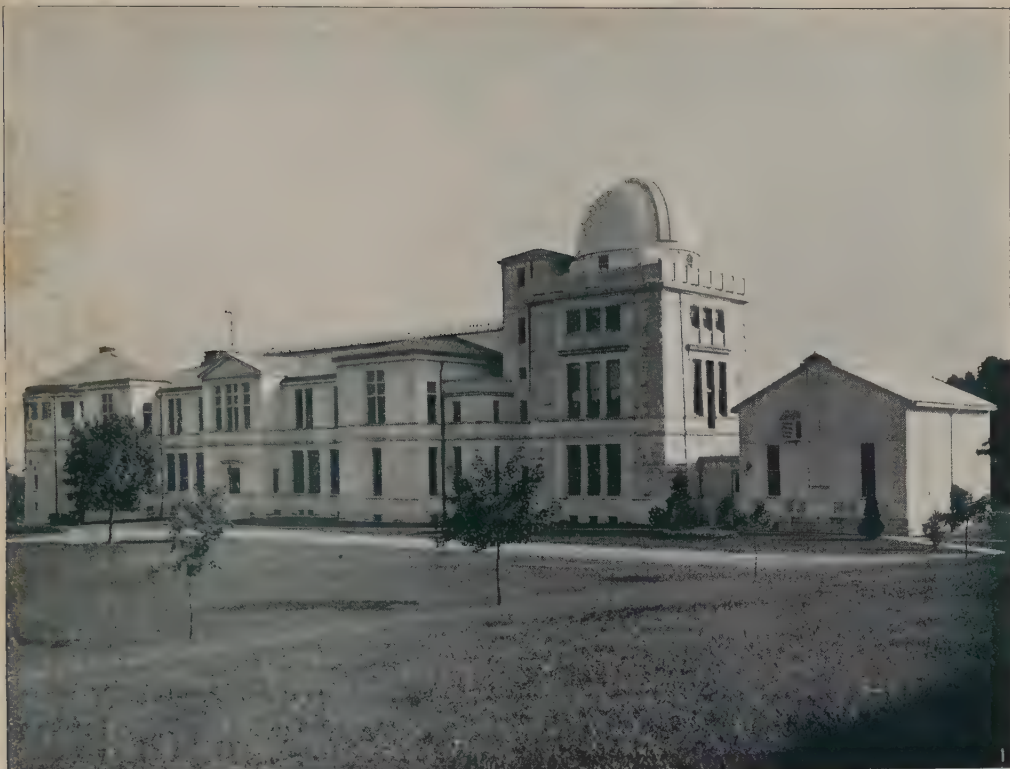
than formerly. The site should have a wide horizon and be free from the disturbances associated with life in large communities, such as shocks and vibrations due to traffic of railways and electric lines, dust and smoke. The modern illumination of cities produces a glare of light at night, even at distances of several miles, which greatly hinders visual observations and practically forbids celestial photography. Accordingly the tendency has been in recent years to remove existing observatories to stations farther from large cities, while new institutions are located with much more care than formerly. Observatories chiefly for research, if not attached to a university, are placed in favored mild and dry climates where clear skies are the rule, and where there is only a small diurnal range of temperature. An altitude of a few thousand feet is desirable, to avoid the dust-laden and denser lower strata of the atmosphere and to secure good transparency. The heating of the slopes of a mountain in such a region by the sun may injure the steadiness of the air for observation of the sun, and produce what is called poor "seeing" during the daytime, while at night the seeing may be very steady. Some lofty stations, like Pike's Peak, Colo. (14,000 feet above the sea), seem to be continually subject to conflicting currents of the upper air, producing unsteady images, fatal to good astronomical work.

In view of the heavy piers which must be installed for supporting the instrument and which constitute a large item of expense of construction, the site should be suitable in respect to drainage and rock formation. It is undesirable to set piers on ledges, as they may outcrop elsewhere and convey vibrations from a long distance. Probably a deep gravel furnishes as good a foundation as any.

Where possible a large observatory is placed with its main axis east and west, as the rooms for meridian instruments must have their openings of roof north and south; but these instruments may be placed in wings, or, better, in small detached buildings, which are planned so that they will quickly assume the temperature of the outer air. If there are large domes, they are placed at the ends of the building, to avoid mutual obstruction; but they, too, are often detached structures. Aside from domes and observing rooms, a modern observatory generally includes the following rooms: Offices for the staff of observers and computers and for administration; a library; rooms for lectures, for the reception of visitors, for measuring machines; laboratories (for instance, physical, spectroscopic, photographic, photometric); dark rooms for developing and copying photographs, storerooms for preserving them; clock rooms; cabinets for small apparatus; a machine shop and a carpenter shop.

Observatories for instruction of college students may be very simple, with a dome for the largest telescope, and one or two wings for meridian instruments. A flat roof or balcony from which celestial objects may be pointed out to students is a convenience. To avoid the great expense of large turning domes, horizontal telescopes have come into use somewhat in recent years. They are often set up for temporary stations, as for observing solar eclipses. Here an instrument called a coelostat or siderostat carries one or more large flat mir-

OBSERVATORIES



1 Main Building, United States Naval Observatory 2 Nine-inch Meridian Circle, United States Naval Observatory
3 Twenty-six-inch Great Equatorial, United States Naval Observatory

rors and by a driving mechanism continually throws the light into a long horizontal tube, which may be of wood, or even paper, containing either a lens at the near end or a concave mirror at the far end for forming the image of the celestial object. The image may be brought into a laboratory or dark room for observation or photography, if desired. This construction has serious limitations, however, and one of its defects is the difficulty of avoiding unequal temperatures in the cross-section of the beam within the tube, which seriously impair the definition. The largest instrument of this sort thus far constructed is the Snow telescope of the Yerkes Observatory, afterward transferred to the Solar Observatory. The flat mirror of the coelostat had a diameter of 30 inches and the second flat mirror of 24 inches, the concave mirror at the far end having a diameter of 24 inches and a focal length of 60 feet.

An improvement over this construction is the vertical telescope. The same two flat mirrors are required, but the beam is reflected down vertically instead of horizontally. This avoids the difficulty in the cross-section of the tube, as a progressive change of temperature and density of the air along the direction of the beam should not injure the definition. If an objective is used, it is placed just below the level of the coelostat; if a concave mirror forms the image, it would be placed far below, at a distance something more than its focal length, e.g., in a well, with the apparatus of the eyend housed at the surface of the ground, or a little below it. Horizontal and vertical telescopes commonly are of relatively extreme focal length. At the Mount Wilson Observatory two of these vertical instruments, called tower telescopes, have been erected for solar work, one of 75 feet, the other of 150 feet focal length. The small dome covering the coelostat and objective is supported on a skeleton steel tower, the members protected by steel sheaths from vibration due to wind, and the powerful spectroscopes into which the light is brought are set down in pits beneath the surface of the ground. A vertical reflector, of the well type, has not yet been constructed. These designs obviously depart widely from the conventional type of observatory.

For detailed description of the Snow horizontal telescope, consult *Astrophysical Journal*, 21, 157-167, 1905; for tower telescopes, *ibid.*, 25, 68-74, 1907; 27, 204-212, 1908; articles by G. E. Hale.

The type of telescope known as the *Coudé*, invented by M. Loewy of the Paris Observatory in 1871, and put into operation 12 years later, is now used at a few European observatories. It has manifest advantages. The observer can remain in a warm room in a comfortable position before the fixed eye-piece, and looking down the direction of the polar axis. Flat mirrors throw the image from the object-glass up the oblique tube to the eye-piece. A special construction is required for the building; the dome is unnecessary, but the large movable cylinder for protecting the instrument cannot be much less expensive than a dome of corresponding size.

The Field of Research and Study.—An astronomical observatory is provided with instruments for the precise study of celestial phenomena. This study may cover a wide

field of research, including some or all of the following: (a) The measurement of the accurate positions of sun, moon, planets, comets, stars, nebulae. From the combination of successive positions, the motion in the sky of these objects may be deduced. The knowledge of such positions is necessary for the navigator, the geographer, the surveyor and is the basis for practical astronomy. (b) The determination of the exact time by observing the passage of stars across the meridian. Modern life requires the constant knowledge of the time. It is obtained from observations of the stars, and then widely distributed to railway stations, jewelers and public places by telegraph and by wireless. (c) Conversely to (a) and (b) the exact position of the station itself is determined by observation of the stars with special instruments. This yields fundamental data for geography and geodesy. (d) The measurement of the brightness, or intensity of the radiation, of all celestial objects, which is found to be changeable in a great number of cases. For instance, the intensity of the sun's radiation lately has been found to vary, which is of the greatest practical importance for the inhabitants of the earth. (e) The visual and photographic study of the surface markings, rotations and changes of the sun, moon and planets. (f) The photography of the heavens as a whole for investigating the structure of the universe; and of comets and nebulae in particular, for recording the appearance and changes, which are very marked for comets, but not for nebulae. (g) The investigation of the physical and chemical constitution of celestial bodies, for giving a basis for a philosophy of the universe and for studying its evolution. Such observations are the special field of astrophysics, and an institution devoted chiefly to such work is called an astrophysical observatory. The instruments of an observatory differ according to the purposes named above for which they are to be used.

For precise fundamental positions of celestial objects, (a) the meridian circle is the chief instrument. This is a telescope of from 6 to 10 feet long, turning on a horizontal axis pointing exactly east and west, and very rigidly supported by heavy piers. The motion of the instrument itself is, therefore, solely in the meridian, from the north point, through the zenith to the south point of the horizon. Attached to the sides of the instrument are large graduated circles representing the highest skill of the instrument-maker. The divisions are generally made on an inlaid strip of silver, usually 12 to each degree, or 4,320 for the whole circle. They are read by from two to six microscopes rigidly connected to the large piers supporting the axis. When the star passes across the field of the telescope the observer sets a movable spider thread so that the star shall run exactly along the thread; then he notes the exact instant when the star passes each of a set of vertical spider-threads, pressing a key which makes a record of each within a few hundredths of a second on a chronograph connected with a very accurate clock keeping sidereal time. Then the microscopes are very carefully read and the star's position is obtained for that passage or transit: the circle giving the position in the north and south direction, and the record of the time giving that in the east

and west direction. Similar observations of standard stars, and of fixed points like the nadir (by sighting the instrument at a surface of mercury under the floor and making the horizontal thread and its image coincide) yield the accurate position of the star, after numerous instrumental corrections have been determined and applied. The star's distance in degrees, minutes and seconds north or south of the celestial equator is its declination; its distance in hours, minutes and seconds east of the vernal equinoctial point of the sky is its right ascension.

It is thus apparent that clocks of the best possible construction are essential in an observatory. They are generally kept in special vaults protected from all jar of traffic and from changes of temperature or moisture, and sometimes from changes of atmospheric pressure by being in a chamber exhausted of air. Chronometers, being portable, are also used in observatories for some observations, and generally at astronomical stations in the field.

For the determination of the time, (b) above, a smaller and less complicated instrument, known as the transit, is employed. No finely graduated circle is necessary and the telescope is seldom over 30 inches long, with a lens of two or three inches aperture. For eliminating instrumental constants, the observer raises the axis out of its V-shaped supports, and reverses its direction, changing the east and west sides, after half of his list of stars has been observed. The essential feature of having the telescope exactly in the plane of the meridian, and of observing and electrically recording the instant at which a time star passes each of the set of vertical spider threads, is the same as in case of the meridian circle.

For finding the accurate positions of faint objects instruments set in the meridian have too many limitations, and telescopes are used which may be pointed to any part of the sky. These are now almost universally mounted equatorially, which means that one axis points toward the celestial pole, thus allowing a free east and west motion, while the other axis is perpendicular to the first, allowing a free motion north and south. A driving mechanism is provided which turns the polar axis toward the west one complete turn in a sidereal day. This makes the telescope follow any star quite closely as it moves across the sky from rising to setting; otherwise the stars would quickly drift out from the field of view. Very large telescopes can be mounted in this way. The positions observed with such an instrument are relative: that is, the distance and direction of the unknown object from a known star in the same field of view is measured by a system of fixed and mobile spider threads operated by a very accurate screw with graduated head. This attachment is called a filar micrometer. If no known star is in the field of view, but one is seen to the east or west nearby, the telescope may be clamped and the two objects be allowed to drift in succession through the field, the distance in declination between them being measured by the threads, and in right ascension by the interval of time elapsing between the passage of the two objects across the system of north-and-south threads.

Equatorial telescopes are of two principal

kinds: refractors, in which the image is formed by an object-glass; and reflectors, in which a concave mirror, generally of glass, silvered, collects the light and brings it to a focus. See TELESCOPE.

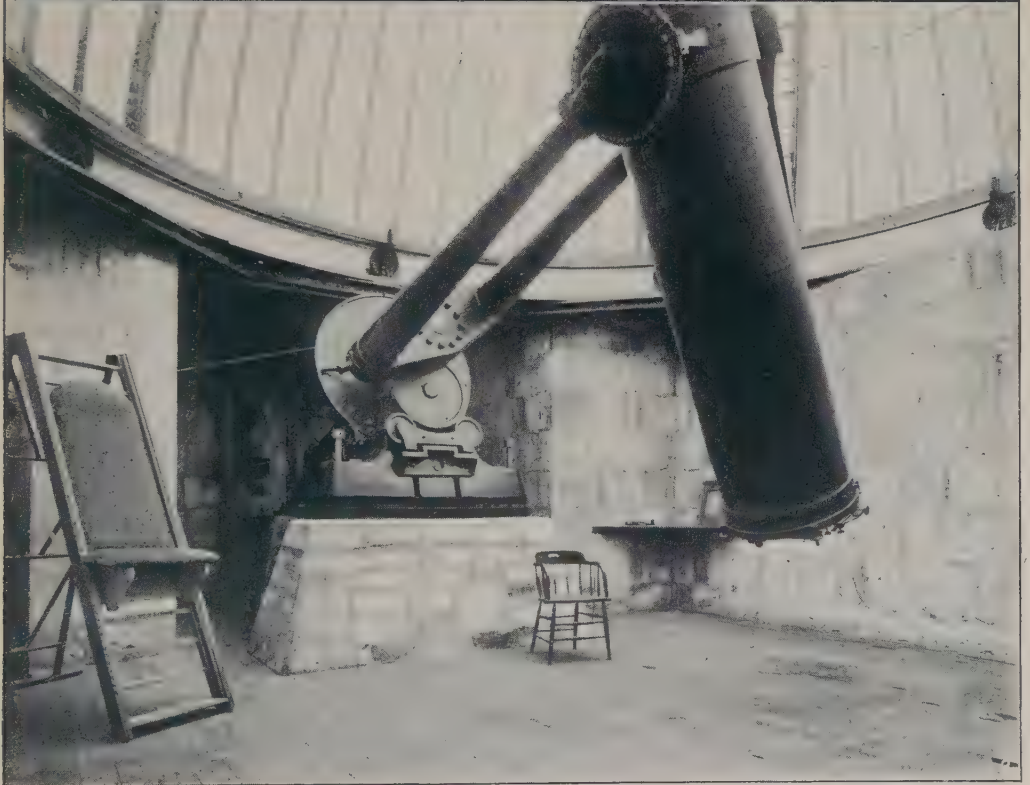
The arrangement of the dome is different for the two types of instrument. The observer does his work at the lower end of the refractor, and for large instruments it is a great convenience to have a rising floor or platform so that he can be always at a convenient height for reaching the eye-end. As the observer must be at the upper end of the tube of a reflector, it is necessary with the largest instruments to hang an observing cage on the inner surface of the dome, opposite the shutter, and to move this about by electric motors to suit the necessary altitude of a given object. Large equatorial telescopes require domes which may be turned on circular tracks toward any direction; cylinders may be used, but in America hemispherical domes are employed almost without exception. A shutter several feet wide covers the opening, extending from the base to the top of the dome.

From the observation of the altitudes (c) at transit of stars whose declinations are exactly known, the latitude of the observatory may be precisely determined, with employment of the meridian circle as above, or of a smaller, portable transit instrument provided with extremely sensitive levels and called the zenith telescope. The practical use of this instrument was developed by Capt. Andrew Talcott of the United States engineers shortly before 1850. It is used for the survey of all boundaries which run along a parallel of latitude and for the exact location of all stations used in the triangulation of a national survey. The same room or detached building can be used for the zenith telescope as for the transit instrument for time.

It may seem unnecessary to determine the latitude of a fixed observatory but once, when it is definitely located. It was by the repetition and increase in precision of such measurements, however, that the discovery was made in 1885-88 that the latitude of a place is not constant but variable. This is proved to be due to the fact that the earth's axis varies within the earth, so that at the pole it would trace an irregular curve in a period of about 428 days, having, in years showing the greatest range, a maximum diameter of about 60 feet. This affects the latitude of every station on earth. Another instrument used in a few observatories for this purpose is the transit set in the prime vertical or plane passing through the zenith and east and west points of the horizon. For this instrument the opening of the roof must lie east and west, but otherwise the installation is the same as for the transit.

The measurement of the brightness (d) of celestial objects, or celestial photometry, has been greatly developed in recent years. Useful observations of the brightness of variable stars can be made by the eye, without instruments, or with a field glass or small telescope. Numerous varieties of photometers are used, some depending upon polarizing the light by nicol prisms and equalizing the images of the variable and comparison star. At Harvard College Observatory, E. C. Pickering devised the "mc-

OBSERVATORIES



1 Yerkes Observatory, Williams Bay, Wis.

2 Twenty-four inch Bruce telescope, Harvard College Observatory

ridian photometer^b of this type, in which the north star was kept in the field for comparison with each star measured. This instrument was arranged so that the observer could remain in a small room without a dome and observe the stars as they crossed the meridian. The newest photometers are intended to be independent of the eye, depending on the principle (a) that the electric resistance of selenium changes when light falls upon it, or (b) that a so-called photo-electric current is developed when light falls upon specially prepared surfaces of sodium, potassium, etc., inside of evacuated glass cells. These photometers are commonly attached to refracting telescopes with apertures of 10 inches or more.

Both refracting and reflecting telescopes are now employed successfully in photographic photometry, with ordinary and with special plates sensitized to match the human eye.

The measurement of the intensity of the radiations received from the nearest star, our sun, is a special problem of astrophysics closely related to meteorology. The instruments employed are the actinometers and the bolometers, the latter invented by S. P. Langley and successfully used by him at the Astrophysical Observatory of the Smithsonian Institution at Washington, and further developed by his successor, C. G. Abbot. A horizontal telescope was used considerably. Special apparatus was also designed and set up on Mount Wilson, Cal., for the problem of measuring the fundamental "solar constant," or amount of heat-energy received per square metre per second at the earth from the sun. Observations by Abbot at widely separated stations have established the fact that the radiation received from the sun varies by as much as 7 per cent.

With an exceedingly sensitive radiometer it was possible for E. F. Nichols to detect and roughly measure the heat-radiation from two of the brightest stars in 1900 at Yerkes Observatory. Further advances were made when W. W. Coblentz of the Bureau of Standards at Washington revived the use of the thermopile and greatly increased its sensitiveness. He was able to measure the radiation of 110 stars during a few weeks of work with the reflector at the Lick Observatory in the summer of 1914.

The investigation (e) visually and photographically, of the surface markings, etc., of celestial objects is an important part of the work of practical astronomy. The refractor has more generally been employed, but large reflectors can serve very usefully. Direct photographs of the sun's surface and spots (for which a refractor of small aperture, photographically corrected, then called a *photoheliograph*, is used) are made daily at several observatories. It is possible that at some time in the future the relation between the sun's activity and the weather will be sufficiently understood to be of the greatest importance to agriculture. The *spectroheliograph* is a particularly valuable instrument for photographing in desired monochromatic rays not only the surface markings (spots, *faculae*, *floculi*), but also the enormous gaseous eruptions, called prominences, around the edge of the sun. The calcium radiation at the H or K line is chiefly used. The instrument, which is fundamentally a spectroscope, was devised almost simultane-

ously by G. E. Hale at the Kenwood and Yerkes observatories and by H. Deslandres at the Meudon Observatory near Paris. Work with the *spectroheliograph* generally forms an important item in the program of an astrophysical observatory.

That portion of the surface of the moon (60 per cent) which is visible from the earth has been minutely studied, both visually and on photographs. No changes of importance have been established. The question of the origin of the moon is of interest to geology as well as to mathematical astronomy (celestial mechanics). To not a few observers there has been a particular fascination in the study of the changing surface-markings of the planets, particularly of Mars, Jupiter and Saturn. It was primarily for the investigation of Mars that the late Percival Lowell established his excellent private observatory at Flagstaff, Arizona. Photography has been successfully applied to several of the planets, but others, like Venus, are still shrouded in mystery as to their surface markings. Four new satellites of Jupiter and one of Saturn have recently been discovered photographically, besides hundreds of asteroids. If a planet exterior to Neptune should be found at some future time it will probably be picked up on a photograph.

The ever-increasing application of photography (f) to astronomical investigation has resulted in great progress and has to a large extent changed the character of observing. If a cluster containing perhaps thousands of stars in one field is to be measured and triangulated, the present procedure is to secure as good photographs as possible on nights when the atmospheric conditions are the best. One such photograph, secured with an exposure of perhaps two hours, may require months for its measurement and discussion. This work is done microscopically under measuring machines of the utmost precision in a convenient, well-lighted office rather than under the difficult conditions of visual observations in strained positions of the observer and with perhaps severely cold temperatures in the dome. It is found that nearly all kinds of relative measurements of celestial objects can be thus performed more accurately and more easily on good negatives than at the eyepiece of a telescope of even larger size than that with which the photograph was taken.

For finding the relative distances of the stars from their annual parallaxes, the photographic procedure with large refractors has been very successful in recent years and an important campaign in this work has been in progress, particularly in American observatories. When refractors corrected optically for visual observations are used photographically, a yellow filter is placed before the plate, which must be sensitive to yellow light.

The great international undertaking for the production of a photographic map of the entire heavens, known as the *Carte Celeste* or the *Astrographic Chart*, to include all stars as faint as the fourteenth magnitude, together with a catalogue of the measured positions of the stars as faint as the eleventh magnitude, was begun under the auspices of the Paris Observatory about 1887. It is only partially completed after about 30 years of labor. Practically all of the

necessary photographs have been secured. A nearly uniform type of photographic refractor with aperture of 33 centimeters (13 inches) and focal length of 343 centimeters (11¼ feet) was employed by the 19 co-operating observatories. The greatest part of the labor is required for the precise measurement of the positions of the stars involved, several millions in number, and the subsequent computations, all of which must ultimately be published with the fewest possible errors in the process of typesetting.

The whole sky has also been photographed with smaller instruments and on a correspondingly smaller scale. The Harvard Map of the Sky, taken with a lens of but one inch aperture and of only 13 inches focal length, is comprised in a set of 55 glass plates 8 by 10 inches in size. It records a vast amount of information.

Photography with a large reflecting telescope was used for important studies of nebulae by Keeler at the Lick Observatory and by Wolf at Heidelberg, showing vast numbers of spiral nebulae. Special provision has to be made in a modern observatory for the safe and dry storage of the great number of plates which accumulate.

The investigation (g) of the physical and chemical constitution of celestial objects has increasingly occupied attention at observatories in recent years and has affected the design and equipment of such institutions. Spectroscopes, generally for photography and called spectrographs, have been improved in design and efficiency. The spectra of over 300,000 stars have now been classified at the Harvard Observatory, on plates taken with one or more prisms put over the object-glasses of photographic refractors.

The type of spectrograph having a slit and apparatus for producing a spectrum of comparison from iron or other metal has been used for determining the velocity of celestial objects in the line of sight, and this has constituted a chief part in the program of some observatories with their principal refractors and reflectors since 1900. Such instruments have been applied successfully in measuring the rotation of Saturn's rings, of the planets themselves, and very recently to the rotation of the nebulae.

A new variety of very close double stars was revealed by the alternate double and single appearance of the lines in spectra of stars otherwise inseparable in the most powerful telescopes, and by the alternating approach and recession of stars revolving around close and invisible companions. The investigation of such interesting systems has occupied much of the time of the telescopes at several observatories. The interferometer, an instrument of the physical laboratory capable of measuring the most minute quantities, has been applied with great success to the measurement of wave-lengths in the solar spectrum. Adapted for photography, it has demonstrated that the gases of the interior of the Orion nebula are in a state of commotion, with relative velocities of several miles per second. For studies of cosmogony the knowledge of physical and chemical properties of the celestial objects is recognized as of fundamental importance.

Historical Notes.—The first suggestions of observatories are probably to be found in the

towers of the temples of the priests of the Babylonians, who required astronomical data to fix the dates of religious ceremonies. This may have been as early as between 4000 and 3000 B.C. The Babylonians or Chaldeans as they were often called made use of the gnomon, which was a vertical shaft or pillar erected on a level surface and served for determining the sun's position from the length of the shadow cast. The obelisks of the Egyptians were thus employed as astronomical instruments and perhaps were erected mainly for that purpose. The Greeks learned the use of this instrument from the Chaldeans and from the Egyptian priests. In the 6th century B.C., Anaximander, a disciple of the first Greek astronomical philosopher Thales, erected a gnomon at Lacedæmon. We may infer that Pythagoras used astronomical instruments.

The School of Alexandria, which flourished from B.C. 331 for more than seven centuries, contributed greatly to the development of mathematics and astronomy. Aristarchus of Samos was a careful observer in the 3d century B.C., and taught that the earth moved around the sun and believed that the planets also did so. We do not know what instruments he used. His follower, Eratosthenes (276-194 B.C.), designed an armillary sphere for the school at Alexandria with which observations were then made and important data determined. Hipparchus, who lived during the 2d century B.C., was an accurate observer and is justly regarded as a founder of the science of astronomical observation. His greatest discovery was that of the precession of the equinoxes. Ptolemy, living in the 2d century A.D., was the last great astronomer of the School of Alexandria.

With the rise of culture among the Arabs, especially under Haroun al Raschid, great interest in astronomy was developed, and by his son, Al Mamun, an observatory was built near the flourishing city of Bagdad. The Arabian prince, Albategnius (in the 9th century A.D.), was an industrious observer in Mesopotamia and in Damascus, where an observatory had been established earlier. The learning of the Arabs spread to Persia, where observatories were erected at Maraga and also at Samarcand.

Ulugh Beg, grandson of the Tartar Prince Tamerlane, re-established an observatory at Samarcand about 1420 and made important observations. At about the same time, Regiomontanus, a German astronomer, was provided with an observatory, well equipped, by a merchant prince at Nuremberg. The most elaborate observatory of the period before the invention of the telescope was that built for the Danish astronomer Tycho Brahe (1546-1601) on the island Hveen. It was called Uraniborg and with his excellent equipment Tycho made for many years highly accurate observations which led to the discovery by Kepler of the important laws which fully established the Copernican system.

The invention of the telescope was put into practical use in astronomy in the first decade of the 17th century, primarily by Galileo at Padua and Florence. Great precision in pointing at celestial objects was thus obtained and new instruments of observation were then developed.

National Observatories.—The national

observatories were founded particularly to aid navigation in solving the problem of finding the longitude at sea. The Royal Observatory at Greenwich was erected in 1675 by King Charles, for John Flamsteed, the first Astronomer Royal. It has maintained a leading place among observatories, particularly during the long directorate of Sir G. A. Airy (1835-81). The field of work of the observatory and the equipment have been much enlarged during the administration of Sir William Christie (1881-1910) and of the present Astronomer Royal, Sir Frank Dyson (1910-). In addition to departments for the time, for meridian observations, for the alt-azimuth, for heliographic work, for astrographic work and for double star work, the observatory has also a department of magnetic and meteorological observations. While fully maintaining the standard of its earlier work, the observatory is now highly efficient in all of these fields.

The Paris Observatory was erected during the years 1667-71. It has specialized in the determination of the position of celestial objects, with meridian instruments and equatorials. It contributed greatly to the introduction of photographic methods in astronomy, the brothers Henry having made photographic refractors and applied them successfully. A fine series of photographs of the moon has been taken with a large coudé and accurately measured. Pioneer work was done in the distribution of the time by wireless telegraphy from the Eiffel tower. For the first 120 years of its existence the observatory was directed by four of the Cassini family, son, grandson and great-grandson of the first. Among the later directors may be named Arago, Leverrier, Mouchez and Loewy.

The observatory at the Cape of Good Hope was established under the English Admiralty in 1820. Fundamental observations of position were its first care. Later, and particularly under Sir David Gill, the observatory was greatly enlarged and work with the heliometer, with photographic telescopes and with the spectroscope was added to its scope and improvements were made in all of the instrumental equipment.

The Russian observatory at Poulkova was founded in 1839 and fundamental observations of great accuracy, in addition to extensive observations of double stars, were conducted under W. Struve. Important work in stellar spectroscopy has been done there.

In 1844 the Naval Observatory at Washington was established by Lieutenant Gilliss, with F. M. Maury as its first director. Fundamental observations with various instruments and micrometric measurements with the equatorial have constituted the principal programs of work, in addition to the time service, which is distributed throughout the United States by telegraph. It has a department of nautical instruments, one for chronometers and for compasses and the important department of the Nautical Almanac.

The National Observatory of Argentina was completed at Cordoba in 1873 under the direction of B. A. Gould. Great catalogues were issued giving the places and brightness of the southern stars.

The first institution to be known as an astro-

physical observatory was that established at Potsdam (1874-78) by the Prussian government. H. C. Vogel was the first director. Very important work has been done here in solar and stellar spectroscopy and stellar photometry and photography and in other applications of physics to astronomy.

An astrophysical observatory was established at Meudon, near Paris, in 1876. Important work was accomplished in photographing the sun and its spectrum by the first director, J. Janssen, and by H. Deslandres with spectroheliographs of different types.

In 1918 the Canadian government erected at Victoria, B. C., a great silver-on-glass reflector of 72 inches aperture, equipped with a powerful spectrograph, which is now being successfully operated.

University Observatories in Europe.—

Some of the best-known university observatories are the following, to which are added the names of the observers who contributed most to their fame:

- 1751. Göttingen: Tobias Mayer, Gauss.
- 1765. Vienna: Von Littrow.
- 1771. Radcliffe Observatory, Oxford.
- 1776. Observatory of the Roman College: Secchi (1852-78) here observed the spectra of the sun and stars.
- 1811. Königsberg: Bessel here developed the art of astronomical observation to the highest point thus far attained.
- 1818. Munich: Lamont.
- 1835. Berlin: Encke.
- 1845. Bonn: Argelander established this observatory and made his Durchmusterung of the northern stars, giving approximate positions of over 300,000. This has served as the foundation for much future work.
- 1897-98. Heidelberg (Königstuhl): Max Wolf has conducted here some of the most important photographic observations of the heavens made in Europe and discovered large numbers of asteroids. He has also made important spectroscopic observations, in addition to many other varieties of work.

Among private observatories should be named that of William Herschel (1786-1827) at Slough near Windsor, whose observations were with his reflecting telescopes and, including the discovery of Uranus, made a new epoch in astronomy; this work was continued and extended by Sir John Herschel. The Earl of Rosse constructed at Parsonstown, Ireland, a great reflector in 1844, with which observations of the nebulae and of other objects were made by himself and his son. Sir William Huggins (1824-1910) in his private observatory at Upper Tulse Hill, London, made many important observations of the spectra of the stars and nebulae with the aid of photography.

Among contemporary American observatories, the following may be named as the most important ones: Harvard College, 1840, famous for work of the Bonds and from 1876-1919 of Edward C. Pickering, director, and his associates. The most extensive work in photographing the heavens by a single institution and of photographing the stellar spectra have been carried out under his administration, together with a vast amount of photometric work. To extend the work done at Cambridge to the southern hemisphere, a branch station was established at Arequipa, Peru, and equipped with powerful instruments.

At the University of Michigan, Ann Arbor, 1853, important research and instruction yielding valuable results, have been carried on continuously.

At the Dudley Observatory, at Albany, 1856, fundamental observations for position

and extensive cataloguing of the stars have been carried out by Lewis Boss and his son, Benjamin Boss. The work there of Ormsby McKnight Mitchel (q.v.) also was notable.

Allegheny Observatory, University of Pittsburgh, 1859. Important work on the heat of the sun and moon was done under S. P. Langley. A new observatory was built in 1900 with large instruments, used now for photographic astrometry and spectrography.

Dearborn Observatory, founded in Chicago in 1864 and transferred to Evanston, Northwestern University, in 1887. The excellent 18-inch refractor was used for observations of double stars and planets for many years by G. W. Hough and since by Philip Fox.

Lick Observatory, University of California, Mount Hamilton, was opened in 1888, with the 36-inch refractor by Clark as its principal instrument. Extensive campaigns of observation of double stars and micrometric observations of other objects have been made with this instrument. The observatory has taken a leading place in the determination of the motions of stars in the line of sight by the spectrographic method. For this purpose also a branch station has been established in Chile. Important observations of the nebulae have been made with the three-foot Crossley reflector. Refined fundamental observations have been made with the meridian circle. Extensive observations of solar eclipses have been carried out in different parts of the world. The directors have been E. S. Holden, 1888-98; James E. Keeler, 1898-1900; W. W. Campbell, 1900-.

Astrophysical Observatory of the Smithsonian Institution, Washington, 1889. This was founded by S. P. Langley for the study of the solar radiation with the bolometer and other appliances developed by Langley and C. G. Abbot, his successor as director.

Chamberlin Observatory, University of Denver, 1890. The large refractor has been used for micrometric observations under the direction of H. A. Howe.

University of Virginia, McCormick Observatory, 1882. The 26-inch refractor has been used for micrometric and photometric observations and latterly for determining stellar parallax by photography.

Lowell Observatory, Flagstaff, Ariz. This private observatory was established by Percival Lowell in 1894, particularly for the observation of the planet Mars. It has an excellent 24-inch refractor and a 40-inch reflector. Very important spectrographic observations have been made at this elevated station by V. M. Slipher, present director, on the velocity in the line of sight of the nebulae and their rotation and the motion in the line of sight of some of the star clusters.

University of Chicago, Yerkes Observatory, Williams Bay, Wis., was opened in 1897 under the directorship of George E. Hale, who developed here the use of the spectroheliograph, which he had begun earlier in Chicago. The great 40-inch equatorial refractor has been used by Burnham for double stars and by Barnard for extensive micrometric work. A large amount of time has also been given for spectrographic observations in determining the radial velocities of the stars. The method of using

a visually corrected refractor photographically was developed for this instrument by Ritchey, who employed a yellow filter and plates sensitive to rays of that color. For a dozen years this instrument has thus been applied successfully to the photographic determination of stellar parallaxes. The photographic study of the Milky Way has been carried on by Barnard with the Bruce photographic telescope and much photometric work, visual and photographic, has been done by J. A. Parkhurst, and by Edwin B. Frost since 1905.

Flower Observatory, University of Pennsylvania, Philadelphia, 1896. The principal work has been the study of variation of latitude and the observation of double stars under the direction of E. Doolittle.

Carnegie Institution of Washington, Mount Wilson Solar Observatory, Pasadena, Cal., 1904. This institution was inaugurated in 1904 by George E. Hale, present director. Its equipment comprises a large horizontal telescope with coelostat, known as the Snow telescope, two tower telescopes 60 and 150 feet high, a five-foot reflecting telescope provided with powerful spectrographs, also used for direct photography. A still larger reflector of 100 inches aperture is just being brought into use in 1919. A large laboratory is maintained at Pasadena and a great amount of work has been accomplished in many directions of astrophysics. A method has been developed by W. S. Adams for determining the distances of the stars from certain characteristics of their spectra. Important photographic and photometric researches on the study of stellar clusters are in progress.

Excellent equipment for instruction and research are also usefully employed at many other institutions, as Princeton University, Carleton College (Northfield, Minn.), Swarthmore College, Pennsylvania, the State universities of California, Wisconsin, Illinois, Ohio, Minnesota, Missouri; also at colleges for women, Vassar, Wellesley, Smith, Mount Holyoke.

EDWIN B. FROST,

Director of Yerkes Observatory, University of Chicago.

OBSIDIAN, a vitreous glass of volcanic origin, usually black or blackish green, but sometimes brown, red, gray, or banded with combinations of these colors, varying from opaque to translucent. It is chemically a rather complex silicate, most commonly of aluminum. Next to its vitreous appearance the most striking physical characteristic is its conchoidal fracture, which was utilized by primitive races for the making of knives and weapon-heads, ornaments and mirrors, notably by the Mexicans, who called the material *itztli* and quarried it in their mountains. The principal American variety is the chatoyante or cat's-eye, which contains a ruddy golden or silvery white gleam. The liparobsidians, or those resembling liparites, are best typified by the famous Obsidian Cliff in Yellowstone National Park. Other acid obsidians are found in California, Mexico, Hungary, the Lipari Islands and New Zealand. More basic sorts averaging 65 per cent of silica are found in Iceland, the Azores and Milo. The vitreous type (with about 53 per cent of silica) occurs in volcanic districts, notably various parts of Mexico, Kilauea and Réunion.

OBSTETRICAL FROG, or MIDWIFE TOAD, a small European frog (*Alytes obstetricans*) of the *Discoglossidae*, which has the general appearance of a smooth toad. The upper parts bear many warts and are variegated in color, reddish spots becoming conspicuous in the males at the breeding season, and the under parts are dull white. It is found in Spain, Portugal, southern France and Switzerland, on high mountains as well as in the lowlands, and in towns, gardens and parks as well as in the remotest wilds, wherever a little water is available for a home. The species is thus very numerous, yet is rarely seen, for it is nocturnal, hiding quietly by day in some dark nook or in a little hole dug in the ground by itself. At night, during all the warmer months, the males call to one another incessantly in a tinkling note which is not loud enough to be annoying. This frog gets its names from its peculiar manner of caring for its eggs. When the female feels the time approach for the discharge of her eggs, the male mounts upon her back and waits, assisting her efforts, for the extrusion of the ova, which at last happens suddenly. This takes place on land, not in the water. The eggs are comparatively large, and from 50 to 100 in number, connected by a gelatinous cord into two strings; and they are caught and retained, as in a dish, by the thighs of the female, which are extended straight behind her, close together. The male immediately fertilizes the eggs, and then proceeds to wind them about the upper part of his own legs, by thrusting his feet back and forth through the mass until they are fastened upon his thighs to his satisfaction. The female is then released, and the male carries his burden to his hole, where he remains, going abroad at night in search of food and to moisten the eggs in the dew, or occasionally in a puddle or pond. After about three weeks, the embryos are nearly mature, and the father takes them to the nearest water and remains within it until soon the tadpoles emerge. They are in a more advanced stage than in most frogs, but do not complete their metamorphosis until the following spring. Consult Fischer-Swigart, 'Zoologischer Garten' (Berlin 1885); Gadow, 'Amphibia and Reptiles' (1901).

OBSTETRICS, that department of medical practice which deals with the care and treatment of women during and after pregnancy and childbirth and with the care of the child when born. It is one of the most important branches of medicine. The study of all the parts of the female body concerned in the process of procreation, the healthy and sick functions during pregnancy and childbirth, besides the care of the mother and child during the early weeks following birth, all fall within its province. Although the function of child-bearing is strictly physiological, it is a process of great complexity and shows many variable features, so that in ancient as well as in modern times it has always caused an immense amount of sickness and suffering. Happily the art of obstetrics is being established on a rational and scientific basis, and the mortality, suffering and after-invalidism due to child-bearing are being reduced to a minimum. As would be natural with such a universal fact as reproduction, many and curious myths and customs have had

their day, to give way to equally fantastic ideas. Among ancient peoples obstetrics had its special workers, and among savages at the present time a crude obstetric art is practised. Among the Chinese in prehistoric times (3000 B.C.) midwives were the chief attendants on pregnant women. The length of pregnancy is given in the oldest existing works on medicine as 270 days. Women then were compelled to stay in bed at least three days and for 14 days were not allowed to see visitors. In ancient Assyria and Babylonia midwives were many, and to these women helpers was entrusted the care of the pregnant woman. This custom has continued to the present time, but with the gradual increase in education the better qualified physician is called upon with increasing benefit both to the mother and child. Physicians have also, however, been employed in this work since the earliest times. The modern era of obstetrics covers scarcely more than 30 years. The practical annihilation of puerperal sepsis by methods of cleanliness has revolutionized the whole subject of obstetrics, as the knowledge of bacterial infections has done with every branch of medicine. As the fœtus is practically under the control of the obstetrician at the present time, and as the danger of blood-poisoning can be eliminated, obstetrics, in the hands of the properly qualified, has risen to the level of an exact science. Women still die of childbed fever, but lack of proper care is the cause. Cleanliness is salvation. Dirty hands or finger-nails on the part of the nurse, midwife or doctor may be fatal, and every mother should know it. In different lands and races the earliest age of child-bearing varies from about 10 to 18. In European races the average is about 14 to 15. Women of warmer climates mature younger than those of the temperate zones. The general period of cessation of child-bearing is about the 45th year. Eight years is about the earliest authentic recorded age of pregnancy, and women of 60 or 70 have been known to have children. One case of pregnancy, with birth of child, is said to have occurred in a woman of 103 years, but the authenticity of this is doubtful. Following impregnation, which occurs physiologically only as a result of coitus, the ovum, which in the great majority of cases has previously come from the ovary, descends the Fallopian tube and becomes fastened to the wall of the uterus. Here a rich supply of blood-vessels grows up and around it to nourish the developing fœtus. This set of blood-vessels subsequently becomes the placenta, or after-birth, and constitutes the chief medium of blood-supply between mother and child. Following impregnation a characteristic series of symptoms occur in the pregnant woman. Menstruation ceases, as a rule, the breasts begin to give peculiar sensations, the woman urinates more frequently and her nipples have darker lines about them. These are the early signs. Later — from six weeks to a few months — she notes morning discomfort, with perhaps nausea and vomiting; constipation begins to annoy her; the abdomen begins to swell; the breasts become tender; and the bladder grows troublesome. Still later the nausea may disappear; the swelling uterus makes itself more and more prominent; the breasts become fuller, firmer and have a waxy exudation. At the end of

about nine months—270 to 280 days—labor begins. This is usually preceded for about two weeks by a distinct drop of the child in the pelvis, whereby the waist-line sinks very perceptibly. Labor is ushered in by some premonitory cramp-like growls, with inability to hold the urine and by the escapement of a certain amount of fluid in which the child has floated for the final three or four months or more. Irregular pains, which slowly increase in severity, cramp-like in character and intermittent, continue for from 4 to 24 hours or more. These constitute the first stage of labor and are premonitory and useful in dilating the opening of the uterus (q.v.), the cervix. The pains become more severe and frequent and longer in duration, and the second stage of labor, during which the child is to be squeezed out of the uterus, begins. This is a very distressing time and, were it not for the intermissions in the pain, would be unendurable. The pains become faster and harder, the bag of water usually bursts, and with further cramps the child progresses, head-first, through the vagina into the world. Here meeting with a cold reception when compared to the warmth of the body from which he came, he reflexly cries out and with cleansed mouth, takes his fill of air.

Following the birth of the child there is a quiescent period for a few moments to half an hour, then with further pain the uterus squeezes out the afterbirth, and the third stage of labor is completed. The cord connecting the child and the placenta is cut between two knots and the infant becomes an entity. The length of time of the second stage varies widely. In first children, and in older women, with the first baby particularly, it is apt to be longer. From two to six hours may be said to be the average. Following the birth the mother should lie in bed and the child be put to her breast at regular two-hour intervals. Although the milk will not come for a few days, the child begins a regular habit and the breast receives its physiological stimulus. It is wise for the young mother to remain in bed at least 10 days, as this favors the return of the uterus to its normal condition.

OBSTFELDER, Sigbjörn, Norwegian novelist: b. 1866; d. 1900. In 1897, with 'The Red Drops' and 'The Cross' this young author came into prominence as opening a new field in Norwegian literature. The promise of a brilliant future was closed by his death in a hospital in Copenhagen in August 1900. He left in manuscript a notable book 'A Priest's Diary,' posthumously published (1901).

OBSTRUCTION, a term applied to the policy which intentionally impedes progress in a legislative body for party or factional purposes. In the United States House of Representatives during the 80's of the 19th century, the policy of obstruction became such a serious abuse, that drastic remedies had to be applied to check the evil. By motions to adjourn to a certain day and to take a recess the time of the House of Representatives was wasted and the power of the majority to control legislation was seriously threatened. Both motions were subject to two amendments upon each of which as well as upon the original motion the yeas and nays could be demanded by one-fifth of the members present. These motions could be repeated without limit and the time of the house wasted in

useless roll-calls. In the 50th Congress on one occasion the house remained in continuous session for eight days and nights during which time there were over 800 roll-calls on motions to adjourn and to take a recess. Speaker Reed in 1890 announced that he would henceforth refuse to entertain such motions and the practice he established was embodied in the rules of succeeding Congresses. Rule XVI, section 10, as revised in 1911, stipulates that "no dilatory motion shall be entertained by the speaker." See CLOSURE; FILIBUSTERING IN LEGISLATION.

OBVERSION, from the Latin *obvertere*, to turn toward or against, used in logic as a form of immediate inference in which, by changing the quality from one proposition another is inferred, having a contradictory predicate. The import of the judgment remains unchanged. The original proposition is called the obvertend, and that from which it is inferred is called the obverse. The logical term obversion is also called permutation.

OC, Land of, the name given to the country in which Provençal is spoken in the south of France. The term is specifically applied to it by the members of the Félibrige Society. See PROVENÇAL LANGUAGE; PROVENÇAL LITERATURE; FÉLIBRIGE.

OCALA, ô-kä'la, Fla., city, county-seat of Marion County, on the Ocala Northern, the Ocala and Southwestern and the Seaboard Air lines, about 160 miles in direct line southeast of Tallahassee, and 70 miles southwest of Saint Augustine. The noted Silver Spring is about five miles east of Ocala. It is in a region in which are raised large quantities of cotton, oranges and vegetables. Other products which are sent to Northern markets are lemons and sweet potatoes. It has considerable trade in phosphate found in the vicinity. The sewerage system is most unique, it being formed by a subterranean river, which was accidentally discovered while drilling for a well. Neither the source nor the mouth of the river has been discovered. The city owns and operates the electric-light plant. Pop. 5,002.

OCALA PLATFORM, in American politics, a series of resolutions passed at the national congress of the Farmers' Alliance, held at Ocala, Fla., 8 Dec. 1890. It demanded the abolition of national banks; the establishment of sub-treasuries which should lend money directly to the people at low rates of interest, free coinage of silver, low tariff, the prohibition of alien ownership of land and a graduated income tax.

O'CALLAGHAN, ô-käl'a-hän, Edmund Bailey, Irish-American historian: b. Mallow, County Cork, Ireland, 27 May 1797; d. New York, 27 May 1880. He was educated in Ireland and in France. He removed to Canada in 1823, where in 1827 he became a medical practitioner, and was editor of the *Vindicator*, the organ of the Society of the Friends of Ireland (1834). He was elected to the assembly of Quebec in 1836, but after the insurrection (1837-38) he removed to the United States to escape the consequences of the part he took in the insurrection. He spent many years in the office of the secretary of state at Albany employed in editing the records of the State. He wrote 'History of the New Netherlands'

(1846); 'Documentary History of the State of New York' (4 vols., 1849-51); 'Documents Relating to the History of New York' (11 vols., 1855-61); 'A Calendar of the Land Papers' (1864); 'Voyages of the Slavers Saint John and Arms' (1867).

OCAÑA, ò-kā'ña, Colombia, town in the department of Santander, on the Taira River, 230 miles north of Bogotá. It was founded in 1572, and is the commercial centre for the coal, anise, hides, lead, coffee and other products of the district. From Ocaña extensive trade is carried on with parts of Venezuela and down the Magdalena River. Pop. 17,200.

OCARINA, òk-a-rē'na, a musical instrument extensively used in Calabria by the peasants, and said to be of Tyrolese or Austrian origin. Prior to the discovery of America an instrument similar in form and make was in use among the Aztecs and other more cultured races of Mexico; and it is still found there in the mountainous districts. The Chinese *hsüan*, in use 3000 B.C., is the earliest known prototype of the ocarina. It consists of a gourd-shaped clay bulb, pierced with a number of small holes and a mouthpiece. Its tone was sweet, but the range was exceedingly limited—less than an octave—but in the course of subsequent development its compass and power were greatly augmented.

O'CAROLAN, Turlogh, Irish musician-poet. See CAROLAN.

OCCAM, òk'am, or **OCKHAM**, William of, mediæval controversialist, of the Franciscan order, known as "VENERABILIS INCEPTOR" and "DOCTOR INVINCIBILIS": b. Ockham, Surrey, 1270; d. Munich, 7 April 1349. He was educated at Oxford, where he studied under Duns Scotus, and subsequently proceeded to the University of Paris. He took part (1321) in the controversy on the subject of "evangelical poverty," and was present at the general chapter of Perugia, which decided it in the following year. Pope John XXII condemned the decision of the chapter, and Occam defended it against him, for which he was by order of the Pope imprisoned at Avignon. He escaped, however (1328), and a vessel sent by Louis the Bavarian conveyed him to Italy. The Pope excommunicated the fugitive and vainly tried to get him sent back to Avignon, but Occam from that time resided at the court of Louis and engaged in polemical warfare with papal authority. He charged John XXII with teaching heresies, and when Louis in 1348 declared the imperial accession independent of papal confirmation Occam supported him. On the death of Michael da Cesena in 1342 he became general of his order, though not recognized by the Pope. In logic and philosophy Occam occupies a distinguished place. His principal work is 'Summa Totius Logices.' Consult Lindsey, T. M., 'Occam and his Connection with the Reformation' (London 1872); Little, A. G., 'Gray Friars of Oxford' (Oxford 1892); Riezler, 'Die literarischen Widersacher der Päpste zur Zeit Ludwig des Baierns' (1874); and Poole's article in the 'Dictionary of National Biography,' Vol. XLI.

OCCANEECHI INDIANS, an American tribe of the Siouan family residing in southern Virginia in the 17th century. When they first appear in American history in 1670 their

chief town was upon an island at the junction of the Staunton and Dan rivers near Clarks-ville. Their tongue became the general trade language of a very considerable extent of country. They aided the white settlers against the invasion of northern Indians in 1676. In these wars they suffered so severely that they were not able to hold their own against their enemies, so in 1701 they removed to North Carolina, near the present town of Hillsboro, and disappeared by uniting with other tribes. Consult Mooney, James, 'Siouan Tribes of the East' (Washington 1894).

OCCASIONAL CAUSES. See DESCARTES, RENÉ; METAPHYSICS.

OCCLEVE, òk'klēv, or **HOCCEVE**, Thomas, English poet of the 15th century: b. about 1370; d. about 1450, both dates being based merely on the internal evidence of his poems. For 24 years he was a clerk in the Privy Seal office, London. He evidently knew Chaucer, and the famous portrait of Chaucer on the margin of the Harleian manuscript of the 'De Regimine Principum' is believed to have been drawn by Occleve himself. This work (Concerning the Duties of Kings) was, for the most part, a digest of the Latin treatise bearing the same title by Ægidius Colonna. It is in the prologue to it that Occleve gives the few details of his life that are known. Besides this poem, which was edited by Wright in 1860, Occleve wrote the autobiographic sketch 'La Male Regle de T. Occleve,' and various shorter poems, the most notable being the 'Mother of God,' an orison to the Virgin, long attributed to Chaucer. Occleve's poems are edited by Furnivall (1892-97).

OCCCLUSION, in chemistry, a name given by Graham to the property of metals to absorb, or hold in solution, gases. This property is most remarkably displayed by platinum and palladium in their affinity for hydrogen, of which platinum will absorb 114 times its own volume and palladium between 700 and 800 times its own volume. The entire class of oxides illustrates again this special kind of absorption. The term is also used of mere surface condensation, as of ammonia or oxygen in charcoal.

OCCOM, òk'òm, Samson, Indian preacher: b. Mohegan, New London County, Conn., about 1723; d. New Stockbridge, N. Y., 14 July 1792. He entered the Indian school of Rev. Eleazar Wheelock at Lebanon, where he remained four years. In 1748 he kept a school in New London, but shortly after removed to Montauk, Long Island, where he taught and, as a licensed Congregational minister, preached to the Indians. In 1759 he was ordained to the Presbyterian ministry, with which he remained connected. In 1766 he went to England with Rev. Nathaniel Whitaker as an agent for Moor's Indian charity school. Being the first Indian preacher who had visited that country, he was successful in attracting large audiences and obtaining donations exceeding £10,000. After his return to America, Occom preached at various places, passing his latter years within the bounds of the Albany presbytery. He wrote an account of the Montauk Indians, printed in the (Massachusetts) Historical Society collections (1st series, Vol. X), and published a sermon on the execution of an Indian at New Haven in 1772.

OCCULTATION. The occultations of stars and planets by the moon, as in its eastward motion during the month it passes in front of star or planet and blots them for a while from view, have, in a measure, their counterpart in occultations of stars by planets or by comets, and also in the occultations of satellites by their primaries.

Occultations of the Moon.—The general theory of occultations is analogous to that of solar eclipses. (See *ECLIPSE*, *Bibliography*). For stellar occultations, however, considerable simplification occurs because the apparent radius of the occulted body is indefinitely small and there are but two instants to be computed, namely, the immersion or disappearance of the star and its emersion or reappearance from behind the moon's disc. The elements for the prediction of the occultations of stars are given in all the national ephemerides, chiefly according to Bessel's method. In the 'American Ephemeris' these elements are given for stars down to 7.5 magnitude. Observations of the occultations of stars are chiefly valuable as furnishing indispensable data for determining the distance, size and motions of the moon. (See *MOON*). The accuracy of a lunar position thus determined is many times that of the ordinary meridian observations of the moon's limb. The occasion of a total lunar eclipse offers special facilities for determining with great accuracy the occultations of a number of small stars. The best lunar method of determining the longitude of a place is that of observing the occultations of stars, and it has only been superseded by the telegraphic method of the comparison of signals.

The immersion and emersion of stars in occultations by the moon are accompanied by phenomena of a varied character, which have been the subject of much discussion. Some astronomers have been willing to dispose of all these phenomena by vaguely describing them as due to physiological causes, without attempting any scientific explanation and without satisfying the experience of the more acute and sensitive observers. The various phenomena noted may be scheduled as follows: (1) Instantaneous disappearance or reappearance of the star. (2) Apparent projection of the star upon the moon's limb. (3) Sudden change of magnitude. (4) A slow disappearance or reappearance, sometimes described as "gliding." The instantaneous immersion or emersion of the dark limb is naturally to be expected, and is readily accounted for by the assumption that the moon has no appreciable atmosphere, and that the apparent angular diameter of the stars is insensibly small. This instantaneous disappearance is very usual under conditions of good seeing, although under such conditions also, when the star apparently approaches closely to the moon's serrations along the dark north or south limb, it has been seen to disappear behind a mountain and reappear in the next valley, and so on. Such instances have been particularly noted by the elder Bond and by Davidson. These disappearances and reappearances are to be distinguished sharply from those not associated with the finest definition. Sensible displacement of stars with respect to the moon at occultation, or a "clinging" upon the lunar limb, has frequently been observed, and although attributed

by Innes to improper focusing, or focusing on the red star so as to throw the moon's image out with respect to it, it is probably, as Davidson suggests, due to the formation of a "fictitious or spurious limb" of the moon by irregular refraction, upon which the star is projected through the unconsciously selective action of the eye on the star image. It is chiefly large, bright and mostly red stars, like Aldebaran and Antares, that have been projected from the whitish, spurious border of the moon. "With a large, colored star," says Davidson, "all the phases of this phenomenon are unmistakable; with a large white star they may be somewhat in doubt; with a small white star, they will probably not be noted, especially in small telescopes with low power." With this phenomenon the true immersion is still instantaneous. Sudden decrease in the magnitude of the disappearing star, as if in two distinct stages, has again and again been noted by expert observers. In certain instances this distinct phenomenon has been proved to be due, and in all cases is probably due, to the occultation of a double star. It seems likely that a very close observation of these light changes at occultation will more and more be deemed a valuable means of detecting very close double stars lying in the moon's path. The "gliding" or gradual occultation of stars is, with some show of probability, attributed by Innes to occultation of double stars too close to make a separate physiological impress. He thinks that close doubles of a period too long for spectroscopic discovery and yet too close for visual detection may thus reveal themselves by the magnification due to the appreciable interval taken by the moon in traversing an arc too small for direct measurement. In both of the cases of "disappearance in two distinct stages" and of "gliding" the position angle of the double star with respect to the moon's path, as well as the angular separation of the components, enters as a factor of the delicate phenomena.

That the disturbance and reappearance of a star in nearly all cases appears to be absolutely instantaneous is not surprising when we consider the great distances which separate all of the stars from the solar system. A very simple computation shows that were even the nearest star to have a diameter of 1,000,000 miles, its apparent angular diameter as seen from the earth would be but 0.0076 inches, and the time occupied by the advancing edge of the moon in passing across this apparent disc would be less than two-hundredths of a second. If we suppose that a star of the same size is 10 times as far away, the time would be but one-tenth as great as this. It cannot be doubted that the time required for the complete extinction of a star's light, in the great majority of cases, does not exceed one-thousandth of a second. This is far too small an interval to be directly observed, and no photographic device for recording the necessarily gradual extinction of the light has yet been successfully invented. If, however, such an apparatus shall be secured, it will enable us to directly measure the apparent angular diameter of the stars—quantities far too small for us to observe by any methods at present known to us.

Occultations of Planets.—The phenomena attendant upon occultations of planets by the

moon differ somewhat from those of stars. The beautiful and startling appearance which Venus and the new moon present to the unaided eye at the time of this planet's occultation, and the early association of the new moon with religious festivals, has led to the crystalization of this phenomenon as a symbol on the Turkish flag and is also thrice emblazoned on the Egyptian. The phenomenon of an occultation of Jupiter, photographed and visually observed at Arequipa in 1892, led W. H. Pickering to an interesting discussion of the apparent effect of a slight lunar atmosphere. Of an occultation of Saturn, 3 Sept. 1900, G. G. Tupman says that it "disappeared at dark limb, which was not visible except on the planet and ring. The last little patch of light, longer than broad, parallel to the moon's limb, seemed to linger strangely. The distance of centres was diminishing 0.28 inch per second, and the moon seemed to travel very rapidly across the planet and ring." It seems undesirable to speculate on this phenomenon further than to class it with similar phenomena of displacement of stars at the occulting limb of the moon.

Occultations by Planets.—The observation of the occultations of stars by planets may be utilized in determining the position and diameter of the planets and in securing some knowledge of the effect of their atmospheres on the phenomena. The prediction of these occultations by planets was for some time annually made by Berberich of the 'Astronomisches Jahrbuch.' The phenomena of immersion and emersion have, in the cases of Mars as observed by South, of Venus by Curruli, been practically instantaneous. Only a slight hesitancy in reappearance was noted in the latter case. An occultation of a 6.5 magnitude star by Jupiter, as recently observed by H. Struve, gave the times of the immersion and the emersion uncertain from 7 to 10 seconds and showed these times to be phenomena of a gradual character.

Occultations of Satellites.—The occultations of Jupiter's satellites by the planet are a part of the general theory of the configuration of the Jovian System as seen from the earth, and are regularly predicted in the *American Ephemeris* and *Nautical Almanac* and other Ephemerides. The projection of the satellites within the apparent limb of Jupiter at occultation has been seen by many observers and is satisfactorily explained by the effects of atmospheric disturbances on the planetary edge just as in the case of the star's projection on the disturbed and spurious limb of the moon.

Occultations by Comets.—The passage of comets over stars, as visually and photographically observed, has disclosed some facts of interest in this class of occultations. Until quite recently all observers agreed that the nebulous envelopes of comets do not absorb the light of stars, and long ago Olbers had shown that there was no evidence of refraction by comets. One eminent observer after another has recorded the occultation of a star or cluster of stars by a comet without sensible diminution of the light of the stars, and this phenomenon has also been markedly attested by the photography of comets. A few observers have noted the diminution or even the complete extinction of stellar light in their occultations by comets. Max Wolf has, moreover, recently demon-

strated by photography that the envelope of Comet 1903c exercised a selective absorption on a 6.5 magnitude star and that the same comet failed to absorb the light of a less brilliant star of a different type. The projection of the stars upon the envelopes and tails of comets thus not only affords means for accurate measurement of the position and form of these objects, but promises to supply occasional hints of the cometary absorption of stellar light.

Bibliography.—Bessel's method of treating predictions of occultations is given in 'Astronomische Nachrichten' (No. 145). A number of graphical, or partly graphical, methods, useful to observers in predicting occultations, have been published in recent years. Among these may be mentioned the suggestions of G. W. Hough in *Popular Astronomy* for 1897; Major Grant's diagram given in 'Hints to Travellers'; M. J. Bijourdan, 'Occultations' in the 'Annales de l'Observatoire de Paris' (Vol. XXIII), and the graphical method of Rigge, No. 3786, *Astronomische Nachrichten*. In the same journal (No. 2388) Seeliger has discussed the conditions of frequency of occultation of stars by planets.

Revised by ERIC DOOLITTLE.

OCCULTISM (from the Latin *occultare*, to hide), deals with the doctrines, principles or practice of occult science, such as magic, theosophy, mysticism, etc. Occultism deals with forces of nature, not generally known, and is chiefly kept up in the Eastern countries, particularly in India. Dr. Joseph Grasset, in his 'L'Occultisme hier et aujourd'hui' (Paris 1907), writes: "Occultism is not a survey of all things hidden from science; it is a survey of facts not yet belonging to science (*positive* science, after August Comte's manner), but which may belong to it. Occult facts are outside of science, or in the vestibule of science, endeavoring to conquer the right to be included in the text of the book of science, or to cross the threshold of the palace. There is no logical situation which hinders these facts from ceasing one day to be occult and becoming scientific. Charles Richet calls them metaphysical. As they are really psychical, I should rather term them *juxta-* or *pre-scientific*. To the word metaphysical Boirac prefers the term *paraphysical*, in which the prefix *para* indicates precisely that exceptional and paradoxical phenomena are in question—phenomena quite outside the known principles of thought and life. One might describe *paraphysical* phenomena as all phenomena manifesting themselves among living beings, or through their actions; and as being not entirely explained by nature's principles and powers as already known.

"The attractions of a scientific mystery have not been the appanage of any one epoch; but one divides into three periods the stopping-places of the prescientific wonders of the modern age: the period of Mesmer; the period of Spiritualism; and the present day."

Mesmerism, or animal magnetism, introduced by Mesmer (1734-1815), was derived, in fact, from the works of Paracelsus of the 16th century; Spiritualism originated in the United States in 1847; and the end of the 19th century witnessed a new spirit which Paulhan spoke of in 'Le Nouveau Mysticisme' (1891) as "a mysticism that, far from repelling the scien-

tific system willingly seeks it." From this time onward occultism has assumed the aspect of a serious study. Among those, to quote from Charles Richet, who "endeavor, or have endeavored, to make a number of mysterious and unseizable phenomena pass into the sphere of positive sciences" are Aksakoff, William Crookes, Dariex, Durand, De Gros, Gibier, De Grammont, Joseph Grasset, Pierre Janet, Sir Oliver Lodge, Lombroso, Maxwell, F. H. Myers, Ochorowicz, Charles Richet, De Rochas, Sabatier, Stainton Moses, R. Wallace, De Wetleville and Zoellner.

An impetus was given to the scientific study of occultism in 1893, when De Grasset presided at the Montpellier Faculty of Medicine during the presentation of a thesis about occult phenomena. Albert Coste in 'Les phénomènes psychiques occultes' (2d ed., 1895), made an official report of the actual condition of the subject. At the same time, Dariex, wishing to establish in France a similar work to that of the Society for Psychical Research, already promoted in London, issued the *Annales des Sciences Psychiques*, which contains much documentation of all these questions. These investigators "limit occultism," in the words of Dr. Grasset, "to the investigation of phenomena that, first, does not belong to science; second, that may without logical hindrance belong to it later on. In a word occultism is the pre-scientific Wonders." (See MAGIC; MYSTICISM; THEOSOPHY; SPIRITUALISM). Consult Bertrand, G., 'L'occultisme ancien et moderne' (Paris 1899); Besant, Annie, 'Ancient Wisdom' (London 1910); id., 'The Changing World' (London 1910); id., 'War Articles and Notes' (London 1915); Blavatsky, H. P., 'Isis Unveiled' (2 vols., New York 1877); Bourgeat, Jean, 'Magie' (Paris 1895); Constant, A. L., 'Philosophie Occulte' (2 vols., Paris 1862-65); id., 'Transcendental Magic' (trans. by A. E. Waite, London 1896); Cooke, C., 'Curiosities of Occult Literature' (London 1863); Davies, Thomas W., 'Magic: Black and White' (Chicago 1910); Decrespe, M., 'Principes de physique occulte' (Paris 1894); Denis, J. F., 'Tableau historique analytique et critique des sciences occultes' (Paris 1842); Debay, A., 'Histoire des sciences occultes' (Paris 1869); Doni, A. F., 'Mondi celesti, terrestri et infernale' (Venezia 1567); Durey, Louis, 'La médecine occulte de Paracelse' (Paris 1900); Encausse, Girard, 'Clef absolue de la science occulte' (Paris 1889; trans. by A. P. Morton, London 1896); id., 'La magie et l'hypnose' (Paris 1897); id., 'L'occultisme et le spiritualisme' (Paris 1902); id., 'Qu'est ce que l'occultisme' (Paris 1905); Fabart, F., 'Histoire philosophique et politique de l'occulte, magie et préface de Camille Flammarion' (Paris 1885); Figuier, G. L., 'Les mystères de la science' (Paris 1887); Flagg, W. J., 'Yoga' (New York 1898); Flammarion, Camille, 'Mysterious Psychic Forces' (Boston 1907); id., 'Uranie' (trans. by M. J. Serrano, New York 1896); Galais, A., 'Les mystères de la magie' (Paris 1909); Garland, Hamlin, 'The Shadow World' (Boston 1908); Hartmann, Franz, 'Die weisse und schwarze Magie' (Leipzig 1902; in English, 'Magic, White and Black,' New York 1904); Jacolliot, L., 'Le spiritisme dans le monde' (Paris 1879); Lacroix, Paul, 'Curiosi-

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ESTHER SINGLETON.

OCCUPANCY. See POSSESSION.

OCCUPATION, Diseases of. See DISEASES, OCCUPATIONAL.

OCEAN, The, or SEA, comprises the continuous body of water which covers the greater part of the earth's surface, the area being two and one-half times that of the dry land. The latter is for its greater part aggregated on the northern hemisphere, the southern is pre-eminently oceanic. The ocean is divided into five great divisions which have partly natural, partly imaginary boundaries.

The Pacific, the largest one, is bounded on the east by America and the meridian of Cape Horn, on the west by Asia, the Great Sunda Islands, Australia and the meridian of Tasmania, on the north it terminates in Bering Strait and on the south at the Antarctic circle.

The Atlantic Ocean, the next in size, is bounded on the east by the coasts of Europe, Africa and the meridian of Cape Agulhas, on the west by America and the meridian of Cape Horn and on the north and south by the Arctic and Antarctic circles respectively.

The Indian Ocean is bounded on the east by the Great Sunda Islands, the west and south coast of Australia and the meridian of Tasmania, on the west by the coast of Africa and the meridian of Cape Agulhas, on the north by Asia and on the south by the Antarctic circle.

The Arctic and Antarctic Oceans comprise the waters between the Arctic circle and the North Pole, the Antarctic circle and the South Pole, respectively. The actual boundaries of the oceans do not always agree with these theoretical ones; thus the northern coasts of America, Europe and Asia are the actual boundaries of the Arctic Ocean; Hudson Bay and the White Sea are included, although they reach

far into the temperate zone. Furthermore, the Arctic circle is not the actual boundary between the Arctic Ocean and the Atlantic, but a line drawn from Greenland to Norway by way of Iceland, the Farøe and Shetland islands. From a morphological point of view there is no such thing as an Antarctic Ocean; there are no land surfaces or submerged ridges that separate it from the adjoining oceans. The area should properly be divided among the adjoining great oceans—the Atlantic, Pacific and Indian; when we speak popularly of Antarctic Sea and Antarctic expeditions we refer to the entire region that lies south of the extreme southern points of the land masses, Cape Horn, Cape Agulhas and Tasmania, in lat. 56° S., 34° 51' S. and 43° 40' S., respectively.

Area.—The areas of the three great oceans are given at 67.7 million square miles for the Pacific, 34.7 for the Atlantic and 18.6 for the Indian. The two Polar seas are much smaller, but no exact figures can be given for the reason that there are about 3.1 million square miles in the North Polar regions and 8.3 in the South Polar regions still unexplored. As to dimensions the Pacific is the widest, with 9,400 nautical miles between Panama and the Philippines; the Atlantic is much narrower, about 3,700 nautical miles between Cape Agulhas and the La Plata, or 4,500 miles between Cape Bojador on the African Coast and the Rio Grande, if we include the Gulf of Mexico. The Indian Ocean has its greatest width between the southern capes of Africa and Australia, over 6,000 nautical miles. The distribution of islands plays a prominent part in the physiognomy of the oceans. We have to distinguish between oceanic and continental islands. The open Atlantic is rather poor in oceanic islands, more so is the eastern part of the Pacific, and especially poor is the northern part of the latter ocean and the eastern part of the Indian Ocean. The south Pacific is unsurpassed for its wealth of oceanic islands; "small size" is a characteristic feature of these islands, in fact the hundreds and thousands of Polynesian islands have a total area less than that of Celebes. Each ocean has its share of continental islands, which includes not only those near continents, but also such as have a continental structure, of which New Zealand is a type. The Pacific has its East Indian Archipelago, New Guinea, etc.; the Atlantic, the British Islands, the Antilles; the Indian Ocean, Madagascar and Ceylon; the Arctic, Greenland, Nova Zembla, etc. According to size Greenland with 0.81 million square miles heads the list of large continental islands, with the New Guinea, Borneo, Madagascar, Sumatra, Nipon, Celebes, Java and Cuba following in the order of size. There is yet another element which imparts diversity of character, not only to different oceans, but to different parts of the same ocean—the development of the coast line. An ample development, the presence of deep incisions, is considered a great factor in the promotion of culture. Europe with the Mediterranean, Baltic, North Sea and English Channel; the eastern coast of North America with the Gulf of Saint Lawrence, the Gulf of Mexico and the Caribbean Sea, are especially favored in this respect, while the absence of deep incisions is noticeable in the contour lines of the southern continents, notably Africa and South America. A very

peculiar feature in this respect is the border seas which line the eastern coast of Asia; these are in succession, commencing at Bering Strait, the Bering Sea, Okhotsk Sea, Japan Sea, East Sea and South China Sea. A very rich development, though on a smaller scale, is imparted by glacial action to coast lines in northern regions; we notice this especially on the coasts of Norway, Iceland, Greenland and the northeast and northwest coasts of America.

Depth.—The mean elevation of the land surface is estimated at about 383 fathoms, and the mean depth of the sea at between 1,900 and 2,000 fathoms, hence the latter is about five times as great as the former; but, in spite of this disparity, the culminating heights of the land (the Gaurisankar with 29,000 feet) approach very nearly the greatest depths of the sea (the Guam trench with 5,269 fathoms or 31,614 feet). The mean depth of the three great oceans is about the same, the Pacific is slightly deeper and the Indian rather shallower than the Atlantic Ocean.

The bed of the Atlantic has a peculiar form: instead of one deep basin separating the Old and New Worlds, as it was thought to be 50 years ago, there are two separate troughs, one on the American and the other on the European side, separated by a rise which commences at Iceland and passes through the middle of the ocean, taking in on its course the Azores, Saint Paul and Ascension islands, and has been traced as far as lat. 40° S. This rise was formerly designated the Dolphin Rise, but in modern nomenclature it is Atlantic Rise. The troughs, which are divided by gentle swells into several basins, terminate on the south in two cross ridges, the Rio Grande and Whale ridges, and on the north in a ridge stretching from Greenland to Iceland and thence to the Shetland Islands. It is called the Icelandic Ridge and has a depth of less than 328 fathoms. The depth of the basins exceeds 3,000 fathoms (3,825 southeast of the Bermudas). The greatest depth, however, 4,662 fathoms, is not found in these basins, but in a trench off Porto Rico which terminates in the Old Bahama Channel. It has been noticed that the arms of the north Atlantic in the higher latitudes, like the Baltic, North Sea and English Channel on the European side, and Hudson Bay and the Gulf of Saint Lawrence on the American side, are shallow, while those in lower latitudes have comparatively great depths, the Mediterranean 2,406 fathoms, the Bay of Biscay 2,625 fathoms, the Gulf of Mexico 2,119 fathoms and the Caribbean Sea 3,428 fathoms.

In the Pacific we find the northern part decidedly deeper than the southern. In about lat. 20° N. are the Hawaiian Islands rising from a plateau of over 1,000 fathoms depth and to the northward and southward of it are basins with over 3,000 fathoms depth which extend in an east and west direction over the greater part of the width of the ocean. The southeastern Pacific or, more definitely speaking, that part to the eastward of the Marquesas and other coral islands, appears to have been more charily located by the explorers and surveyors than any other part of the great oceans. We have no exact knowledge of the disposition of its basins and ridges, but may form some conception of the depths from the observation that, barring the immediate vicinity of the coast,

there are no soundings recorded of less depth than 1,450 fathoms, or more than 2,711 fathoms. Farther west we notice the groups of innumerable coral islands which have become historic from the investigations of Forster, Darwin, Dana and A. Agassiz. They rise rather precipitously from depths of between 1,000 and 3,000 fathoms. Only passages of very moderate depth lead from the deep parts of the western Pacific into the Indian Ocean through the archipelago of islands which separates Asia from Australia, but within this archipelago there are several basins which show rather remarkable depths—the China Sea with 2,715 fathoms, the Sulu Sea with 2,550 fathoms, the Celebes Sea with 2,795 fathoms, the Banda Sea with 4,000 fathoms and the Coral Sea with 2,518 fathoms. The uniformity of these depths appears to indicate that these successive basins were at some remote period parts of a continuous sea and that their separation is due to volcanic eruptions. The discovery within the last 30 years of several areas of local depression in different parts of the Pacific whose depth is far in excess of those of the large basins, also leads to the supposition that they are the result of violent volcanic action. They are found in close proximity to the coast of the mainland or close to chains of islands in the shape of longitudinal depressions, designated as trenches. The deepest one of these trenches is the Guam with 5,269 fathoms (the deepest sounding ever recorded), the Kermadec-Tonga with 5,155 fathoms, the Japan with 4,656 fathoms, the Aleutian with 4,037 and the Atacama, off the coast of Peru and Chile, with 4,175 fathoms depth.

Of the three great oceans the Indian appears to be the least complicated in form, having only one great basin of 3,532 fathoms depth; this is found in its eastern part, in the bight formed by the west coast of Australia and the Great Sunda Islands.

The Arctic Ocean may properly be divided into two parts, separated by Greenland, which descends into the temperate zone to lat. 60°. The eastern part lies north of Europe and Asia and the western part north of America. This ocean was formerly credited with very moderate depths, less than 700 fathoms, this mainly for the reason that the regions earliest known, those just north of the continents, were very shoal, but late Arctic expeditions have shown the existence of a deep trough, 2,650 fathoms between Greenland and Spitzbergen, which is taken as a continuation of that of the Atlantic beyond the Icelandic ridge, and also depths of over 2,000 fathoms far to the eastward and northward of Spitzbergen, indicating the existence of another large basin. In the western part we find at Davis Strait, in about the latitude of the Arctic circle, a barrier of 360 fathoms depth which separates the trough of the western Atlantic from Baffin Bay. Except Baffin Bay, which has depths of over 1,000 fathoms, the entire region to the westward as far as Bering Strait seems to be shallow; in Bering Strait the greatest depth is only 28 fathoms.

Since the time of the Antarctic expedition of Wilkes and James Ross (1839-43) the opinion has prevailed that the Antarctic Ocean was one of inferior depth and that a gradual shoaling would have to be expected from the south-

ern parts of the great oceans toward the Antarctic continent. This opinion was based upon the nature of the soundings which Ross took near the newly-discovered land and which indicated a rapid shoaling, but has been dispelled by the results of the recent Antarctic expeditions which show depths of over 3,000 fathoms to the southward of Africa in about lat. 60° S., 2,975 fathoms between Madagascar and Kerguelen Island, and between the latter and the Antarctic Continent 2,540 fathoms. We are rather interested in the depths existing between the southern capes of the continents and the nearest land to the southward in order to ascertain if any submarine connections exist, such as we have traced between North America and Asia on one side and Europe on the other. Between the Cape of Good Hope and Bouvet Island 2,962 fathoms have been found, between Cape Horn and the New Shetland Islands 2,106 fathoms; there are no soundings between Australia and the Antarctic Continent, but rather less than 2,000 fathoms are expected.

Composition and Density of Sea Water.—

The briny taste and higher specific gravity of sea water than fresh water is due to the presence of salts, held in solution, and although the absolute quantities of these salts are very variable, the relative proportions are always very nearly the same. In 1,000 parts of sea water are found on an average 26.9 parts of chloride of sodium (common salt), 3.2 parts of chloride of magnesium, 2.2 parts of sulphate of magnesium, 1.3 parts of sulphate of lime and 0.7 residue.

The salinity is increased by evaporation on the surface, and although this is supposed to be always active, it is greatly promoted by high temperature and strong dry winds. The salinity is diminished by the addition of fresh water either from rivers, rain or melting ice. The highest salinity is found in the regions of the trade winds with the following results: 37.9 in the north Atlantic, 37.6 in the south Atlantic, 36.4 in the Indian Ocean, 35.9 in the north and 36.9 in the south Pacific, each in 1,000 parts of water. Between these regions of high salinity in approximately lat. 20° to 30° both north and south, there is found in the neighborhood of the equator a zone of low salinity, 35.5 to 35.0 in the Atlantic and 34.5 to 34.0 in the Pacific, and this is attributed to heavy rains and weak, humid winds. In the higher latitudes a rapid decrease of salinity is noticed with increase of latitude, except in regions that are reached by the Gulf Stream drift; thus a density of 35 is found beyond lat. 76° N. between Spitzbergen and Norway, while in the southern oceans this density is not met with far beyond lat. 40° S., and not so far in the north Pacific. The Gulf Stream, which is fed by the highly saline waters which both the north and south trade winds convey to the eastern shores of North America, has a density at least as high as the north Atlantic in the trade-wind regions, while several arms of the sea in the Bahamas have a density greater still.

The greatest densities, exceeding those of the open ocean, are found in land-locked basins in warm and dry climates; thus we find 41 in the Red Sea, 38 in the Persian Gulf, 37 in the Mediterranean. Copious additions of river water reduce the salinity, and for this reason

we find low densities along the eastern and Gulf coasts of the United States, and when such waters empty into basins with narrow entrances we observe even lower degrees of salinity, thus 15 to 18 in the Black Sea and from 5 to 8 in the Baltic. Salinity is also reduced by melting ice, as we notice especially in the north Atlantic, where two mighty currents, the East Greenland and the Labrador, carry vast quantities of ice in the shape of bergs and floes from the Arctic regions toward the south. Concerning the vertical distribution of salinity, it has been noticed that it decreases to the depth of 200 to 300 fathoms in those regions where a decided evaporation takes place, like the trade-wind regions, and increases to the same depths where a dilution occurs; that beyond these depths it decreases slowly to the depth of 1,400 to 1,830 fathoms, thence increases again until bottom is reached. In the inland seas, however, the density generally increases as the depth to the bottom.

Temperatures.—The rule holds good generally that the mean annual temperature of the surface waters is somewhat higher than that of the air, and that it fluctuates much less. The warmest water is found at the equator, and here the Indian Ocean and the western Pacific exceed in heat the Atlantic and eastern Pacific. From these equatorial regions there is a gradual decrease in temperatures north and south, but the temperatures of northern regions are generally higher than those of the southern in corresponding latitudes for the reason that the warm water which is carried by the southern trades across the equator is replaced by cold water from the Antarctic regions, which is assumed to be the coldest on earth. Furthermore, in the higher northern latitudes the eastern parts of the oceans are warmer than the western, the drift being northeast, and again, the northeast Atlantic is much warmer than the northeast Pacific for the reason that the Gulf Stream is a much more powerful stream than the Kuroshio. The warm waters which we meet at the equator reach to the depth of only about 50 fathoms, the cold waters which we meet beyond that depth are assumed to come from the Antarctic regions. In the regions of the trade winds the surface water, made heavy by evaporation, descends, and hence we find here in depths of from 50 to 250 fathoms the water from 4° to 6° warmer than in the equatorial regions. But this water moves not only downward, but drifts to greater distances from the equator. The last traces of these tropical waters we find in the bottom layers of the Arctic and Antarctic oceans; this water has parted with nearly all the heat with which it, started on its journey, by supplying cold currents and by melting ice, but still retains enough salt to betray its origin.

From the bottom regions of the Arctic Ocean there is a slow movement of the water toward the equator and although that from the north polar regions starts with much lower temperatures, between -2° to -3° C., it rapidly gains heat and shows temperatures of from $+1^{\circ}$ to $+2^{\circ}$ C. in middle northern latitudes, while under the equator and in southern latitudes the bottom temperatures do not vary greatly from 0° C. This distribution leads to the assumption that the cold waters which in the equatorial regions rise toward the surface

are of Antarctic origin. Theoretically no ice should be formed on the surface of the sea water until the whole body of water has been reduced to less than $-2\frac{1}{2}^{\circ}$ C., but in the Arctic regions freezing generally takes place before this temperature is reached, on account of the slowness of vertical circulation, and warm layers are often found under the surface ice. For seven or eight months of the year the entire Arctic Ocean, with the exception of the southern parts of the Greenland Sea and Baffin Bay, is covered with ice. In the Atlantic, Iceland, the British Islands and the coast of Norway; in the Pacific the Pribilof Islands and Aleutian Islands are free of ice all the year round. Thawing in the Arctic regions commences about the end of May. The Arctic summer is rather short; new ice begins to form in September. The discovery of a "northwest passage" from the Atlantic to the Pacific furnishes the motive for the greater number of expeditions commencing with those of Cook (1778) and Vancouver (1792-94) on the Pacific side of America, and those of Parry (1819-24) and Ross (1831-33) on the Atlantic side; these undertakings were finally abandoned only after human endurance had been put to its severest tests and many lives sacrificed in the vain endeavor. Nordenskjöld in 1878-79 successfully accomplished the northeast passage by way of the Siberian coast; but the experience of subsequent expeditions teaches that the chances for finding an open passage all the way through are rather uncertain. In the Atlantic two great currents convey the melted ice with its freight of bergs and floes from the Arctic regions, the East Greenland and Labrador currents. The first one, after following the east coast of Greenland to Cape Farewell, turns north along the eastern side of Davis Strait, crosses over to the western side before reaching Baffin Bay and joins the Labrador current. The latter flows along the Labrador coast, sends a branch through the Strait of Belle Isle; but the principal part passes along the Newfoundland coast and banks and, if not dissipated by the warm waters of the Gulf Stream, dips under it. Here on the southern edge of the Banks of Newfoundland we witness the most rapid change of temperature found in any part of the ocean, in May 10° , from 5° to 15° , within two degrees of latitude, or from the temperature off the coast of Iceland to that off the coast of Spain. There are no Arctic currents on this grand scale in the Pacific; the ice generally disappears a short distance south of the Pribilof Islands. In the Southern hemisphere we have a vast region of floe ice the limit of which is lat. 57° S. off Cape Horn and 38° S. off Cape of Good Hope. The vertical distribution of temperature in enclosed basins is essentially different from that in the open ocean by decreasing from the surface downward to the depth of the channel which opens into the ocean and remaining constant thence to the bottom. Thus in the Celebes Sea a uniform temperature of 3.8° is found between 860 fathoms and the bottom (2,795 fathoms), while in the adjoining Sulu Sea, with about the same depth, the temperature is 10.3° below 400 fathoms. In the Gulf of Mexico and the Caribbean Sea a uniform temperature of 4.2° is found below 900 fathoms, and in the Mediterranean, with a depth of less

than 200 fathoms in the Strait of Gibraltar, the temperature from about 270 fathoms to the bottom is 13°.

The Bottom of the Sea is different in many respects from the surface of the land. The mantle of sea water protects it from subaerial disintegration and erosion which gives such a varied shape to the landscape and although sea water may decompose the bottom of the ocean, there are no currents strong enough to transport the residue to distant regions. While the land surface is constantly reduced by denudation, the bottom of the sea receives constant accessions. The materials which contribute to this process are either of continental or pelagic origin. The first are either such as the ceaseless actions of the waves remove from exposed parts of the coast or material brought down to the coast by the rivers. The currents carry these materials out to sea and, while the heavier ones, such as gravel and coarse sand, remain near the shore, the lighter ones, as fine sand, silt and mud, are transported to considerable distances before they sink to the bottom. In this way the coast is lined with a fringe of continental deposits which may be quite narrow, but often attains a width of 100 miles or more. This fringe is designated as continental shelf; when broad it has a moderate slope and is generally assumed to terminate with the 100-fathom curve. It is succeeded by a well-defined steeper slope called the continental slope. Continental or terrigenous deposits are often found at considerable distances from the coast, disconnected from the shore deposits; in such cases they are formed by conflicting currents losing their velocity and depositing the sand and silt which they carry. These deposits, called sand banks, often constitute dangers to navigation. In the higher latitudes melting icebergs and floes produce banks; in this way the large Newfoundland Banks, 270 miles wide, are supposed to have been formed.

The finest terrigenous material, designated as mud, is carried to sea far beyond the 100-fathom limit and in the shape of blue, red, green, volcanic and coral mud covers about one-seventh part of the ocean's bottom to depths of over 1,000 fathoms. These "muds" also cover the bottom of the large continental basins with the exception of the Gulf of Mexico and Caribbean Sea, and prevail in the Arctic Seas. The continental slope generally descends very gently from the "shelf" to the trough of the sea, but there are instances of quite steep descent; such are met with off the west coast of Europe, Africa, Mexico and South America, also near volcanic and coral islands. But the bottom of the deep troughs and basins nearly everywhere presents the profile of the dead level of a vast plain. Although animal life presents its contribution to the continental deposits in the shape of broken shells of mollusca, etc., they occupy only an accessory position, and it is in the deeper parts of the ocean that they constitute the principal component. Globigerina ooze, composed mainly of the microscopic shells of a genus Foraminifera, covers over one-third of the ocean's bottom; it prevails in the medium depths and especially where there are warm currents, like the Gulf Stream. The largest area is found in the Atlantic Ocean; it predominates in the northwestern part of the Indian, but is re-

stricted to the Polynesian Plateau in the Pacific Ocean. A variation of this ooze, which contains large proportions of mollusca shells, principally those of Pteropods, is called Pteropod ooze and is found on the central ridges of the Atlantic, in depths not exceeding 1,400 fathoms, and also in the Gulf of Mexico and Caribbean Sea. The red clay occupies the greater depths of the ocean and a larger area than any other deposit, more than one-fourth of the earth's surface. It is a genuine clay and assumed to be the result of the decomposition of pumice and other volcanic materials. The absence of shells in this deposit is not thought to be proof of the absence of animal life; apparently the shells have been dissolved by the free carbonic acid of the sea water and absorbed by the latter before reaching bottom. In some of the deepest parts of the Indian and in the eastern Pacific, silicious radiolarian remains are found in such quantities in the red clay that this kind of deposit has been designated radiolarian ooze. See OCEAN CURRENTS; OOZE.

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OCEAN CABLES. See CABLES, SUBMARINE.

OCEAN CURRENTS. The surface of the ocean is very rarely in a state of perfect rest. We make a distinction between vertical and perceptible horizontal motion; the latter we call *currents*. Near the coast, in channels and estuaries, the currents are referred to a variety of causes, among which the tides are the most important, but in the open sea the winds are recognized as the primary cause of all the great currents. A regular and continuous wind blowing over the surface of the ocean will induce motion in its surface, but the velocity communicated to the water is always far less than that of the air producing it. In consequence of the viscosity of the water the motion of the surface will be transmitted in part to greater or less depth but greatly diminishing rapidly below the surface. The rate of this motion in a body of water and the depth to which it penetrates are altogether a question of time, and it has been demonstrated that if the winds act continuously upon an unconfined ocean the entire body of water from surface to bottom will have motion imparted to it. Furthermore, the momentum acquired by the water in motion will carry it on in its course for a considerable time with slowly diminishing velocities, should the wind cease to blow.

The trade winds are those which in the Atlantic and Pacific oceans blow with great regularity all the year round on both sides of the equator in the Northern hemisphere from the northeast and in the southern from the southeast. In the Atlantic the southeast trades are the prevailing winds between the Cape of Good Hope and Rio de Janeiro to the equator, the northeast trades between lat. 12° N. and about lat. 30° N. The two regions are separated

by a region of light changeable winds and calms called the equatorial calms or doldrums. The trade winds induce currents on the ocean's surface called the North and South Equatorial Currents respectively. The limits approximate those of the corresponding trade winds; the northern lies between lat. 10° and 28° N. and has a mean velocity of 14 miles per day, the southern between lat. 15° S. and the equator and has a mean velocity of 16 miles per day. The South Equatorial Current from about long. 20° W. passes north of the equator; this may be due partly to the southeastern trades which extend into the Northern hemisphere and partly to the configuration of the South American coast which compels the current to take a northwesterly course. It finally enters the Caribbean Sea through the different passages among the Lesser Antilles; a small portion, however, separates from the main body and moves south, following the South American coast. Between the two Equatorial Currents we find the Guinea Current which belongs to a secondary class, called compensating currents, which always run in an opposite direction to the primary, and are explained by a natural tendency of the water to restore equilibrium disturbed by the primary current. The Guinea Current commences about $35\frac{1}{2}^{\circ}$ W., attains a velocity of 15 miles, and on reaching the coast of Africa, near Cape Palmas, passes into the Gulf of Guinea. One part of the waters which the North Equatorial Current conveys to the American shores enters the Caribbean Sea and joins those of the South Equatorial; the other part moves along the Bahamas toward the northwest. The waters which the Equatorial Currents carry into the Caribbean Sea are assumed to acquire their motion partly from the impulse of the trades, partly in consequence of the prevailing easterly winds and to pile up against the western shores. Very little doubt is entertained at present that the current through the Strait of Yucatan into the Gulf of Mexico, which is one of the strongest on record (from 60 to 120 miles per day), is solely due to the difference of level between the Caribbean Sea and the Gulf. But these waters do not tarry in the Gulf of Mexico, its level being in turn higher than that of the Atlantic; they are, consequently, forced toward the Strait of Florida where they find an outlet, enter the Atlantic as the celebrated Gulf Stream, a name first used by Franklin. In the narrowest part of the channel, off Cape Florida, it approaches the coast to within 15 miles, occupies the entire width (40 miles) and depth (482 fathoms) of the channel and attains velocities of 69 to 100 miles per day at the surface. By calculation it has been shown that a current of the velocity of the Gulf Stream requires a difference of elevation of at least 0.7 feet of the Gulf over the Atlantic, which difference agrees very nearly with that found by direct leveling across the Florida Peninsula. After leaving the Straits, the Gulf Stream moves to the northward over a rocky bottom with a depth of 460 to 270 fathoms, and distant from the coast about 100 nautical miles. In lat. 34° it enters the deep water of the ocean; when off Cape Hatteras, it again approaches the coast, being distant only 35 miles and in depths of over 1,500 fathoms. Its temperature there is 31° C. in summer and 26° C. in winter, having lost only 3° since leaving the Straits of Florida.

It is readily recognized by its high temperature and dark blue color, its western edge being especially well defined. It is not a deep current; at the depth of 250 fathoms its temperature is 10° C., under its western edge it is 7.2° , while under its eastern edge a temperature of 15.6° is found. This appears to indicate that it moves over a wedge of cold water which comes from the north and west and descends toward the east into the depths of the ocean. The width of the Stream off Hatteras is about the same as in the Straits of Florida, 40 miles, and its velocity is between 50 and 73 miles per day. After leaving Cape Hatteras it gradually changes its northeast direction into due west with constantly diminishing velocity and temperature until it reaches the southern edge of the Banks of Newfoundland which it does in summer in lat. $42\frac{1}{2}^{\circ}$ N. and in winter in $41\frac{1}{2}^{\circ}$ N., with temperatures of 22° C. and 10° C. respectively and velocity of 24 to 30 miles per day. It is here no longer considered as an ocean current but a drift, and is called the Gulf Stream drift. The deflection of the Gulf Stream toward the east is attributed partly to the rotation of the earth and partly to the direction of the prevailing winds. While the central part of the Gulf Stream drift makes its way toward the western shores of Europe and moderates their climate, one part enters Davis Strait and produces an open channel to the southern part of Baffin Bay during winter; another one passes into Denmark Strait between Iceland and Greenland, but it soon sinks into the depths of the sea. A more persistent branch passes between Iceland and the British Islands and the coast of Norway, and has been traced to the eastward as far as the west coasts of Spitzbergen and Nova Zembla during the summer season. The southern part of the Gulf Stream drift, more properly called Atlantic drift, leaves the main body south of the Azores and, as the North African Current, follows the coast of Africa to Cape Blanco where it joins the North Equatorial Current. The vast oval-shaped area enclosed by the North Equatorial Current, the Gulf Stream and the Gulf Stream drift is one of calms and weak drifts, and is called the Sargasso Sea from the sea-weed which accumulates about its borders.

Turning to the currents that descend from the polar region into the temperate zone, we find in the removal of vast bodies of water from the western part of the ocean to the eastern of the Gulf Stream the cause of other currents, compensating currents, whose function it is to move waters in the opposite direction, from the northeast to the southwest, for the purpose of restoring equilibrium, as in the Labrador current. The prevailing northwesterly winds in Baffin Bay assist such a movement along the coast of Labrador and Newfoundland to the southward, and this direction is maintained until Cape Race has been passed where it is changed to southwest on account of the rotation of the earth. This current is active during the season of melting ice. Field ice generally appears on the Banks as early as February and disappears about the end of May. Icebergs are most abundant in May and are found in diminishing numbers until the end of August. The majority of bergs come from the west coast of Greenland (some few come from Frobisher Sound and Hudson Strait), and move

at the rate of about 10 miles per day. Similar conditions to those existing in Baffin Bay produce a southerly current along the east coast of Greenland, called the Greenland Current, which rounds Cape Farewell and turns to the northward toward the depression which the Labrador Current has created in Baffin Bay. After skirting the ice barrier which usually exists in Davis Strait in the spring, it merges into the Labrador Current. The temperature of these currents is very low, but their density is comparatively high for the season that they are shallow and rest on warm and heavy waters and have been constantly gaining salt during their progress. Being comparatively heavy the Labrador Current sinks under the Gulf Stream. The cold waters which extend along the western edge of the Gulf Stream as far as Cape Florida have sometimes been considered a continuation of the Labrador Current, but it appears that the movement of these waters toward the southwest is extremely slow and disguised by the more powerful motion produced by the winds and tides. Furthermore, the movement of this littoral band is retarded by warm currents making their way into the Gulf of Saint Lawrence and Gulf of Maine. In conformity with the laws of oceanic circulation as now understood, the waters of the Labrador Current as well as the cold waters of the coast regions pass beneath the edge of the Gulf Stream (which is very thin) and continue to sink and move along the slope of the continental plateau as they drift slowly southward until they reach the bottom of the ocean with a temperature of 2.2° . The existence of a cold wall along the western edge of the Gulf Stream and cold bands within its limits, which were discovered by the early Gulf Stream explorations and which have since been denied and reaffirmed, can hardly be considered as permanent features; similar bands are often noticed in thin superficial currents and are the consequence of underlying cold water being forced to the surface either by lateral pressure or by the sinking of the warm water by reason of evaporation or loss of heat.

That part of the South Equatorial Current which turns to the southward off Cape San Roque, called the Brazilian Current, is quite weak, having a velocity less than 20 miles per day; off the Falkland Islands it is joined by the Cape Horn Current which comes from the southern Pacific and crosses the south Atlantic. When off Cape of Good Hope this "Westwind drift" turns to the northward and as a cold current, the Benzucla Current, flows along the west coast of Africa with a velocity of 12 to 20 miles per day. Off the mouth of the Kongo it turns to the westward and joins the South Equatorial.

The currents of the Pacific are similar to those of the Atlantic. The North Equatorial has its origin near the Revillagigedo Islands off the coast of Mexico, in long. 110° , flows between lats. 10° N. and 20° N. in a westerly direction across the entire width of the ocean to the Philippines, about 7,500 miles, with a velocity of 12 to 18 miles per day. The South Equatorial extends from lat. 15° S. to the equator and has its greatest velocity near its northern edge. It has a mean velocity of 24 miles per day, but this is often more than doubled in the eastern part. In the neighborhood of the Fiji Islands it divides, one part, the northern, known as the Rossel Current, passing

through the various passages among the Polynesian Islands toward Torres Strait and the north coast of New Guinea; the southern branch called the Australian Current, trends toward the east coast of Australia with a velocity of 24 miles, but gradually loses strength and is deflected toward the southeast. The Equatorial Counter-Current, setting toward the east, commences at Mindanao in the Philippines and extends to the Bay of Panama and is especially strong during the period from June to October. The Japan Current, or Kuroshiwo, is a continuation of the North Equatorial and is the Gulf Stream of the Pacific. Starting from the east coast of Luzon, it passes the east coast of Formosa; changing its course to the northeast, it makes for the southwestern point of Japan. Off this point the current divides; the major portion passes through Van Diemen Strait and the passages between the Linschoten Islands, and runs parallel to the south shores of the Japanese Islands, attaining its greatest velocity of 48 to 72 miles per day. It leaves the coast of Japan after having reached Cape Maboye, to the eastward of Yokohama, and turns to the northeast, like the Gulf Stream off Cape Hatteras, without, however, reaching beyond the latitude of 40° N. One branch of the Kuroshiwo parts from the main stream before Van Diemen Strait has been reached, enters the Japan Sea through the Korea Channel and follows the west coast of Japan to La Perouse Strait, through which it passes into the Okhotsk Sea and flowing along the west shores of the Kurile Islands it can be traced to the west shore of Kamchatka Peninsula. The strength of the Kuroshiwo is greatly influenced by the winds of the western Pacific; during the summer months, between the middle of May and the beginning of October, the southwest monsoon blows on the coast of China to lat. 20° N., and is followed during the winter by the northeast monsoon which retards the stream, hence it has its greatest strength in August and its least in March when it is hardly recognized as a warm stream. It is an open question whether a branch of the Kuroshiwo enters the Bering Sea. The currents here are so feeble and so much influenced by the winds and tides that their record does not convey any definite information; but from the fact that the southwestern, or deeper, part of this sea is always free of ice while the northeastern, or shoaler, part during the winter months is covered with an impenetrable mass of ice we may safely conclude that warm water from the Pacific enters the sea, if not as an active current, at least as a powerful drift. In confirmation of this supposition we find in the deeper parts of the sea during August a mean surface temperature of 7.4° , at the depth of 100 fathoms a minimum of 2.9° , at 200 fathoms a maximum of 3.4° , and at 1,000 fathoms 1.9° , with salinity increasing regularly from surface to bottom. The breaking up of the ice for some distance northward of Bering Strait indicates that a portion of the current passes through the strait. In long. 150° W. the Kuroshiwo can no longer be considered a warm current; it thence gradually assumed a more southerly direction and passes the coast of California as a cold current, the California Current, and finally merges into the North Equatorial in about long. 130° W. The east Australian Current, corresponding to the

Brazilian of the Atlantic, is regarded as a warm current; it has a width of 40 miles, with its inner edge about 20 miles off shore, and shows velocities of from 12 to 72 miles. South of Tasmania and New Zealand we find the same westerly winds and easterly drift that we noticed in the south Atlantic. On reaching the South American coast a branch of this drift turns to the northward past the coast of Chile and Peru and joins the South Equatorial southward of the Galapagos Islands. This current has a velocity of only 15 miles and is generally supposed to produce the comparatively low temperatures prevailing along the west coast of South America, but these are more correctly attributable to the cold water which rises from the bottom to the surface near the coast. There are no Arctic currents in the Pacific on the grand scale of the Labrador, no icebergs and the ice in Bering Sea is not very compact. In fact the trips over the ice by the natives of both Asia and America in the depth of winter to visit their kinsfolk on Diomed Island, in the middle of Bering Strait, are considered hazardous ventures. The ice in winter extends from Bristol Bay to some miles to the northward of Saint Paul Island, thence northwest to Cape Navarin; in the summer months, August, September and early October, the Arctic pack ice extends from Icy Cape on the coast of Alaska to Herald Island. Floating ice is found as far south as 35 miles to the southward of the Pribilof Islands and to about 60° lat., off the coast of Kamchatka. Along this coast there is a cold current in spring and early summer; this is reinforced by cold water which by strong tidal currents may reach the eastern shores of the Kurile Islands through Amphitrite and other straits from Okhotsk Sea. This cold current, the Kurile Current, carries quantities of Arctic ice and is noted for its low temperatures from surface to bottom. It follows the east coast of Japan as far as Van Diemen Strait, is interposed between the shore and the Kuroshio and is known as Oya Siwo (green water).

The Indian Ocean shows different conditions from those of the other two great oceans for the reason that its northern limit is within the torrid zone. During the summer months the southeast trade winds pass the equator and are changed into southwest winds or southwest monsoon. During the rest of the year from October to April, the northeast monsoon, which corresponds to the northeast trade winds of the other oceans, blows over the northern part of the ocean. During this period the currents north of the equator have a northwesterly direction, attaining especially great velocities off Ceylon (80 miles) and the east coast of Africa. During the southwest monsoon the water north of the equator moves in the opposite direction, from west to east toward Sumatra, and again attains its greatest velocity off Ceylon. In the Southern hemisphere between the latitudes of 7° and 20° S. the Equatorial Current flows to the west during the whole year with velocities of between 12 and 36 miles, sometimes as much as 60 miles. Off the east coast of Madagascar the current divides into a northern and southern branch. A part of the northern branch turns to the northwest, reaching the Bay of Zanzibar during the southwest monsoon and turning into the Equatorial Coun-

ter-Current during northeast monsoon. The other part rounds the northern Cape of Madagascar with velocities of 18 to 48 miles and enters the Mozambique Channel as the Mozambique Current. During the northeast monsoon the Equatorial Counter-Current is found between the equator and lat. 7° S. with velocities of from 12 to 18 miles. Its function is to restore the equilibrium by carrying back part of the waters removed by the Equatorial Currents from the eastern part of the ocean. During the southwest monsoon the eastern flow extends over the whole ocean north of lat. 5° S., with velocities of more than 48 miles at the equator. The Agulhas Current is a continuation of the Mozambique Current; it has a velocity of 46 to 51 miles and off Cape of Good Hope meets the cold water from the vicinity of Cape Horn. The collision of the two currents produces streaks of alternate warm and cold water, differing 8° or more in temperature, a feature which has attracted the attention of many navigators.

The most noticeable feature of the currents in the Arctic Ocean is the almost universal eastward and southeastward set north of the American continent and the generally westward set north of Siberia, although at a considerable distance from the mainland. Both currents seem to originate north of Bering Strait and the fact that they set out from this locality in nearly opposite directions has suggested the existence of a large island or continent between the Pole and Bering Strait.

In the Antarctic regions, or rather those to the southward of Tasmania, Cape Horn and the Cape of Good Hope, the drift is generally from west to east, in conformity with the prevailing westerly winds.

In conclusion it may be of interest to notice one or two currents which in a strict sense may not be considered ocean currents but which may explain the function of difference of density in the production of currents. In the Mediterranean we have noticed a higher density in consequence of evaporation than is possessed by the adjoining ocean. In consequence of this difference there is a surface inflow of ocean water with a velocity of 48 to 72 miles and an undercurrent of the denser water into the ocean. On the other hand the density of the Baltic is less than that of the adjoining North Sea, hence we have a surface current from the Baltic into the North Sea and an undercurrent in the opposite direction.

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OCEAN DISASTERS. See DISASTERS OF THE WORLD, NOTABLE.

OCEAN GROVE, N. J., town in Monmouth County, on the Atlantic Ocean and on the Central of New Jersey and the Pennsylvania railroads, 54 miles south of New York. It is a famous summer resort on account of its fine beach and the ease of access from New York, Philadelphia and other cities. It adjoins Asbury Park (q.v.); Wesley Lake is on the boundary. The Ocean Grove Camp Meeting Association of the Methodist Episcopal Church controls the town and regulates its laws. The sale of intoxicants and tobacco and theatrical performances are prohibited. The Sunday laws are strict and rigidly enforced. The prominent buildings are the Auditorium, which seats 10,000 persons, cost \$75,000 and was dedicated 9 Aug. 1894; the public school building and the post office. Religious meetings are held in the Auditorium. The school building, called the Neptune Township High School, cost \$72,000. The Association owns and operates the electric-light plant and the waterworks. The Association was organized in 1869; but the first permanent building, a wooden frame covered with green boughs, was not erected until 1875. In 1874 a stand for the speakers had been erected and the audiences sat on temporary seats made by placing planks on trestles. There are several large hotels and boarding-houses and many summer cottages. In the summer months the population varies from 20,000 to 30,000. The winter population is about 3,000.

OCEANA, ō-shē-ā'na, or **ENGLAND AND HER COLONIES**, a work of travel by James Anthony Froude, published in 1886. This is the record of a journey made by the author via Cape Town to Australia and New Zealand and home by way of Samoa, the Sandwich Islands, San Francisco, Salt Lake, Chicago and New York, in 1884-85.

OCEANIC DEPOSITS. See OCEAN; OOZE; section on *Oceans* in article on GEOLOGY; and section on *Sedimentary Rocks* in article on ROCKS.

OCEANIC LIFE. See BENTHOS; DEEP SEA LIFE; DEEP SEA EXPLORATION; FISHES, GEOGRAPHICAL DISTRIBUTION OF; GLOBIGERINA; OOZE; PLANKTON; SEaweeds; ZOOGEOGRAPHY, etc.

OCEANICA, ō-shē-ān'i-ka, **OCEANA,** or **OCEANIA**, the name given to the land division of the world which is composed of islands in the Pacific Ocean. The limits of Oceanica are not well defined; some geographers include in this division all the oceanic islands in the Pacific, others include the East Indian Archipelago. A subdivision of Oceanica adopted by many is into Western Oceanica or Malaysia,

corresponding with what is better known by the name of the Malay Indian or East Indian Archipelago, Micronesia or Northern Oceanica, Polynesia or Eastern Oceanica, and Melanesia or Southern Oceanica. The islands and peoples of Oceanica will be found described under their respective titles.

OCEANIDS, in Greek mythology, a class of nymphs, daughters of Oceanus and Tethys. They were 3,000 in number and were said to have an equal number of brothers. See MYTHOLOGY.

OCEANOGRAPHY. Oceanography is the science which treats of the physics and biology of the ocean, including the extent and conformation of the basins, the deposits which cover the bed, the depth, physical and chemical properties, motions and circulation of its waters, and the nature and distribution of marine organisms.

As a result of the marine hydrographic coast surveys of the various maritime countries, undertaken in the interests of navigation, the coast-line of the world is now among its best-known geographical features, and hence, since geodesists have determined the size of the terrestrial spheroid, the area of the oceanic surface of the globe is known with closeness to 140,000,000 square statute miles, which is an expanse exceeding the total area of the lands of the globe by 83,000,000 square statute miles. In other words, 71 per cent of the surface of the globe is covered by the waters of the ocean. Although the depth of the ocean has been measured in many thousand places throughout the world since the middle of the 19th century when deep-sea soundings first began to be successfully made, yet there are oceanic areas as large as the United States where no soundings have been made, and many others where the present soundings are but widely spaced. The contours of the oceanic basins cannot, therefore, be completely drawn at present and the volume of the ocean may only be stated by estimation to be 324,000,000 cubic statute miles; or 14 times the bulk of all the lands in the world above sea-level. The accepted measurements of the areas within the different zones of depth are given in the following table:

DEPTH IN FATHOMS	Estimated area in square statute miles	Percentage of total ocean floor
Between 0 and 1000....	22,000,000	16
" 1000 " 2000....	27,000,000	19
" 2000 " 3000....	81,000,000	58
" 3000 " 4000....	9,800,000	7
" 4000 " 5000....	195,000	Less than 1
Exceeding 5000....	5,000	

The mean depth of the ocean is 2,080 fathoms and the greatest depth, which is found east of the island of Mindanao, is 5,348 fathoms.

In their general extent and position, it is likely that ocean basins have been permanent since the waters were gathered together. The study of deep-sea observations does not support the view that, by alternate rising and sinking of the earth's crust, oceans and continents have successively occupied the same areas.

Traces of all known chemical elements have been found in the waters of the ocean and if there are any that are unknown traces of them will be found there. Although the total amount of salts contained in sea water varies in different parts of the ocean, the existing proportions

set forth in the following table, according to Dittmar's analysis, are practically the same in all parts and at all depths of the open ocean:

	Parts per thousand
Sodium chloride.....	27.213
Magnesium chloride.....	3.807
Magnesium sulphate.....	1.658
Calcium sulphate.....	1.260
Potassium sulphate.....	0.863
Calcium carbonate.....	0.123
Magnesium bromide.....	0.076

The dissolved substances are present mainly as ions. Of the elements in solution, sodium and chlorine seem to be the only ones that are not withdrawn by organisms and organic processes, and they may therefore have been uniformly on the increase since the beginning of geological time. This conclusion has been made use of in the calculations which have assigned 100,000,000 years as the age of the ocean.

The average value of the salinity of the surface waters of the ocean is 35 parts in a thousand parts of water. The factors affecting its variation are evaporation, dilution and the action of winds. In the Red Sea, where the rate of evaporation is high and the rainfall small, the salinity rises to 39, while, under the opposite conditions of the China Sea, it falls to 34. In the borders of the frigid zones, as well as in the doldrums of the tropics, the salinity is reduced and in the trade-wind regions increased. In general, there is a small decrease of salinity with increasing depth in the open ocean down to about 1,000 fathoms and below that a tendency to increase is observable.

The gases of the atmosphere are everywhere contained in sea water, but the proportions in which they are present are different in the atmosphere and the ocean, because of the varying capacity of water to dissolve them. Dry air contains about 21 per cent of oxygen, but air extracted from sea water contains about 34 per cent. The gas content of sea water is chiefly made up of nitrogen and oxygen, together with small quantities of free carbonic acid and traces of argon and neon.

While the nitrogen suffers little or no diminution, the oxygen is continually being used up by the processes of marine organisms, so that, if it were not being constantly dissolved at the surface and distributed by the general circulation, the proportion of oxygen in the depths would be reduced below the amount necessary to support the animal life which now abounds there. The rate of solubility varies with the temperature in such a manner that more gas is absorbed at low than at high temperature. Since the rate of solubility is greater at low than at high temperatures, the polar waters are found to contain as high as 24 parts of oxygen and nitrogen per thousand parts of water while tropical waters contain as low as 12 parts.

It is in respect of temperature that the ocean exhibits many of its most significant characteristics. Over 80 per cent of its bulk remains at a temperature below 40° F. More than 90 per cent of the sea-floor is thus covered, including all these vast regions, in depths greater than 2,000 fathoms, where the temperature is uniformly found to be within the range of a few degrees above the freezing point of fresh water. Salt water freezes at a lower

temperature than fresh water; sea-water with a salinity of 35 per thousand freezes at 28° F. and it is not uncommon to find temperatures but little above this in the waters of the polar seas. About 16 per cent of the entire ocean surface has a temperature below 40° F. In the surface waters of lower latitudes there is a progressive rise in temperature, reaching the average of 80° at the equator; but the position of the isothermal lines is much modified by prevailing winds, by the situation of land-masses and by distribution of areas of barometric maxima and minima. The warmer surface waters occupy only a comparatively small depth even in the tropics. The following table gives the mean temperatures for the whole ocean, as calculated from all observations in all latitudes at the specified depths:

DEPTH IN FATHOMS	Mean Fahrenheit temperature	DEPTH IN FATHOMS	Mean Fahrenheit temperature
100.....	60.7°	900.....	36.8°
200.....	50.1	1,000.....	36.5
300.....	44.7	1,100.....	36.1
400.....	41.8	1,200.....	35.8
500.....	40.1	1,300.....	35.6
600.....	39.0	1,400.....	35.4
700.....	38.1	1,500.....	35.3
800.....	37.3	2,200.....	35.2

While the mean daily variation of temperature in the surface waters of the open ocean is probably less than 1° F., the range from season to season may amount to 50° F. in those regions, like the oceanic areas around Japan, Newfoundland and the Cape of Good Hope, where the surface is occupied successively by waters of polar and of equatorial origin; but, on the other hand, there are very extensive regions both in the tropical and polar waters where the range does not exceed a few degrees during the course of the year. With descent into the depths, the seasonal changes in temperature tend rapidly to diminish.

The variation of the density of sea-water according to salinity and temperature is a prime factor in oceanic circulation. The mean density at successive depths is given in the following table:

DEPTH IN FATHOMS	Density	DEPTH IN FATHOMS	Density
Surface.....	1.0252	400.....	1.0273
100.....	1.0261	800.....	1.0276
200.....	1.0268	1,500.....	1.0279
300.....	1.0271	2,000.....	1.0280

The observed increases of density with increasing depth is chiefly attributable, down to 1,000 fathoms, to decrease of temperature but below that depth the continued rise in density

DEPTH	Pressure per square inch		
	Atmospheres	Pounds	Tons
33 feet.....	1	15	.....
66 ".....	2	30	.....
99 ".....	3	45	.....
100 fathoms.....	18	270	.....
500 ".....	90	1,350	.....
1,000 ".....	180	2,700	1.2
2,000 ".....	360	5,400	2.4
3,000 ".....	540	8,100	3.6
4,000 ".....	720	10,800	4.8
5,000 ".....	900	13,500	6.0
5,348 ".....	960	14,400	6.4

is due to a small increase of salinity which prevails in the greater depths of the ocean augmented by the compression to which the deep waters are subject under the weight of the

superincumbent mass since water is compressible by about one-twenty-thousandth of its bulk under the pressure of one atmosphere. Leaving out of account the pressure of the atmosphere upon the surface, for the pressure at successive depths in the ocean see the last table on preceding page.

The blue color of the ocean is owing to the selective absorption of light by sea-water, in which the blue rays are 10 times less absorbed than the red rays. There is light entering into the lesser depths of the ocean, but it is different from the familiar light of day on account of its deficiency in the rays from the red end of the solar spectrum. Recent observations conducted with photographic plates showed that, on a sunny day in the Sargasso Sea, there was sufficient light at a depth of 550 fathoms to affect a sensitive film after an exposure of 80

ing currents rise from the depths. These massive movements are in striking contrast with the rate of motion of the surface currents impelled, for the main part, in a clockwise circuit in each of the oceans of the northern hemisphere and in an anticlockwise circuit in each of the oceans of the Southern hemisphere, in general accord with the circuit of the prevailing winds, which, in their direct and indirect effects, taken in conjunction with the configuration of the continents, constitute the prime agency in originating and maintaining the circulation of the ocean.

The deposits which cover the bed of the ocean have been classified by Murray, according to their origin, into two grand divisions: terrigenous and pelagic. In the accompanying table these deposits are described and further subdivided into classes:

MARINE DEPOSITS

Littoral deposits between high and low-water marks.	{ Boulders, shingle, gravels, sands, muds, etc., derived from adjacent land.	
Shallow-water deposits, between low-water mark and 100 fathoms.	{ Sands, gravels, muds, marls, derived from adjacent land, shores, and shallow waters.	{ Terrigenous deposits formed in deep and shallow water close to land masses, from materials carried down from the land surfaces or torn away from the coast together with the remains of organisms which live on the bottom in shallow waters.
	{ Blue mud Red mud Green mud Volcanic mud Coral mud	
Deep-sea deposits beyond 100 fathoms.	{ Globigerina ooze Pteropod ooze Diatom ooze Radiolarian ooze Red clay	{ Pelagic deposits formed in deep water far removed from land, largely from the remains of calcareous and siliceous organisms which have lived in the surface waters and have fallen to the bottom after death.

minutes. Another plate was exposed for two hours at a depth of 900 fathoms without showing any effect. By employing filters for rays of different color, it was shown that, at a depth of 275 fathoms, many blue rays were present but scarcely any red ones, while at a depth of 55 fathoms all the component rays of sunlight were present, although there were fewer of the red than the others. The extent of the vegetable kingdom in the ocean is confined to this region of light-penetration or photic zone which must vary in its depth according to the zenith distance of the luminary and the nature of the materials held in suspension and solution in the water. The mantle of living matter which clothes the globe wherever water, air and earth commingle, while extending only a short depth into the crust of the earth and a short height into the atmosphere, extends throughout the whole depth of the ocean; but below the photic zone all of the numerous forms of living things which abound belong to the animal kingdom.

It has been pointed out that there exist in the ocean systematically varying distributions of salinity and of temperature, giving rise to a systematic distribution of the density or heaviness of the waters. This is one of the basic factors in oceanic circulation, causing a systematic descent from the surface of the heavier waters which characterize the polar borders of the temperate zones and a slow movement thence of the deeper waters, entirely distinct from the oscillations of the mass of the ocean set up by seiches and tides, both toward the equator and toward the poles, where ascend-

As yet knowledge is scanty in relation to the rate of deposition and the depth of marine deposits, since, in the operation of deep-sea sounding, the bottom soil has not usually been penetrated more than a few inches. It is very doubtful whether any analogues to the terrestrial rocks are to be found in connection with the pelagic deposits, from which there is a significant absence of quartz.

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OCEANUS, ō-sē'a-nūs, in Greek mythology, the oldest of the Titans, and a personification of the sea. He was called the son of Gæa (the earth) and of Uranus (heaven). Oceanus and Tethys were the parents of rivers and of the race of goddesses called Oceanids (q.v.). According to another account he was the father of all gods and men. The physical idea attached by the Greeks to the term Oceanus was that the earth was a flat circle surrounded by a river (Oceanus), out of which the sun and stars were supposed to rise and set, and on whose banks were the abodes of the dead. The term ocean was thus applied especially to the Atlantic, or sea beyond the Pillars of Hercules, in contradistinction to the Mediterranean or internal sea.

OCELLUS, a structure found in various groups of invertebrate animals, consisting of a spot of pigment enclosed in a capsule or cavity, generally supplied with nerve-filaments, and to which the function of sight is attributed. See EYE.

OCCELLUS LUCANUS, ō-sĕl'ŭs lŭ-kā'nŭs, a Pythagorean philosopher: b. Lucania, Italy, 5th century B.C. His works are 'On Law'; 'On Kingly Rule and Piety' and 'On the Nature of the Whole,' the last of which is the only one of his treatises now extant, excepting some fragments found in Stobæus, written in Doric. 'On the Nature of the Whole' is in Ionic, which fact leads some critics to doubt its authenticity. It is divided into four chapters, in which the author maintains that the whole, that is, Nature, the Universe, has no beginning nor end, and that men have always existed. He treats of the divisions of the universe, the heavens, the earth, the human race and the nature of time. Consult Mullach, 'Fragmenta Philosophorum Græcorum' (1860); Taylor, 'Ocellus Lucanus,' translated into English (1831).

OCELOT, ō'sĕ-lŏt, a tropical American wild-cat (*Felis pardalis*), averaging about two and one-half or three feet in length exclusive of the tail, and about 18 or 20 inches tall. Its body color is a variable and handsome fawn or grayish-brown, marked with lines of blackish ring-spots. The muzzle is somewhat long. The ocelot ranges northward as far as Louisiana, and is found in forests, where it preys largely upon birds. It is commonly seen in menageries, and in Mexico is often found in a semi-domesticated condition about farmhouses. It can climb trees with ease.

OCHAKOF, ō-chā'kŏf, or **OTCHAKOFF**, Russia, a town in the government of Cherson, on the Black Sea, at the mouth of the Dnieper, formerly an important Turkish fortress, with a citadel, the walls of which were 25 feet high. In 1737 it was stormed by the Russians, who lost 18,000 men in the attack. The Turks attempted to recover it with a force of 70,000 men, but were repulsed with the loss of 20,000. In 1738 it was given up by the Russians, who had previously destroyed the works. The Turks fortified it anew in 1743, and held it until 1788, when, after a siege of six months, it was stormed by Suvaroff, who razed it to the ground. By the peace of 1792 it was ceded to Russia. It has modern fortifications, and some coasting trade. Pop. 16,250.

ÖCHELHÄUSER-YUNKERS ENGINE. See INTERNAL COMBUSTION ENGINE.

OCHIL HILLS, Scotland, a mountain range on the borders of Perth, Clackmannan, Kinross and Fifeshire; average breadth, about 12 miles; highest summit, Bencluch, in the southwest, about 2,300 feet above sea-level. The Ochils are of basalt and greenstone, and contain copper and iron ores.

OCHINO, ō-kĕ'nō, **Bernardino**, Italian theologian and reformer: b. Siena, 1487; d. Schläkau, Moravia, 1564. He entered the Order of Observantine Friars, the sternest of the Franciscan orders, and in 1534 he had himself transferred to the still more strict Order of Capuchins, of which he was elected vicar-general in 1538 and in 1541. He evidenced leanings toward the Reformation as early as 1539, being convinced that salvation was not to be attained by ecclesiastical meditations, fasting and prayer. His sermons plainly indicated the change in his beliefs, but no movement was made against him until 1542, when the Inquisition was set up in

Rome, and Ochino was cited to appear. Realizing that either death or imprisonment was in store for him he decided upon flight and made his way to Geneva, where he joined Calvin. Here, within two years, he published six volumes of sermons explaining the change in his views upon religion. He was minister in charge of the Italian Protestant congregation at Augsburg in 1545-47, but was compelled to flee before the occupation of the city by the imperialist forces, and made his escape to England. There he became a prebendary of Canterbury, and received a pension from Edward VI. During this time he wrote 'A Tragedy or Dialogue of the Unjust usurped Primacy of the Bishop of Rome' (1549), a work of remarkable power, written originally in Latin, but translated into English by John Ponet, bishop of Winchester. The Latin version is lost, but the translation shows so striking a resemblance to Milton's 'Paradise Lost' that it is considered by many to be the inspiration of that work. The accession of Queen Mary in 1553 deprived him of his haven in England and he went to Zürich, where he became pastor of an Italian Protestant congregation. Here he was accused of favoring polygamy and doctrines derogatory to the Trinity, and neither his denial nor the record of his life served to secure him from banishment. He then went to Poland, but an edict against foreign heretics in 1564 forced him again to find a refuge. He settled in Moravia, and died soon afterward. He was bitterly criticized by the Protestants at the time of his death, but it has since been demonstrated that many of his doctrines were misrepresented and many forgeries foisted upon him. He expounded his faith in free will as against predestination in his 'Labyrinth' (c. 1562). His 'Thirty Dialogues' (1563) were misunderstood and deepened the troubles of his last years. Consult Benrath, B. O., 'B. Ochino von Siena' (1875; 2d ed., 1892; Eng. trans. by H. Zimmern, 1876).

OCHLOCKNEE, ōk-lŏk'nĕ', or **OCK-LOCKNEE**, or **OCKLOCKONEE**, a river of southeastern United States, about 150 miles in length, rising in Worth County, Ga., passing into Florida, between Leon and Gadsden counties, and flowing into the Gulf of Mexico through Apalachee Bay. It is too shallow for navigation, but is useful for rafting timber from the neighboring pine forests. Its banks also furnish a clay used in brick-making.

OCHRE, ō'kĕr, or **OCHER** (Greek, "yellow," "yellowish green," "pale"), friable clay with an admixture of iron oxides, giving it a color varying from yellow to red, as the iron peroxide is hydrate (yellow) or anhydrate (red). The reddish color may be deepened artificially by burning. Rarely manganese takes the place of iron in the composition of ochre, or occurs in addition to iron, the brownish variety thus formed being called "Sienna" (from its famous source in Italy) or "umber" (Latin, *umbra*, "shade"). Ochre is used largely in the production of paints. The coloring of these two shades again is deepened by their being burnt. UMBER and sienna are largely found, outside of Italy, in New York, Pennsylvania, Missouri and Tennessee; and the leading States in the production of ochre are Pennsylvania, Georgia, California and Vermont. But the United States

produces less ochre and iron oxide pigments than France or Germany. Until recently the home product was inferior to the foreign, being only 50 per cent pure, a fault now remedied by specially designed crucible furnaces, which ensure the purity of the increased output. The best yellow ochre is that coming from Oxford, England. See LIMONITE; HEMATITE.

OCHRO, same as Okra (q.v.).

OCHS, öks, **Adolph S.**, American publisher: b. Cincinnati, Ohio, 12 March 1858. His early life was that of a country lad, and he obtained a common school education at Knoxville, Tenn., where for a year he served as carrier and newsboy. In 1871 he was grocer's clerk at Providence, R. I., attending a night school meanwhile. He then returned to Knoxville, where he was a druggist's apprentice for a year. Later he learned the printing trade, and in 1876 he became assistant to the foreman in the composing room of the *Knoxville Tribune*. In 1877 he joined the staff of the *Chattanooga Dispatch* and became its editor-in-chief. In 1878 he acquired a half interest in the *Chattanooga Times*, which he developed into a leading newspaper of that State. Incidentally, he established *The Tradesman*, which is familiar to Southern business men, in which periodical he still owns a large interest. He also established the *Southern Associated Press* and became its president. In 1896 Mr. Ochs became publisher and controlling owner in the *New York Times*. In 1901 he purchased the *Philadelphia Times*, which was managed by his brother, George Washington Ochs. The next year he paid more than \$2,500,000 for the *Philadelphia Public Ledger*, and the two papers were consolidated. Just, considerate, resourceful, enlightened of view, undaunted by difficulties and unspoiled by success, preferring always the straight and open way to the path of indirection, as mindful of public responsibility as private duty, loyal to principle even at the cost of present advantage, one of the best and highest examples of the commercial publisher, Mr. Ochs is a recognized force of international importance.

OCHS, George Washington, American journalist, brother of Adolph S. Ochs (q.v.): b. Cincinnati, 27 Oct. 1861. He was graduated at the University of Tennessee in 1879. He was mayor of Chattanooga, Tenn., in 1894-95 and in 1896-97. He published the Paris edition of the *New York Times* at the Paris Exposition in 1900; and in 1901-02 he was general manager of the *Philadelphia Times*. He was editor of the *Philadelphia Ledger* in 1902-15, since when he has edited the *Current History Magazine* and the *New York Times' Mid-Week Pictorial*. He is a Chevalier of the French Legion of Honor.

OCHSNER, öks'nēr, **Albert John**, American surgeon: b. Baraboo, Wis., 3 April 1858. He was graduated from the University of Wisconsin in 1884, took his M.D. at the Rush Medical College, Chicago, in 1886, and later studied medicine at Vienna and Berlin. He has been engaged in practice at Chicago since 1889 and has served as chief surgeon of Augustana and Saint Mary's hospitals since 1896. He has been professor of clinical surgery at the College of Physicians and Surgeons, Chicago, since 1900, and in 1908 was appointed first lieu-

tenant in the United States Army Medical Reserve Corps, becoming major in 1916. Author of 'Handbook on Appendicitis' (2d ed., 1906); 'Clinical Surgery for the Instruction of Practitioners and Students' (2d ed., 1905); 'Organization, Management and Construction of Hospitals' (1907); 'Year Book of Surgery' (1917-18); 'Treatise on Surgical Diagnosis and Treatment' (1918), etc.

UCHTERLONY, ök-tēr-lō'nī, **Str David**, British general and administrator: b. Boston, Mass., 12 Feb. 1758; d. Meerut, near Delhi, 15 July 1825. He went to India as a cadet in the Bengal army of the East India Company in 1777, was appointed resident at Delhi in 1803, was promoted major-general in 1804 and in that year successfully defended Delhi against Holkar. He prevented the advance of the Sikhs in 1808. He conquered Nepal in the War of 1814-15, received a baronetcy for his service and in 1816 concluded the final peace treaties of the British with Nepal. He brought the Pindari War of 1817-18 to a successful termination with little bloodshed, and in 1818 was appointed British resident in Rajputana and afterward became British resident of Central India, performing excellent service in pacifying and building up the country. In 1825 he supported Balwant Singh, the infant Rajah of Bharatpur, against the insurrection headed by his cousin, Durjan Sal, but his action was disapproved by the governor-general, Lord Amherst, and he was ordered to withdraw his support. Ochterlony promptly resigned and died soon afterward. His successor, Metcalfe, supported his policy and forced Lord Amherst to yield, although the delayed action necessitated the employment of 20,000 men for the work Ochterlony had well in hand without outside assistance.

OCHTMAN, ökt'man, **Leonard**, artist: b. Zonnemaire, Zeeland, Holland, 21 Oct. 1854. He settled in Albany with his family in 1866 and became a draughtsman in an engraving office; had a studio at Albany for two years and subsequently took a winter course at the Art Students' League, New York. As a landscape painter he is self-taught, but traveled through England, France and Holland for the purpose of study. His power and skill are shown in such paintings as 'Night on the Mianus River'; 'Autumn Moonlight'; 'Moonlight Night in Spring'; 'A Morning Symphony.' Vivid color, depth of imagination and breadth of treatment characterize his paintings whose truthfulness reveals a genuine love of nature in their author. He is a member and official of the leading art societies and has been the recipient of numerous silver and gold medals and other awards and honors.

OCIMUM, a genus of plants. See BASIL.

OCKERSON, ök'ēr-sōn, **John Augustus**, American civil engineer: b. Skane, Sweden, 4 March 1848. He came to the United States in 1851 and was graduated from the University of Illinois in 1873. He served in the Union army in the Civil War; in 1871-79 assisted in the survey of the Great Lakes, and in 1876 was United States assistant engineer at Eads Junction. He was engaged in the survey of the Mississippi River in 1879-87. He was employed as a mining engineer in 1888-98, and since 1898

has been a member of the Mississippi River Commission. He was consulting engineer of the chief department of Liberal Arts at the Saint Louis Exposition in 1904, and a member of the International Jury of Awards at the Paris Exposition in 1900. He was a delegate to the International Congress of Navigation in 1900, 1905, 1908 and 1912, and to the Congress of the Merchant Marine at Paris. He has been decorated by the governments of France, Italy, Sweden, Germany, Belgium and China and is a contributor to scientific journals on topographical and engineering subjects.

OCMULGEE, òk-mŭl'gē, a river in Georgia which rises north of the central part of the State, flows south, southwest and east, uniting with the Oconee to form the Altamaha. It passes through an agricultural region; its length is about 260 miles. The upper course has many rapids and small cascades, and the lower course is through a more flat country, covered with pine forests. It is navigable for small steamers for about half its distance from the mouth to Macon.

OCONEE, ò-kō'nē, a river in Georgia which rises in Hall County, flows southeast and unites with the Ocmulgee to form the Altamaha. It is navigable for about 100 miles from its mouth.

O'CONNELL, ò-kōn'ēl, Daniel, Irish patriot: b. Cahir, County Kerry, Ireland, 6 Aug. 1775; d. Genoa, Italy, 15 May 1847. He studied in France at the colleges of Saint Omer and Douay, and in 1793, on his return home, began the study of law. In 1798 he was admitted to the bar, and soon began to distinguish himself both by legal skill and oratory. After a speech made at Dublin in the beginning of 1800, at a meeting held to petition against the union, he was regarded as one of the most promising and energetic of the younger Catholic leaders. The question of Catholic emancipation being seriously agitated, he was active in every attempt to remove the national grievances, and he was a tireless member of the various Catholic societies and unions formed for the purpose of procuring the repeal of the laws placing civil disabilities on Catholics; in 1824 he founded the "Catholic Association" which carried on active agitation in spite of government measures against it and succeeded in creating a general sentiment in favor of Catholic emancipation. The chief grievance was that Catholics could not sit in Parliament without taking an oath contrary to conscience. In 1828 O'Connell took a decisive step by becoming candidate for Parliament in the county of Clare. He was elected but could not take his seat because he refused to take the preliminary oath. His election, however, was a fact that could not be ignored, and as the feeling in favor of emancipation continually increased, the ministry with the Duke of Wellington at its head decided they must concede it. In 1829 therefore the Catholic Emancipation Bill was passed, and under its provisions O'Connell took his seat, and became the leader of the Irish party in the House of Commons where he continued to represent Clare until his death. While carrying on this agitation, he was for many years the annual recipient of a large sum contributed by his Catholic countrymen who idolized him as their liberator. In 1842

he began the agitation for the repeal of the union between Great Britain and Ireland, and the disestablishment of the Anglican church, holding monster meetings at which he was the chief speaker. In 1843, arrested on a charge of conspiracy and sedition, he was convicted and sentenced to fine and imprisonment; but the House of Lords reversed the judgment on 4 Sept. 1844. He then resumed his seat in Parliament, but his influence was lessening as a new Irish party had risen—called Young Ireland—which advocated more radical measures, and did not favor O'Connell's "moral force" policy. In 1846 he supported the Whig ministry which still further alienated him from the younger party. His health was failing, and in 1847 he went to Italy, intending to visit Rome, but he died at Genoa.

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O'CONNELL, William Henry, American cardinal: b. Lowell, Mass., 8 Dec. 1859. He was graduated from Boston College A.B. 1881, and studied theology at the North American College, Rome, Italy, 1881-84. He was ordained priest at Rome, 8 June 1884 and was appointed rector of the North American College, 21 Nov. 1895. He was named a domestic prelate in 1897, and on 22 April 1901 was appointed bishop of Portland, Me. He was consecrated at Saint John Lateran, Rome, 19 May 1901, and returning to the United States he at once entered upon the duties of his diocese, having been installed in the cathedral at Portland, Me. He was honored with the title of assistant at the Pontifical Throne in January 1905, and was a special papal envoy to the Emperor of Japan in 1905, at which time he was presented with the Grand Cordon of the Sacred Treasure by the Mikado of Japan. He was elevated to the archbishopric and named coadjutor to Bishop Williams of Boston, Mass., on 8 Feb. 1906, his title being archbishop of Constance, and on the death of Bishop Williams he succeeded to the see of Boston, 30 Aug. 1907. He was created cardinal by Pope Pius X, 30 Nov. 1911. By this time he was already looked upon as one of the most influential Catholics in the United States. His published works consist of sermons and addresses.

O'CONNOR, ò-kōn'ôr, Andrew, American sculptor: b. Worcester, Mass., 7 June 1874. He was from childhood the pupil of his father, to whom he owes the greater share of his education as an artist. He works in both marble and bronze and is noted for his statues and bas-reliefs. He received the second medal at the Paris Salon in 1906, the highest award ever given a foreign sculptor at that institution. Among his works may be mentioned the central porch at Saint Bartholomew's Church, New York; 11 marble statues at the Essex County courthouse, Newark, N. J.; a bas-relief in the

library of J. P. Morgan, New York; the General Liscom monument, Arlington; the General Thomas monument, Tarrytown; a bronze statue of Gen. Lew Wallace at the Capitol, Washington, and a marble statue of him at Crawfordsville, Ind.; the monument to Gen. John A. Johnson, Saint Paul; the original model of the statue of Commodore Barry at the Luxembourg Museum; and the original design of the bronze doors at Saint Bartholomew's, and a marble portrait of Edward Tuck, also in the Luxembourg Museum; a statue of Lincoln at Springfield, Ill., etc. In April 1919 Mr. O'Connor was chosen associate of the National Academy of Design.

O'CONNOR, Arthur, Irish political leader: b. Mitchelstown, County Cork, Ireland, 1763; d. near Nemours, France, 25 April 1852. He was admitted to the bar in 1788, was elected to the Irish Parliament and as a member of the United Irishmen served as one of their directory of five, in consequence of which he was tried for high treason, but finally discharged. He then became editor of *The Press*, the society organ. He went to France and on his return to Ireland was again arrested, and kept in prison until 1803 when he made his escape and entered the service of Napoleon, who made him a lieutenant-general in 1804 and later general of division. He married the daughter of Condorcet and became a French subject in 1818. He published 'Letters to Earl Camden' (1798); 'The Actual State of Great Britain' (1804); 'A Speech on the Catholic Question' (1795); 'Monopoly, the Cause of All Evil' (1848).

O'CONNOR, John, Canadian jurist: b. Boston, Mass., January 1824; d. Coburg, Ontario, 3 Nov. 1887. He removed with his parents to Canada in 1828 where he was educated, and in 1854 admitted to the bar. He sat for Essex in the Canadian Parliament 1867-72, and in the last-named year was president of the council in Sir John Macdonald's administration. Later he was Minister of Inland Revenue and Postmaster-General, and became queen's counsel in 1873. In 1878 he was reappointed president of the council and in 1880 became a second time Postmaster-General, was Secretary of State for a time, and in 1881 reassumed the office of Postmaster-General. He was a commissioner for revising the statutes of Canada and Ontario, and in 1884 was appointed judge of the High Court of Justice of Ontario.

O'CONNOR, John Joseph, American Roman Catholic bishop: b. Newark, N. J., 11 June 1855. He was educated at Seton Hall College, in the American College at Rome, at Louvain and in 1877 he was ordained to the priesthood. Professor of philosophy and theology, Seton Hall College and Seminary, 1878-95; pastor Saint Joseph's Church, Newark, 1895-1901; consecrated bishop of Newark, N. J., 25 July 1901.

O'CONNOR, Roderic, or **Rory**, king of Ireland, son of Turlough O'Connor, king of Connaught: b. 1116; d. Abbey of Cong, County Mayo, 1198. He succeeded to the throne of Connaught on the death of his father in 1156, made war against the O'Brians, O'Lochlinns and others and in 1166 was inaugurated king of all Ireland at Dublin. When Henry II

visited Ireland in 1171 after the Norman invasion Roderic did not make submission to him; but in 1175 a treaty was concluded by which Roderic was to continue to rule Connaught, and was to be head of the kings and chiefs of Ireland under the sovereignty of Henry II, whom Roderic acknowledged as his liege lord. His son Chonchobhar, allied with the English, invaded Connaught in 1186 and drove Roderic into Munster. Later he was permitted to return but was deprived of his throne. He was again king for a short time after the death of his son in 1189, but was deposed by Cathal O'Connor. He retired to a monastery, where he died. Consult Orpen, G. H., 'Ireland Under the Normans' (2 vols., 1911).

O'CONNOR, Thomas Power, Irish journalist and politician: b. Athlone, 5 Oct. 1848. Educated at Queens College, Galway, he entered journalism in Dublin, went to London in 1870 and was for a time in the London office of the *New York Herald*. He entered Parliament for Galway in 1880, and represented the Scotland division of Liverpool in 1885. He founded and edited *The Star*, 1888-90, *The Sun* and the *Weekly Sun*, and later became editor of *M. A. P.* (Mainly About People). He early became one of the most active members of the Parnell party. In 1881 he made a tour of the United States and lectured on the Irish cause to large audiences. In 1906 and again in 1917 he visited the United States on other lecture tours. In 1883 he had become president of the Irish National League of Great Britain. His works include a biography of Beaconsfield (1883); 'Gladstone's House of Commons' (1885); 'The Parnell Movement' (1886); 'Gladstone, Parnell and the Great Irish Struggle' (1886); 'Sketches in the House' (1893); 'Napoleon' (1896); 'The Phantom Millions' (1902); 'The Story of the Great French Fraud' (1902); 'Sir Henry Campbell-Bannerman' (1904); 'Some Old Love Stories'; and very many magazine and newspaper articles.

OCONOMOWOC, ò-kôn'ô-mô-wôk, Wis., city in Waukesha County, on the Chicago, Milwaukee and Saint Paul Railroad, about 33 miles west by north of Milwaukee. It is in the midst of a region of beautiful lakes, the largest of which are La Belle and Fowler, and it is noted for the good fishing in the vicinity. Fertile farm lands are in this part of the State, and the industries of the city are connected chiefly with farm and dairy products. The city owns and operates the electric-light plant and the waterworks. Pop. 3,301.

O'CONOR, ò-kôn'ôr, Charles, American lawyer and politician: b. New York, 22 Jan. 1804; d. Nantucket, Mass., 9 Feb. 1884. He studied law, was admitted to the bar at 20 and soon became one of the leading lawyers of the country; the Forrest divorce suit, the Slave Jack case (1835), the Lispenard will case (1843) and the Jumel case (1871) were the most important litigations he took part in before the great Tweed suits in which he acted for the prosecution with William M. Evarts and W. H. Peckham. O'Conor wrote 'Peculation Triumphant,' a record of the Tweed ring. A Southern sympathizer during the war, he went bail for Jefferson Davis together with Horace Greeley. In 1872 he was nominated for the Presidency

by the wing of the Democracy opposed to the nomination of Horace Greeley; he refused the nomination, but polled nearly 30,000 votes. In 1876 O'Connor acted as counsel for Samuel J. Tilden before the Electoral Commission.

O'CONNOR, John Francis Xavier, educator: b. New York City, 1 Aug. 1852. A.B. Saint Francis Xavier College, New York; English studies in London; philosophy in Louvain (three years); theology in Woodstock (four years); Oriental studies at Johns Hopkins, and Lyons of Harvard. Became member of Society of Jesus in 1872; ordained priest 1885. Professor of philosophy and rhetoric at College of Saint Francis Xavier; at Georgetown University; Fordham University; Saint Joseph's College, Philadelphia; president and founder of Brooklyn College; founder of Brooklyn Alumni Sodality; Saint Joseph's Alumni Sodality of Philadelphia; Alumni Association of Saint Ignatius School. Preacher; lecturer on Christian art; on Greek art; on the Wagner operas. Lecturer on cuneiform inscriptions before any schools on it were established in United States. Author of 'Babylonian Inscriptions'; and translator of first Babylonian inscriptions published in English in America. Member of Oriental Congress of Vienna. Author of Oriental articles in 'Hebraica.' Author of 'Reading and the Mind' (7th ed., 1907); 'Christian Art' (1885); 'Cuneiform Inscription of Nebuchadnezzar' (1885); 'Three Holy Lives' (1887); 'Pearls of a Year' (1887); 'Life of Saint Aloysius' (1892); 'Practice of Humility' (1890); 'Sacred Scenes and Mysteries' (1898); 'Facts about Bookworms' (1898); 'Rhetoric and Oratory' (1898); 'Education in the Schools of New York' (1901); 'Dante, a Drama'; 'Prayer, that wins'; short stories, music, poems, plays, articles; 'A Study of Francis Thompson's Hound of Heaven' (7th ed., 1914); 'Every soul, Mystical Opera' (5th ed., 1915); 'Sunshine Through the Clouds' (1916); 'Selected Verse' (1916); 'The Crusade of Children' (1916); 'A Spiritual Retreat' (1916). Member of 19th International Congress of Americanists in Washington 1915, and official delegate of Georgetown University, presenting valuable ethnological and historical paper on Early Indians in the United States and their missions; composer of 'Dear Lord' and 'Jesus the All Beautiful' sung through the United States; 'America's National Anthem,' author and composer of words and music.

OCONOSTÓTA (Aganasata, "groundhog"), a Cherokee Indian chief: b. about 1708; d. 1810. He was one of a delegation of 32 chiefs who waited on Governor Littleton of South Carolina with the object of finding a peaceful solution to the troubles that threatened to bring on a long and bloody war between the Indians and the English. In 1760 Littleton ordered all these delegates thrown into prison. After a while, when the governor thought he had impressed the Indian chiefs with the power of the English government, Oconostóta and two other young chiefs were set at liberty and sent home to inform the Cherokees that nothing but unconditional submission on their part would be considered by him as the representative of the British government. As soon as he got back home Oconostóta took command of the Cherokees, organized a large war party and laid siege to the post. He paid back the English

governor's bad faith in coin, by inviting the commander to a peace conference and shooting him. In return the English shot the chiefs still in their power (February 1760). In June of the same year Colonel Montgomery invaded the land of the Cherokees. At first he met with considerable success; but he was finally defeated by the Indians at Nikwasi (near Franklin, N. C.) with heavy loss. Less than two months later Oconostóta captured Fort Loudon. The following year Colonel Grant, with a force of 2,600 men, laid waste the Cherokee country and destroyed their villages and crops. The Indians, though undefeated, suffered so much from hunger and other privations that they finally concluded a treaty of peace with the British. From that time on Oconostóta was the faithful ally of the British. In 1768 he signed a treaty of peace with the Iroquois who had been his lifelong enemies. He took no active part in the Revolutionary War, being infirm and a semi-invalid. He resigned his chiefship in 1782 in favor of his son. See **CHEROKEES**.

OCONTO, ō-kōn'tō, Wis., city, county-seat of Oconto County, at the mouth of the Oconto River, on Green Bay, and on the Chicago, Milwaukee and Saint Paul and the Chicago and Northwestern railroads, about 30 miles north by east of the city of Green Bay. It was settled in 1850 and in 1882 was incorporated. It is in an agricultural and lumber region and has considerable trade in farm and dairy products, fish and lumber. Its chief industrial establishments are flour and lumber mills, canneries, creameries, a brewery and a wagon factory. It has a good public library, a high school, courthouse and a number of fine residences. Pop. (1920) 4,920.

OCOTE, ō-kō'tā, a very resinous pine tree of parts of Mexico and Central America. It makes excellent lumber for flooring and all kinds of carpenter uses, but it is difficult to work on account of its hardness and the quantity of gum which it contains. The trees, which grow to a fair size, are highly aromatic. On account of the great amount of resinous matter contained in the ocote it was used extensively at the time of the discovery of America for torches by the natives of Mexico; and it is still put to the same use in the more remote mountainous districts of the country. Much of it is turned into charcoal, which is sold throughout the towns and villages of the greater part of the republic, where very often it furnishes the only fuel used. The lamp-black obtained from the ocote, which is called *humo de ocote* (smoke of ocote) is used for the basis of an excellent black paint and, mixed with water color preparations, is employed extensively for painting and decorating houses and buildings of all sorts.

OCOTEA, a genus of tropical trees of the mountain-laurel family (*Lauraceae*, q.v.), the wood of which is strongly and usually disagreeably scented. Prominent species are the stinkwood (*O. bullata*) of the Cape of Good Hope; til-wood (*O. fatens*) of Madagascar, and the cinnamon-yielding *O. cupularis* of Mauritius. Some of these trees yield valuable timber. See **STINKWOOD**.

OCRACOCKE (ō'krā-kōk) **INLET**, on the coast of North Carolina, between the islands of Portsmouth and Ocracoke, and forming a

passage from the Atlantic into Pamlico Sound. Just at the western end of the inlet is a light-house, and on each side are dangerous shoals. Cape Hatteras is about 20 miles northwest.

OCTAGON, in *geometry*, a polygon of eight angles or sides. A regular octagon is an octagon all of whose sides and angles are respectively equal to each other. See *GEOMETRY*.

OCTAHEDRITE, dioxide of titanium in the crystal form, so called because of its tetragonal crystallization; sometimes styled *Anatase*. Its chemical composition (Ti_2O_3) is that of the amorphous rutile and Brookite. Octahedrite is yellow, brown, gray, blue or black; has a quasi-metallic lustre; is unaffected by acids and infusible with blowpipe; becomes incandescent if gradually heated; has a density of 3.83 to 3.93; and a hardness of 5.5. It occurs in the granite fissures of Switzerland, of Dauphiné at Bourg d'Oisans (whence the French name *Oisanite*), of the Brazilian diamond fields, and in the United States in Burke County, N. C., and Smithfield, R. I.

OCTAHEDRON, in *geometry*, a solid contained by eight faces. The regular octahedron has as faces equilateral triangles. It has 12 edges and six corners, and is reciprocal to the cube, which has eight triedral angles as vertices, 12 edges and six faces. See *GEOMETRY*.

OCTANS, the "Octant," in *astronomy*, the constellation surrounding and including the South Pole of the heavens, and one of the 14 added to the heavens by Lacaille in connection with his work at the Cape of Good Hope.

OCTAVE, the eighth day after a festival, and the intervening days, all of which partake of the nature of the festival. In the Roman Catholic Church octaves are privileged and non-privileged, with many degrees and subdivisions of the former. The octaves of Easter and Pentecost are specially privileged. In the octave of Epiphany only the feast of patron saint, title or dedication of a church may be kept, and that not on the eighth or octave day, on which the services of the festival are to be repeated. In the Church of England the only festivals mentioned as having octaves are Christmas Day, Easter Day, Ascension and Whitsunday. Dr. Sparrow, in the 'Rationale,' says that our whole life being spent in the revolution of seven days, the eighth or octave signifies eternity. On the other hand Du Cange declares that the eighth day denotes a finished solemnity, inasmuch as our Lord's resurrection took place on the eighth day, counting the period of his Passion as beginning on one Sunday, when he entered Jerusalem in triumph, and ending on the next, when he rose in triumph from the grave.

OCTAVE IN MUSIC, the interval between any musical note and its most perfect concord of which it is half the pitch. See *HARMONY*.

OCTAVIA, Roman matron, wife of Mark Antony, the triumvir, and sister of Octavian, or Augustus: d. 11 B.C. She was married (before 54 B.C.) to Gaius Claudius Marcellus, who became consul in 50 B.C. Julius Cæsar, her great uncle, wished to divorce her from Marcellus so that Pompey might marry her and thus be as closely bound to him as he had been during the life of Julia, his first wife and

Cæsar's daughter; but Pompey and Marcellus both objected. After Marcellus' death in 41, however, she was married to Mark Antony, thus cementing the bond between him and her brother Octavian, the future Augustus. Antony's passion for Cleopatra and his complete enslavement to her, in spite of the remarkable beauty and matchless virtue of Octavia, had much to do with precipitating the war between Antony and Octavian. She was actually divorced by Antony in 32 B.C., but cared tenderly for her children after his death. Her son by Marcellus was Marcus Marcellus, adopted by Augustus as his heir. He died prematurely in 23 B.C. bitterly bewailed by his mother and pathetically sung by Virgil in the sixth *Æneid*. Her daughters by Antonius became, respectively, the grandmother of Nero, and the mother of Caligula. The porticus Octaviæ, built in her honor by Augustus, enclosed the temples of Jupiter Stator and Juno. Consult Abbott, F. F., 'Society and Politics in Ancient Rome' (New York 1909).

OCTAVIA, Roman empress, wife of the Roman emperor Nero (q.v.): b. 42 A.D.; d. Pandataria, 62 A.D. A daughter of the emperor Claudius and of Messalina (thus a granddaughter of Octavia, the wife of Antony), she married in 53 her cousin, Nero, then only 16. He was soon unfaithful to her, first leaving her for Acte, a freedwoman, and then for Poppæa Sabina, whom he married in 62, only 16 days after his divorce from Octavia. But Octavia's popularity was so great that Nero was forced to recall her to Rome, where she was so enthusiastically received as to rouse the jealousy of Poppæa. She was exiled to Pandataria on a false charge of infidelity and was there killed by Nero's emissaries. A tragedy, telling her story and bearing her name, was long attributed to Seneca; its author may have been Cruriatus Maternus, but it is still printed among Seneca's plays. Consult Butler, H. E., 'Post-Augustan Poetry' (Oxford 1909); Chickering, E. C., 'An Introduction to Octavia Prætexta' (New York 1910); Teuffel, W. S., 'Geschichte der römischen Litteratur' (Vol. II, Leipzig 1910).

OCTAVIANUS, or **OCTAVIAN**. See *AUGUSTUS*.

OCTOBRISTS, or **OCTOBERISTS** ("the Party of the 17th of October"), a Russian conservative political party formed by the moderates after the Tsar's manifesto of 17 Oct. 1905, in which he guaranteed to Russia a liberal constitution. They supported the program of Count Witte, advocating an extension of suffrage and a reorganization of the Duma. The Duma already formed was to become a lower house, the Imperial Council to constitute one-half the members of the upper house, while the remaining members were to be elected. They were in the minority in the second Duma; but in the third, through changes in the representation from the more distant provinces and by placing a property restriction on suffrage in other districts, the Octobrists became the Centre of the house. By this time, however, the party as originally conceived had practically disappeared, the remaining members supporting monarchical ideals, so that on the whole they were regarded as reactionaries. They maintained support of the government at the outbreak of the European War in 1914.



DECAPODS AND OCTOPODS

OCTOIC ACID, or **CAPRYLIC ACID**, an organic acid having the chemical formula $C_8H_{16}O_2$, or $C_8H_{15}CO.OH$, and occurring, in the form of a glyceryl ether, in common butter and, also, in much larger quantities, in coconut oil. It may be obtained in the form of white crystals, which melt at $63^\circ F$. Octoic acid is almost insoluble in cold water, but dissolves in boiling water. Various isomers and compounds of the acid are known, but none are of any commercial importance.

OCTOPODA, the eight-armed cephalopods. See **CEPHALOPODA**; **OCTOPUS**.

OCTOPUS, a genus of the dibranchiate *Cephalopoda* (q.v.), or cuttlefishes, forming the type of the family *Octopodidæ*, the members of which group are familiarly known as "poulpes." These forms possess eight arms of equal length, united to each other by a web varying in extent in different forms. The arms possess two rows of sessile, wholly fleshy suckers. The prominent head is joined to the body by a distinct "neck," and the body itself is short, generally more or less rounded in shape and unprovided with side or lateral fins. The shell is internal, and is represented by two short "styles," which lie imbedded in the "mantle." In the octopods the third right arm of the male animals becomes developed to form a "hectocotylus" or sexual organ (see **ARGONAUT**); and in some this modified arm is detached from the body and deposited within the mantle cavity of the female for the purpose of fertilizing the eggs, a fresh arm being developed as occasion requires.

The poulpes attained a popular notoriety from the tales which were formerly circulated of gigantic members of this group which had no existence in reality. Some forms spread their limbs 12 or 14 feet, like great spiders, and might, under favorable circumstances, hold under water a person whom they had seized until he had drowned, at the same time biting him with their horny parrot-like jaws; no doubt such accidents have occasionally happened to pearl-divers and the like. Ordinarily, however, the octopus does not attain one-half these dimensions and many species have bodies no larger than an ordinary pear. These animals live in rocky places along shore and about reefs, protecting their soft bodies by sitting in holes and crevices with arms reaching out to seize their victims, which are fishes and any animal they are able to overpower. They are themselves preyed upon by large fishes, turtles, etc. Many species are eaten in various parts of the world and the common one (*Octopus vulgaris*), of the Mediterranean and neighboring Atlantic coasts, has been speared and taken to market from a time immemorial, and is still a regular object of pursuit, especially in Italy. A deep-water species (*Eledone moschata*) is trapped for market in from 10 to 20 fathoms of water by lowering earthen jars and leaving them a few hours. The creatures creep into these jars, as a fine hiding-place, and allow themselves to be drawn to the surface. The flesh is eaten boiled, fried and in salads and is preserved by pickling. Sepia (q.v.) is the substance in the "ink-bag"; and "cuttlebone" the supporting calcareous plate beneath the skin of certain species. Of the American species *O. bairdii* and others of the eastern coast dwell in deep water or about the tropical

coral reefs. On the Pacific Coast several species are taken near shore and were always utilized by the Indians. Since the settlement of California their flesh is regularly supplied to the San Francisco market, where it is bought by Italians and Chinese. Some specimens brought in there are among the largest known, measuring 14 feet across the outstretched arms. Consult books of conchology, especially Cooke, 'Mollusca' (1895); and 'Standard Natural History' (Vol. I, 1884). See **ARGONAUT**; **CEPHALOPODA**; **CUTTLEFISH**.

OCTOPUS, The, a novel by Frank Norris, published in 1901. It was the intention of its author to write a trilogy of novels which should symbolize American life as a whole, with its hopes, aspirations, possibilities and problems. This book, which is the first of the three, has for its central motive Wheat, the great source of American power and prosperity, and also the literal staff of life. 'The Pit,' the second of the proposed trilogy, appeared in 1902, not far from the time of the author's death.

OCTOSTYLE, a term in architecture applied to a temple or portico having eight columns in front. The most perfect example was the Parthenon at Athens, a building of the Doric order. Few remains of Greek buildings of this style exist, the common practice having been to construct temples of the hexastyle or six-column order. Another notable example of the octostyle is the portico of the Pantheon at Rome.

OCTROI, ok-trwa, an old French term particularly applied to the commercial privileges granted to a person or to a company. In a like sense the term is applied to the constitution of a state granted by a prince in contradistinction to those which are derived from a compact between the ruler and the representatives of the people. The tax was levied on articles of food brought into a city or town. A great deal of the money for the expenses of the local town government in France is obtained from the Octroi, nine-tenths of which are applied to local uses and one-tenth to the national treasury. Under the name "Alcabala" a similar tax was collected in Spain and the Spanish colonies. This tax was in force in Mexico until a few years before the revolution of 1910.

OCUBA-WAX, a vegetable wax obtained from the fruit of a nutmeg (*Myristica ocuba*), growing abundantly in the marshy grounds on the shores of the Amazon and its tributaries. It is easily bleached, and is used extensively in Brazil for the manufacture of candles.

O'CURRY, ô-kûr'î, Eugene, Irish scholar: b. Dunaha, County Clare, 1796; d. Dublin, July 1862. He was son of a rather gifted farmer. Though lame he worked on the farm until 1834. He was for three years employed on the *Ordnance Survey*; and after several years spent in copying Gaelic manuscripts and writing translations for the Royal Irish Academy, Trinity College (Dublin), the British Museum and other learned institutions, he was called, in 1855, by John Henry Newman to the chair of Irish history and archæology in the Catholic University of Ireland, then just founded. There he displayed a wonderful knowledge of all the sources of Irish history,

literature and civilization from the earliest times. His lectures, published in 1860, as 'Manuscript Materials of Irish History,' are accounted the best single work on mediæval Irish literature. A second series of his lectures, 'The Manners and Customs of the Ancient Irish People,' made up of his later lectures, appeared in 1873. O'Curry prepared the catalogue of the Irish manuscripts in the British Museum, and with John O'Donovan (q.v.) worked on the compilation of the ancient laws and institutions of Ireland. Consult Hyde, Douglas, 'Literary History of Ireland' (London 1906); Webb, 'Compendium of Irish Biography' (Dublin 1878).

ODD FELLOWS, The Independent Order of, a secret, fraternal benefit society. The general administration of its laws is designated by the generic term Odd Fellowship. The origin of the society and the source of its peculiar name cannot now be historically traced. Until near the close of the 19th century it had been asserted for years that Defoe—the English novelist—mentioned "Odd Fellow" as early as 1745 A.D., but modern research has relegated this, as well as many other alleged incidents of the order's early days, to the realm of tradition. It is known, however, that a society grew up in England during the 18th century, almost rivaling in numbers and influence the Masonic Fraternity, and that this Antient and Most Noble Order of Bucks began to decline about the year 1773 and passed out of existence. A reasonable supposition attains among antiquaries that these lodges furnished the nucleus of the Odd Fellows, into one lodge of which George IV of England, while Prince of Wales, was quite unceremoniously admitted one night and became a member thereof at a date subsequent to 1780. This is the first authentic reference to the society of Odd Fellows by name. The earliest ritual extant is dated in 1797 and was used by the Patriotic Order. It appears from English contemporary history that an Improved Order existed prior to this, and the title, Most Noble Grand, for the presiding officer of the "Antient," as well as the subsequent Orders of Odd Fellows, would imply a common bond or succession. The Patriotic Order was followed by the Union, or United Orders and the Loyal Order. In 1813 various lodges of the Union Order met and organized the Manchester Unity of Odd Fellows, now the principal Friendly society in Great Britain. In 1819 the American Order was founded and was afterward affiliated with the Manchester Unity. This continued until 23 Sept. 1842, when the Odd Fellows of the United States resumed their original independence, reaffirming the resolution in 1843 and adopting a distinctively American ritual in 1845. In 1919 the Order celebrated the 100th anniversary of its American foundation with appropriate ceremonies and parades in all the chief centres of population in the United States.

Rise of the American Order.—The first lodge established on this continent was Shakspeare, No. 1, New York city, 26 Dec. 1806. The five Odd Fellows composing this lodge were of the Loyal Independent Order and the moving spirits were Solomon Chambers and his son John C., English mechanics from the south of London. The early members were zealous workers and other lodges were soon organized.

In 1809 the roll of membership, in the six New York City lodges, comprised 36 prominent citizens and business men, as well as many others of less influence. In 1819 George Pope Morris was admitted and at once became a leader in the councils of the Order in the Empire State. Attempts had then been made to plant Odd Fellowship in other parts of North America. In 1815 there were two lodges in Halifax, Nova Scotia. In Boston, during 1818, James B. Barnes—who had emigrated to the United States from England the previous year, and four others instituted Massachusetts Lodge, No. 1, and held regular meetings, the method being, like New York, ancient usage and self-institution. The records extant, however, date only from 20 March 1820. Washington Lodge, No. 1, of Baltimore, was organized 26 April 1819 under the leadership of Thomas Wildey, now recognized as the founder of American Odd Fellowship. Wildey came to the United States from England in 1818. He had been affiliated with one of the branches abroad since 1804—had "passed the chairs," and was known as a leading Odd Fellow. The "Unity" became fully organized 21 Jan. 1814. Wildey began his search for Odd Fellows as early as 13 Feb. 1819, when he advertised in the *Baltimore American*; and, again, 27 March 1819, before the required "five for a quorum" had been obtained. The minutes state that the manner of institution was "ancient usage." This ceremony consisted of Wildey's obligation of himself in the presence of the others, and, in turn, the obligation of his companions. Subsequent events would indicate that the Manchester Unity ceremonies of 1816 were used by Wildey and his four associates: John Welch, John Duncan, John Cheatham and Richard Rushworth. On 26 Dec. 1821 Pennsylvania Lodge, No. 1, Philadelphia, was formed, like those in New York, Boston and Baltimore, on the self-institution principle, John Pearce being the leader and his associates were, likewise, English mechanics. While the Order had been planted in four States and the chief cities thereof according to ancient usage, an effort was soon made to frame constitutions and to obtain charters from the so-called regular bodies of Odd Fellows in England. Meantime the pioneers exercised the functions of Grand Lodges—instituting other lodges and assuming sovereignty over them. The Order in Baltimore secured a charter, under date of 1 Feb. 1820, from the Duke of York Lodge, Preston; and this charter not only recognized the regularity of Washington, No. 1, and its associate lodges, but created the Grand Lodge of Maryland and of the United States of America, of the Independent Order of Odd Fellowship. In Brooklyn, Columbia Lodge, No. 1, obtained a charter from Loyal Beneficent Duke of Sussex Lodge of Independent Odd Fellows, Liverpool. This document was delayed in transmission and did not reach its destination until late in January 1823, although dated 4 Nov. 1822. Meantime Columbia Lodge had removed to New York. It at once assumed sovereign jurisdiction and this led to contention; and the attempt of Morris and others to establish a supreme government with headquarters in New York. At this juncture Pennsylvania applied to the Order in New York and Maryland for recognition. It is recorded that the evidence of regularity re-

ceived from New York City was more satisfactory to the Odd Fellows of Philadelphia than that of Baltimore; and it is also stated the lodges in Boston, New York and Baltimore were not aware of one another's existence before this event. The Order made history rapidly during the succeeding six months. Each locality was dominated by a master mind: Wildey, in Maryland; Morris, in New York; Barnes, in Massachusetts; Pearce, in Pennsylvania. The question of supremacy, however, was soon settled. Massachusetts readily surrendered its claims to priority and accepted a charter from the Grand Lodge of Maryland and the United States on 9 June 1823; and the Grand Lodge of that commonwealth was duly opened 11 June 1823, all the lodges participating. The Order in that State accepted a like charter dated 4 June 1823 and the Grand Lodge was duly instituted 24 June 1823. It having become known that Wildey had endeavored to unite the Odd Fellows of Massachusetts and New York, overtures were also made to Pennsylvania and these were immediately accepted. The charter is dated 13 June 1823 and the Grand Lodge of the Keystone State was organized 27 June 1823. The consolidated Order became at once homogeneous and prosperous. As a prelude to these momentous events, coincident with the *actual* foundation of the American Order, the managers in Maryland had organized, under the Duke of York Lodge charter, the Grand Lodge of Maryland and of the United States, 22 Feb. 1821, which relegated Washington and others, in Maryland, to the condition of subordinate lodges. Following the centralization of the government of the four pioneer commonwealths, the "Grand Lodge of the United States" was evolved, on 15 Jan. 1825, by the representatives of the Grand Lodges of Massachusetts, New York, Pennsylvania and Maryland, the last-named taking her place with the State Grand bodies, subordinate to the sovereign head. This theory of a government composed of one head, the source and repository of all true Odd Fellowship, with subordinate State bodies and lodges subordinate, in contradistinction to the English system of a governing movable committee, was due to the genius of John Pawson Entwistle, who had joined the Order in 1820, becoming the *brains* of the young organization; Entwistle, the first Deputy Grand Master, was afterward Grand Secretary, but his career as a "builder" was cut short by his early decease. The last link in the chain of regularity was forged 15 May 1826, when the American body was chartered by the Manchester Unity. Significant of this, the early charters were issued to the Order of Independent Odd Fellows and the branches originating in the United States were organized irrespective of the consent of the English body even prior to 1842-43, the date of official separation.

Government and Degrees.—Between 1826 and 1885 the government of the Order had been evolutionary in its nature. The inheritance from England in ritualistic matters was the merest outline of a possible utility. The degrees were crude in structure and unsuited to the genius of a modern fraternal society, being copies from orders of other origin—notably from Masonry. When the foundations of government had become settled, attention began to

be paid to degrees of higher significance than the lodge system. Entwistle gave the first impulse to this part of the fabric of Odd Fellowship. After his death the work was continued by a long line of distinguished Odd Fellows, including such American citizens as James L. Ridgely, Grand Secretary from 1838 to 1881; James B. Nicholson, Isaac McKendree Veitch, Schuyler Colfax, who may be said to have been the "builders" of the Order; Rev. Edwin H. Chapin, D.D., Rev. James D. McCabe, D.D., Tal. P. Shaffner, who, together with Entwistle and Ridgely, were largely the authors of the present American ritual. Two English degrees and one American, finally, made up the encampment series. As early as 1821-25 these were conferred in connection with the lodge department. The final separation of the encampments into a distinct branch, higher than the lodge and governed by Grand Encampments, did not occur until 1841. In 1851-52 the Rebekah degree was adopted, its author being Schuyler Colfax. This is a branch to which both sexes are admitted, but was made with a view to admitting women to the Order. The sequence of degrees was completed in 1885 by the adoption of the Patriarchs Militant and organization of the uniform or display branch. The Grand bodies followed the sequences of the degrees. In 1879 the name of the supreme body was changed to the Sovereign Grand Lodge, a title more in consonance with its inherent powers, especially in its jurisdiction without the United States of America. The Sovereign Grand Lodge is made up of Grand Representatives from the Grand Lodges and Grand Encampments of the United States and Canada. Grand Lodges possess jurisdiction over State and Provincial Rebekah Assemblies and Rebekah lodges, as well as in the government of subordinate lodges. The Patriarchs Militant, with the local unit, called Canton, is organized like the United States Army, with Department Councils, all under the immediate government of the Sovereign Grand Lodge. In Australasia, Denmark, Germany, the Netherlands, Sweden and Switzerland, Quasi-Independent Grand Lodges govern the Order. These hold an allegiance to the Sovereign Grand Lodge, use the American ritual modified, and a common bond exists in connection therewith; but they do not enjoy a representation in the sovereign head. They, however, govern the Order in the countries named and conform to the laws and usages of the civil governments thereof. The development of this dual system was the labor of many years and varied experiments. The dates of the introduction of American Odd Fellowship without the United States were these: Canada, 1843; Australasia, 1868; Denmark, 1878; Germany, 1870; the Netherlands, 1877; Sweden, 1884; Switzerland, 1871. As early as 1846 lodges were instituted in the Hawaiian Islands; in Cuba, in 1883; in Mexico, in 1882; and the Order has followed the flag into the Orient, having been established, including South America, in 22 nationalities, provinces and territories, in 18 of which Grand Lodges have been chartered. In 1914, however, of the entire lodge membership of 1,672,658, only 63,562 were enrolled outside of North America. In that year there were 1,508,791 Odd Fellows in the United States; Pennsylvania led with 157,751, followed by New

York with 126,294; Illinois with 105,062; Ohio, 87,788; Indiana, 84,044; Missouri, 63,657; Michigan, 62,200; Massachusetts, 60,436; etc., etc. Canada and Maritime Provinces had 100,305 lodge members and Australia 45,300.

Other Organizations of Odd Fellows.—

The largest body is the Manchester Unity, numbering 950,000 members. It has lodges throughout Great Britain and its colonies—a few in the United States—and is, in effect, a chartered benefit society. Annual reports are made to the government, under the laws regulating Friendly societies and actuaries determine the solvency or insolvency of the Order and license lodges accordingly. In ritual matters, likewise, it has nothing in common with American Odd Fellowship. The Grand United Order ranks next in relative importance. This body is the parent of the colored lodges in the United States and elsewhere and is of English origin. Other Friendly societies exist in Great Britain and are of more or less importance as health insurance associations.

Beneficent Features.—The American Order has not incorporated into its polity any features of health or life insurance; indeed, it has, on the contrary refused to recognize voluntary associations of Odd Fellows, the object of which was to enlarge the benefit systems of regular relief. Nevertheless, the Order has always insisted upon "stated weekly and funeral benefits," distinct from voluntary *charity*—these payments to members who are ill, or in affliction, being of "right," not a donation. This characteristic is a distinguishing trait of the American Odd Fellow. On the great seal is emblazoned: "We command you to visit the sick, relieve the distressed, bury the dead and educate the orphan." Correlatively the attention of the Order was early attracted to the founding of institutions of learning, several of which have survived. The dual motive of fraternity and stated relief led to the establishment of homes for the aged, the indigent, the widow and the orphan. Pennsylvania had six of these homes, New York has four, Illinois two, California two and several other States possess two, with more in prospect. Every Grand Lodge in the United States and Canada has one or more of these homes or has taken measures to found such an institution. This beneficence has been fostered in foreign jurisdictions as well; and the Order in Denmark has purchased the palace of the Crown Prince for this purpose, going into the "home idea" on a scale that eclipses all previous efforts. Other nationalities are in no wise behind their fellows in this beneficence.

The Reunion of 1865.—During the Civil War of 1861–65 the roll of the Southern jurisdictions was regularly called during the annual sessions of the Sovereign Grand Lodge. At the close of hostilities the officers and members in the South were welcomed to the chairs and seats which had been held for them during the four years of strife and separation. The roll-call at Baltimore, 18 Sept. 1865, by the venerable Grand Secretary Ridgely, was notable even in fraternal circles. Every survivor answered to his name and appointments had been made to fill vacancies so that the representation was complete. Attempts had been made throughout the States composing the Southern

Confederacy, with varying success, to keep up the organizations of the Order; but, at this reunion, measures were unanimously adopted whereby fraternal hands and hearts assisted in rebuilding the waste places. This was the first fraternization of the Blue and the Gray. The procession in the streets of Baltimore the next day, occupying more than one hour in passing any given point, attracted national attention. The marshals were Joseph Kidder of New Hampshire and John Q. A. Herring of Maryland.

Bibliography.—'Ars Quatuor Coronatorum,' London; publications of Early English Text Society; 'History of Signboards,' London; Ridgely and Spry, histories of Odd Fellowship; 'Official History of Odd Fellowship, the Three-Link Fraternity' (Boston); Rituals of 1797, 1816, 1845 and 1880; Proceedings, G. L. U. S. and S. G. L. (Vols. I to XX); Ford, 'Symbolism of Odd Fellowship' (Providence 1904); Fuller, G. H., 'Directory of Subordinate Lodges of the I. O. O. F. on the Continent of North America' (Boston 1913); Stevens, A. C. (ed.), 'Cyclopædia of Fraternities' (2d ed., New York 1907); Annual Proceedings of the Sovereign Grand Lodge, I. O. O. F. (Baltimore).

ODE, a lyric poem supposed to express the feelings of the poet in the pressure of high excitement, and taking an irregular form from the emotional fervency which seeks spontaneous rhythm for its varied utterance. The Greeks called every lyrical poem adapted to singing—and hence opposed to the elegiac poem—an ode (*ôdē*, that is, song). The Dorians are said to have been the inventors of the choral ode to be sung by a group of persons; the Spartan, Alcman, is credited with having first divided the chorus into two parts, the strophe (turn), and antistrophe (counterturn). These two names had their origin in the fact that as the one group of the performers answered the other they turned to the right and then to the left. Later on from Sicily came a third addition, the epode, which was sung by the united chorus at the end of the movements to the right and left. The principal ancient writers who employed this form of verse were Pindar, Anacreon, Sappho, Alcaeus, among the Greeks, and Catullus and Horace among the Romans. As employed by English writers the ode takes either the Pindaric form of strophe, antistrophe, and epode irregularly arranged and contrasted; or, as in its later development, the form of a regular series of regular stanzas. The former style is found in Dryden's 'Ode for Saint Cecilia's Day,' while the latter is seen in Shelley's 'Ode to a Skylark.' The masters of English poesy who have carried the ode to its highest achievements are Milton, Marvell, Dryden, Collins, Gray, Coleridge, Wordsworth, Keats and Shelly. Consult Gosse, E. W., 'English Odes' (New York 1881); Scollard, Clinton, 'Odes and Elegies' (New York 1905); Sharp, William, 'Great Odes, English and American' (London 1890).

ODE TO DUTY. Wordsworth's 'Ode to Duty,' written in 1805 and published in 1807, is a noble appeal to the principle of morality for guidance and support. It represents in a measure a recantation of Wordsworth's earlier faith in the spontaneous and unguided impulses

of the heart, written at a time when he was coming to feel more and more the need of an invariable standard. While continuing to recognize the worth and beauty of the creed of joy and love, he feels that there must be also the mandate of the stern power which preserves the stars in their courses and lays the law of sacrifice and self-restraint upon the soul of man. Stern as is the voice of duty, it is yet also divinely beautiful,

"Nor know we anything so fair
As is the smile upon thy face."

The mood and temper of the 'Ode' is characteristic of much of Wordsworth's later work. According to Wordsworth's own statement the 'Ode to Duty' was modeled on Gray's 'Hymn to Adversity,' which in turn was imitated from Horace's 'Ode to Fortune.' The stanza is identical with that used by Gray, and there are resemblances in idea and phraseology. Consult notes in Dowden's 'Poems of Wordsworth' (Athenæum Press Series).

JAMES H. HANFORD.

ODE TO GOD, The (Russian title 'Bog').

In the 18th century the Deists of various European nations reveled in singing praises to God. We have such odes by Voltaire, Klopstock, Haller, Brockes, Young; in Russia the fashion was set by Lomonosov's 'The True God.' But none of these productions could equal Derzhavin's 'Bog,' which was at once translated into most of the European languages and, by Admiral Golovin, into Japanese. There are at least 15 French versions of the poem, while in English we have 'To God,' in W. D. Lewis' 'The Bakchesarian Fountain' (Philadelphia 1849); 'Ode to the Deity,' by J. K. Stallybrass (in *The Leisure Hour*, London 1870), 2 May; and 'Ode to God,' by Dole, N. H. (in *The Chautauquan*, Vol. X). Derzhavin commenced writing the ode in 1780, but finished it only in 1784, under the influence of a strong religious emotion. It begins with an appeal to God, then extols his infinite power and wisdom. Man is the reflex of the Divinity, hence man is not insignificant. He recognizes his relationship to God and, therefore, is assured of immortality beyond the grave.

LEO WIENER.

ODE ON A GRECIAN URN.

John Keats's 'Ode on a Grecian Urn' was first published in the memorable volume of 1820 which contains the greater part of its author's most characteristic work. Inspired by the loveliness of an exquisite form of Hellenic art Keats addresses his Urn as the very incarnation of beauty. Three pictures, characteristic of the representations actually found on the Greek vases, are described; the first a lively pursuit of maidens "in Tempe or the dales of Arcady"; the second a pastoral scene of love-making and music; the third a solemn sacrificial procession. To Keats the very incompleteness of the "flowery tale" told by this "sylvan historian" is an essential element in its beauty. What "men or Gods" these are we know not. The melodies the "soft pipes" play are heard in the imagination alone. The lover never consummates his kiss. But it is better so. Fulfilment and completeness would bring with them the sad satiety of all real experience. Frozen there in silence these scenes belong to the ideal world. The

vase becomes the type of that beauty which transcends all its sensuous embodiments:

"Thou, silent form, dost tease us out of thought
As doth eternity."

Its message is the self-sufficiency of beauty and the identity of the ideas of beauty and of truth. In form the poem is a regular or stanzaic ode, firmly knit in structure. Highly imaginative in expression and exquisite in rhythm, it has always been regarded as one of the most consummate of English lyrics. Consult the introductory essay in Selincourt's 'Poems of John Keats'; Brooke, 'Studies in Poetry'; Bridges, 'Keats, A Critical Essay'; Masson, 'Wordsworth, Shelley, Keats and Other Essays'; Arnold, 'Essay on Keats'; selected bibliography in Page's 'British Poets of the Nineteenth Century.'

JAMES H. HANFORD.

ODE: INTIMATIONS OF IMMORTALITY FROM RECOLLECTIONS OF EARLY CHILDHOOD.

The 'Ode on Immortality,' as it is generally called, by William Wordsworth, is by many considered the greatest lyric in the English language. It consists of 203 lines of irregular verse in 11 stanzas of unequal length, was composed between the years 1803 and 1806, while the poet was living at Town End, Grasmere, and was published in 1807. In effect it is a poem on the eternity and the destiny of the human spirit and the interrelation of man and nature. In its mysticism—its belief in intuitive knowledge, in the power of humanizing experiences to interpret nature and in the power of nature to sustain and console the spirit of man—it is a complement to Wordsworth's 'Tintern Abbey.' The two poems should be read together as the supreme statement of the Wordsworthian doctrine and philosophy of life.

Ostensibly the ode asserts the poet's belief in immortality as evidenced by his own transcendental experiences. As a child he seemed to retain vague recollections of a former state of being, and something of the radiance of this heavenly life still invested the outer world of sense. These are the "recollections of early childhood" which are to him "intimations of immortality." Even as a man he had his moments of transcendent vision when he saw into the life of things. He often spoke of such experiences to his friends and often in his shorter lyrics he alludes to them. On such esoteric and highly personal grounds he bases his belief in immortality. This is not a philosophy, nor did Wordsworth assert that it was such, yet it is quite sufficient to give body and consistency to the ode, which should be read not as an argument nor as a philosophy, but as the lyrical expression of a mystic's convictions, intuitions and dreams, transcending philosophies and facts. Though it is customary to speak of the "Platonism" of the ode, Wordsworth based his theory entirely upon his own experiences. In his preface he refers to Platonism, but rather as a sanction of his philosophy than as the source of it. With Plato, moreover, the recollection of past existence increases with a man's growth; with Wordsworth, it grows fainter. It is possible that Wordsworth may have taken hints from such 17th-century poems as Henry Vaughn's 'The Retreat,' 'Corruption' and 'Childhood,' and Thomas Traherne's

'Wonder'; but it is probable that the community of ideas between these poems and the ode is entirely accidental.

The structure of the ode, while coherent and carefully wrought, is not obvious unless the reader perceives it to be based upon the poet's train of thought and emotion. He stands in the midst of a May morning, but can no longer feel the joy of nature that he felt as a child—"there hath passed away a glory from the earth" (I and II); he tries to regain this early delight but fails, and asks whither it has fled (III and IV). The answer is that our birth is but a forgetting of our former existence; the child, fresh from heaven, invests all natural objects with the light that never was on sea or land; as he grows older the light fades (V and VI). As a child he is the "best philosopher": before life lays upon him the weight of custom, he reads the riddles of the universe (VIII). Yet the grown man does not entirely and forever lose the light and the memory; he has his moments of transcendent revelation when his spirit plays upon the shores of the universal ocean (IX); and, as a compensation for the loss of the early glory, has come a deeper insight into the meaning of nature, brought about by common human experiences (X and XI).

No such bare, cold and formal outline can afford any conception of the majesty and splendor of the great ode and the irresistible sweep of its power. Though based upon an intellectual concept, it is not argumentative or didactic, or even philosophic in the ordinary sense. Its thought is vitalized by its profound emotion, and both thought and emotion are enveloped with a glory of diction perhaps unequalled by any other English lyric. Though a few lines in the seventh stanza lapse into something approaching banality—Wordsworth's besetting danger—the style in the main is sustained at the very highest pitch of lyric excellence; and the poem abounds in lines unsurpassable for wealth of suggestive power, imaginative vision and sheer rhythmical beauty. Emerson called this ode the "high-water mark which the intellect has reached in this age." Critics from Coleridge to the present have considered it not only Wordsworth's supreme achievement, placing him among the Immortals, but, in its union of thought, emotion and music, probably the greatest of English lyric poems.

MARION TUCKER.

ODE TO A NIGHTINGALE. John Keats's 'Ode to a Nightingale,' published in the volume of 1820, is one of the richest and most impassioned of English lyrics. The essential theme of the poem is the intoxicating, almost stupefying, beauty of the bird's song, heard in darkness, and the experience it brings with it of momentary release from the weight of mortal care. Like the skylark in Shelley's poem the nightingale becomes a symbol of deathless happiness, and of "the life of sensation rather than of thought" for which Keats yearned. The poet loses himself in rapture and longs to die in the ecstasy of beauty, but the exalted mood quickly gives way to deep depression and the melancholy thought of self, as the song withdraws.

"Past the near meadows, over the still stream."

In no poem is Keats's marvelous power of rich poetic utterance more strongly felt. The lines are steeped in sensuous imagery, but the poet is carried by the intensity of his imagination far beyond mere sensation into the heart of wonder and romance.

"The voice I hear this passing night was heard
In ancient times by emperor and clown:
Perhaps the self-same song that found a path
Through the sad heart of Ruth, when, sick for home,
She stood in tears amid the alien corn;
The same that oft-times hath
Charm'd magic casements, opening on the foam
Of perilous seas, in faery lands forlorn."

The poem is a regular ode in eight stanzas. It falls short of the 'Ode on a Grecian Urn' in spirituality and perhaps in perfection of lyric form, but it is no less a favorite with lovers of essential poetry. Consult bibliography under article 'Ode on a Grecian Urn.'

JAMES H. HANFORD.

ODE TO THE WEST WIND. Shelley's 'Ode to the West Wind,' though not so popular as his 'Skylark,' is perhaps the technical masterpiece among his shorter poems. The poet himself says, "This poem was conceived and chiefly written in a wood that skirts the Arno near Florence, and on a day when that tempestuous wind, whose temperature is at once mild and animating, was collecting the vapors that pour down the autumnal rains. They began, as I foresaw, at sunset, with a violent tempest of hail and rain, attended by that magnificent thunder and lightning peculiar to the cisalpine regions." The poem was published with 'Prometheus Unbound' in 1820.

Above any other modern poet Shelley possesses that mythopoetic faculty of the Greeks which makes the forces of nature personal and alive. His West Wind is a tempestuous and elemental spirit, in which at the end he loses himself. The Ode consists of 70 lines of Italian terza-rima, a difficult metre, here used with astonishing skill. The metrical scheme differs from the Italian in that each of the five parts, or stanzas, of the Ode is metrically complete in itself and is rounded out with a couplet. The structure, planned and executed with a care unsurpassed in any other English lyric, embodies a definite pattern or design. The first, second and third stanzas, respectively, invoke the wind in its play with the dead leaves, the clouds and the waves. In these occur the aerial singing, the color, and the sweep that mark Shelley's characteristic treatment of natural phenomena. The fourth and fifth stanzas make the personal appeal, as the poet prays to be one with the wind; and the whole closes with an irresistible poignancy unmatched even in the poems of Shelley. The diction represents the poet at his best; the Ode abounds in exquisite phrasing, and every line is wrought with the delicacy of the highest poetic art.

In the skillfulness of its structure, in its splendor of imagery and felicity of phrase, in the intensity as well as the universal significance of the poet's aspiration, in its power to inspire the reader with the poet's own emotion and to sweep him along in a rushing tide of melody in which the music of nature and the human heart are identified and blended, the 'Ode to the West Wind' takes its place among the few perfect masterpieces of all modern lyric poetry.

MARION TUCKER.

ODELL, ô-děł', Benjamin Barker, Jr., American political leader: b. Newburgh, N. Y., 14 Jan. 1854. He was educated at Bethany College, W. Va., and at Columbia, leaving the latter after three years to enter the ice business with his father in Newburgh. He proved successful in business, acquired an interest in his father's establishment, and became president of the Consolidated Gas, Electric Light, Heat and Power Company of Newburgh and treasurer of the Central Hudson Steamboat Company. He early took an interest in politics and soon became a prominent local leader of the Republican party. In 1880 he was a candidate for State senator, but was defeated. In 1894 he was elected to Congress; re-elected in 1896, and declined the nomination in 1898. During his last term in Congress he was chairman of the committee on accounts and a member of the committee on the District of Columbia. Before his first election to Congress he had been chosen chairman of the executive committee of the Republican State Committee, and in 1898 was made chairman of the State committee. The election of Roosevelt as governor was, in large measure, due to the energy and skill with which he conducted the campaign. In 1900 he was elected governor of the State of New York. Under his leadership, laws were passed which increased indirect taxes and reduced the direct tax to .13 of a mill, and at the same time appropriations for roads and schools were increased. The administration of State insane asylums was also simplified by abolishing the board of managers and centralizing control under the commission on lunacy. In 1902 he was re-elected. In the first year of his second administration a referendum vote of the people authorized the enlargement of the Erie Canal which Odell had consistently urged. He opposed special legislation and vetoed a large number of special and personal bills; favored home rule for cities, and gave valuable aid to tenement house reform. In 1903 Columbia University conferred upon him the honorary degree of LL.D. in recognition of his public services. In 1905 he was defeated by Timothy L. Woodruff for the office of the State chairmanship, a position he had held previous to his election as governor for the first time.

ODELL, Jonathan, American clergyman and Tory satirist: b. Newark, 26 Sept. 1737; d. Fredericton, New Brunswick, 25 Nov. 1818. A grandson of Jonathan Dickinson (q.v.), he was educated at what is now Princeton University, studied medicine and was surgeon in the British army. After several years spent in England, where he was ordained a deacon of the Church of England, he became a priest in 1767 and was made rector of Saint Ann's, Burlington, N. J. He assured the colonial authorities that he would keep his loyalist sentiments to himself in the exciting times before the Revolution, but on 4 June 1776 he wrote his famous birthday ode for the king, which may have suggested, in part, the phraseology of 'Hail, Columbia,' as it begins 'O'er Britannia's happy land.' The New Jersey Convention, holding him an enemy to the American cause, exacted from him a parole to keep on the east side of the Delaware and within eight miles of Burlington. He was driven from home by the patriot forces and took refuge in the home of Margaret Morris,

who hid him in a secret chamber. He escaped to New York, where he took a prominent part with the Loyalists, notably by his acrid and satiric attacks on Congress and its individual members, as in 'The Word of Congress' (1779), 'The Congratulation,' 'The Feu de Joie' and 'The American Times' (1780). Upon the evacuation of New York he lived in England for a time and then removed to New Brunswick, where he, his son and his grandson after him held high office and took much interest in politics. He had a decided literary gift and was the most effective satirist on the Tory side. Consult the chapter on Odell in Tyler, 'Literary History of the American Revolution' and the collection of Odell's poems with those of Joseph Stansbury made by Winthrop Sargent in 1860.

ODENBURG, ô-dën-boorg (Hungarian *Sopron*), Hungary, a free city and the capital of a county of the same name, near the southwest shore of the Neusiedler See, 36 miles southeast of Vienna. It dates from the Roman *Scarabantia* and has several interesting ecclesiastical and other edifices. It is one of the finest cities of its size in Hungary. Among its excellent public buildings are several monasteries and churches, the Palace of Justice, the Gymnasium, the Realschule, the normal school, the Protestant Lyceum and other educational establishments. Its industries comprise woolen, linen and cotton cloth, sugar refining, cutlery, glass, agricultural implements, soap, starch, rubber goods, fire engines, bricks, vehicles of various kinds and earthenware; and it has a trade in these, and in corn, cattle, wool, wine and generally in agricultural products. Odenburg is one of the strongest Catholic centres in Hungary. Pop. mostly German, about 35,000.

ODENHEIMER, ô-dën-hî-mër, William Henry, American Protestant Episcopal bishop: b. Philadelphia, 11 Aug. 1817; d. Burlington, N. J., 14 Aug. 1879. He was graduated from the University of Pennsylvania in 1835 and after taking orders in the Episcopal Church in 1841 was rector of Saint Peter's Church, Philadelphia, till 1859. In the year last named he was consecrated third bishop of New Jersey. On the division of the diocese in 1874 he chose the diocese of Northern New Jersey (now Newark). He was prominent as a hymnologist, and among his published works are 'Origin and Compilation of the Prayer Book'; 'The Devout Churchman's Companion'; 'Private Prayer Book.'

ODENKIRCHEN, ô-dën-kêrk'ën, Prussia, city in the Rhine province, on the river Niers, 21 miles by rail southwest of Düsseldorf and at a junction of railway lines to Munich, Gladbach and Stolberg. It has Roman Catholic and Evangelical churches, a Jewish synagogue, a teacher's seminary and an agricultural school. There are textile, leather and dyeing industries. Pop. 20,060.

ODENSE, ô-dën-så, the third largest and one of the most important cities of Denmark. The capital of Odense Amt and the largest town on the island of Fünen, it is a busy seaport at the mouth of the Odense River near the fiord of the same name. It is one of the best built cities in Denmark. The streets are well paved and many of the houses are large

and handsome; and quite a number of them are modern. It is the foremost advocate of modern progress in the kingdom and was the first city in Denmark to have water distributed to public buildings and commercial and private houses. Among the notable public edifices of Odense are the cathedral of Saint Canute, built in the 13th century and the best example of Gothic architecture in the country, the church of Our Lady (12th century), Odense Castle (built by Frederick IV), a large and imposing City Hall, a very modern post office, the Agricultural College, the Technical School, a Seminary and the Archæological Museum. The harbor, which consists of two basins formed by the elongated basins of the Odense Ship Canal where it opens into the fiord is one of the most important shipping centres in the kingdom. This, added to the fact that Odense is the chief railway centre of the island of Fünen, gives it a very prominent place in the economy and trade of the nation. Among its chief commercial establishments are machine shops, breweries, textile mills, tobacco factories, distilleries, chemical works, glass factories and sugar refineries. From Odense are exported extensively, bacon, hides, butter and cheese. Pop. about 45,000.

ODENWALD, *ō'dēn-vālt*, Germany, a forest and chain of mountains and a mountainous region between the Neckar and the Main, in the territories of Hesse-Darmstadt, Baden and Bavaria. The Neckar divides the Odenwald from the Black Forest. The Odenwald is about 50 miles in length, contains 1,740 square miles and in Katzenbuckel attains a maximum altitude of 2,057 feet. Several other peaks reach in the neighborhood of 2,000 feet. It presents charming scenery and in literature is associated with much interesting tradition.

ODEON, *ō'dā-ōn*, among the Greeks and Romans, the name applied to a public building devoted to poetical and musical contests. The first odeon was built at Athens by Pericles and was afterward used for popular meetings and the holding of courts. At a later period two others were erected in Athens, beside those in other Greek cities. The first odeon at Rome was built in the time of the emperors. The odeons resembled the theatres, except that they were inferior in extent and were covered with a roof. The name is occasionally given in the United States to a music hall or theatre. Odeon is also the name of a theatre in Paris opposite the gardens of the Luxembourg Palace. It is devoted principally to the classical drama and is next in importance to the Théâtre Français. The Odeon was originally built in 1728. It has been destroyed by fire several times and during its existence has gone under various names.

ODER, *ō'dēr*, a river of Central Europe, which rises in Moravia, in the southern branch of the Sudetic Mountains, flows through Silesia, becomes navigable for small boats at Ratibor, passes by Breslau, where it is navigable for barges of 40 to 50 tons, enters Brandenburg and Pomerania and empties into the Baltic. Its whole course is above 562 miles. It receives numerous navigable streams, communicates with the Elbe by several canals and is of great commercial importance. The principal towns on its banks are Breslau, Frankfort and Stettin. Be-

fore reaching the sea it forms the large maritime lake called the Stettin Haff and divides into three branches—the Peene, Swine and Divenow. The Oder is generally shallow and though only in its upper courses does it flow through a hilly country, yet the current is generally swift and varies much in volume. Vast sums of money have been spent to confine it to its course with only partial success. Consult Brämer, 'Die Oder und ihr Gebiet' (Berlin 1899); Tietze, W., 'Die Oderschiffahrt' (Breslau 1906).

ODERBERG, Germany, town situated on the Alte Oder in the Prussian province of Brandenburg and about two miles from Bralitz and 47 miles from Frankfort-on-Oder. Oderberg has a splendid Gothic church, dedicated to Saint Nicholas. Another object of great interest to visitors is the Bärenkasten, an ancient castle now in a ruined state. Oderberg has extensive lumber interests and has a large trade with Russia in this commodity. Pop. 4,000.

ODES. Under the heading "Canti," or odes, are grouped 41 poems of Giacomo Leopardi of which five are fragments, and three in very brief form. The keynote is love of country. The best known of them is the first, 'All'Italia' ('To Italy') which appeared in 1818 together with the one upon the projected monument to Dante, 'Sopra il Monumento di Dante.' In the former, Leopardi recalls the glorious past of his native land as he looks upon the ancient ruins. He bemoans the sufferings of Italy, her weakness, her low estate, and the fact that the Italian youth must fight not for her, but for others. In the second ode is found the same despairing patriotism, but here the poet sounds a surer and more defiant note. In this he refers to the Italians who died in the service of Napoleon. 'Ad Angelo Mai' ('To Angelo Mai') appeared in 1820. The sub-title indicates that it was written upon the occasion of the discovery of the manuscripts of Cicero's 'De Republica' by Cardinal Angelo Mai, who was at this time the keeper of the Vatican Library. In this ode the poet wishes to put his countrymen to shame and to rouse them from their listlessness. He condemns them and the times in the strongest possible language, and evokes one after another the great masters of Italian culture, Dante, Petrarch, Columbus, Ariosto, Tasso and Alfieri. Of the other odes may be mentioned that on the wedding of his sister Paolina, in which he reviews examples of feminine courage, and the one entitled 'Bruto Minore' which is Leopardi's political testament.

AMERICO ULYSSES N. CAMERA.

ODESCALCHI-ERBA, *o-des'kal-ki'-er-ba*, the name of an ancient Roman house of princely lineage. The family takes its name from Enrico Erba, who was Imperial vicar of Milan in 1165. In 1709 Lucrezia Odescalchi, a sister of the Roman Pontiff, Innocent IX, was married to Alessandro Erba. She traced her descent from Giorgio Odescalchi, who lived at Como in the closing years of the 13th century. In 1714 Alessandro received the title of prince of the Holy Roman Empire and in the same year he was made His Serene Highness the Duke of Symium in Hungary. The family is to-day one of the most powerful in Italy. Its head is now styled Fürst Odescalchi, Duke of Symium in Hungary, prince of Bassano, and

a dozen lesser titles. Until the war he was also an hereditary magnate of Hungary. He is also a grandee of Spain and the holder of numerous foreign titles, orders and decorations. The Roman seat of the family is the Palazzo Odescalchi. Another seat is the beautiful castle of Bracciano. Several estates in Italy and Hungary also belong to this ancient house. Consult the 'Almanach de Gotha' and Reumont, A. von, 'Geschichte der Stadt Rom' (Berlin 1868).

ODES OF HORACE. Horace's Odes are in four books. Books I-III were published together in the year 23 B.C., when the poet was 41 years of age. Book IV appeared several years later, probably in 13 B.C. The four books embrace 103 poems. Horace's tastes had made him an earnest student of Greek literature, particularly of Greek poetry, and we thus find Greek models exercising the most potent influence over the form and content of his verse. So far as form is concerned, the Odes are founded mainly on the measures employed by the Lesbian poets Alcæus and Sappho (about 600 B.C.). In their contents and motives also, as well as in many bits of phrase and epithet, Horace is profoundly indebted to the same writers.

The Odes are brief lyric poems and cover a wide range of themes. Thus we have (1) Patriotic Odes. Horace's earnest patriotism and keen solicitude for the weal of the state, combined with his personal devotion to Augustus and his firm faith in Augustus's wisdom as a ruler, led him to devote his gifts to stimulating the national sense and quickening the national conscience. Some of the loftiest and most successful of his poems are the outcome of this purpose. Foremost in this class are the six odes at the beginning of Book III, in which the poet emphasizes the cardinal virtues that had made Rome great and to which he urges the rising generation to cling, if they would ensure the perpetuation of that greatness for the future. The horrors of civil war are touched upon in the fine ode to "the ship of state" (I, 14). In I, 37, a lofty note is sounded in the exultant ode of triumph at the defeat and death of Antony and Cleopatra. (2) Odes in Praise of Augustus. Book IV abounds in odes of this class, though they are not lacking in the earlier books. Among the most successful are the odes addressed to Augustus as the one hope of the state at the time when he was said to contemplate laying down his power. In IV, 5; IV, 15 and others Horace recounts the blessings of Augustus's sway, in which fertility, peace, honor, uprightness, chastity reign everywhere. (3) Poems on Life and Conduct. These form a large and characteristic class. Favorite motives are the uncertainty of life, the wisdom of a rational enjoyment of its pleasures, the cultivation of a spirit of tranquillity and contentment, the observance of "the golden mean," along with protests against the growing taste for luxurious living. The finest of all these is III, 29, on the superiority of the righteous man to the buffetings of fortune. (4) Love Poems. Love had been one of the most conspicuous themes in the Æolic lyric poetry of Sappho and Alcæus, on which the Odes are chiefly modeled. But Horace's passion lacks every token of sincerity.

His love poems represent no genuine experience or sentiment. Yet III, 9, is a successful little three-act drama in which estrangement passes to a happy reconciliation. (5) Praises of Wine. This favorite theme of the Æolic poets is only sparingly treated by Horace. In III, 21, we have an enumeration of the beneficent effects of wine. But in I, 18, we are cautioned that Bacchus's gift is not to be profaned, but should be enjoyed in moderation. (6) The other poems are miscellaneous in character. Some are affectionate tributes to friends; others are in honor of places, or elaborate some mythological theme. The concluding ode of Book III is a proud prophecy of the poet's immortal fame, "I shall not altogether die."

The 'Odes' have commanded the admiration, and have touched the hearts, of men of all nations through all the ages. As a master of lyric form Horace is unsurpassed. The happy phrases in which his works abound and for the coinage of which he possessed real genius have become current throughout the world. Many of his odes represent a very high order of poetry. His patriotism was genuine; his devotion to his sovereign was profound; his faith in the moral law was deep and clear. Wherever he touches on these themes, he speaks with conviction and sincerity and rises often to the loftiest level. But the very qualities of reason and reflection which made him successful here, naturally limited his success in treating of love and sentiment, the themes most frequently chosen for lyric purposes by other poets. On this account he has not infrequently been challenged as lacking title to high poetic rank. Fortunately the question of his eminence is not an academic one. Generation after generation continues to own the spell of the poet's verse. So long as this is true, we may fittingly ignore any theoretical discussions as to the merits of his lyric work. The most recent translation is by Charles E. Bennett in the Loeb Library.

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ODESSA, ô-dès'a, the most important town and seaport of southern Russia, in the government of Kherson, on the Black Sea, between the mouths of the Dniester and Dnieper, about 950 miles south of Petrograd. It is the fourth city of the country and is the intellectual and commercial capital of New Russia (Novorossiya). It is built principally of stone and is thoroughly modern in appearance. Among the promenades and squares of the city are the Nikolaï boulevard, beside the harbor, with a bronze statue of the Duc de Richelieu; the Cathedral square, with the monument of Prince Voronzoff; the Catharine square, with a monument of the Empress Catharine II; the Alexander Park, with a pillar in honor of the Emperor Alexander II. Among the Greek churches are the Cathedral or Sobornaja church, built in 1794-1848. The other buildings and institutions of the city comprise the town-hall, Voronzoff palace, archiepiscopal palace, public library, chief passenger railway station, university, town theatre, post office, custom-house, institution for noble ladies and barracks. The university, founded in 1864, as a development of the Richelieu gymnasium, has a large library, containing nearly 200,000 volumes, museums and an observatory. It has

faculties of medicine, law, philosophy, history and philology, mathematics and physics. There are numerous other educational institutions of different kinds and grades, including several technical schools. There are also hospitals, an orphanage, a founding institution and a bacteriological institute. Tramways and omnibuses facilitate internal communication; the town is well supplied with water from the Dniester and is electrically lighted. The harbor, which is protected on the southeast by a long mole with a lighthouse at the end, and by a breakwater, consists of several sections separated by shorter moles, and has a floating dock. The harbor, like the city itself, is quite modern and is deep enough to accommodate deep-draft vessels. The business of the port was, in 1912, over 1,450,000 tons from over 700 steamers. The port is usually icebound for a few days in winter, but an ice-breaker is now in use to keep it open. Strong batteries protect the harbor basins from seaward attacks. Odessa is the chief grain exporting seaport of Russia. Other articles of export are sugar, timber, flour, oil-seeds and oil-cake, beans, peas and fish. The principal imports are coal, tea, fruits, agricultural implements and machinery, iron and steel and raw cotton. The chief industrial establishments are the sugar refineries, flour-mills, oil-mills, engineering works, tanneries and tobacco factories, soap works, jute works, breweries. The city had, in 1912, nearly 500 large industrial establishments, employing over 22,000 skilled workmen and many unskilled laborers. Of the Russian ports only Reval and Petrograd receive more imports than Odessa. The imports of Odessa, for the most part, go to Petrograd, Kharkov and Batum. Odessa, named after Odessus, an ancient Greek settlement on this site, dates practically from the Turkish castle of Khadji-Bey, built in the 15th century and captured by the Russians in 1789. Odessa was bombarded during the Crimean War. Odessa is a very cosmopolitan city and is growing rapidly. In 1901 nearly one-third of the inhabitants of the city were Jews; and in its population of over 620,000 in 1911 were many Greeks, Italians and Albanians. Odessa was the scene of very serious anti-Semitic riots in 1905-06, in which many Jews and other foreigners lost their lives. At the same time the mutinous Black Sea fleet terrorized the city. The port was closed during the Balkan War (1912-13) and bombarded by the Turkish fleet at the beginning of the European War in 1914. See WAR, EUROPEAN.

ODEUM, a name sometimes used in the United States for a specific kind of theatre, generally known as "Odeon." See ODEON.

ODGERS, William Blake, English writer on law: b. Plymouth, Devonshire, 15 May 1849. He was educated at the University of London and Cambridge University, and became a barrister of the Inner Temple in 1873. He was recorder of Winchester 1897-1900, and of Plymouth 1900-12, after which he was recorder of Bristol. He became Director of Legal Studies at the Inns of Court (1905); and Professor of Law at Gresham College (1907). He has published 'King Arthur and the Arthurian Romances' (1872); and such well-known legal works as 'Odgers on Libel and Slander' (1881); 'Odgers on Pleading, Practice and Pro-

cedure' (1891); 'An Outline of the Law of Libel' (1897); 'Odgers on Local Government' (1899); 'Powell on Evidence' (1910); 'Odgers on the Common Law of England' (1911), and 'Bullen and Leake's Precedents of Pleadings' (1915).

ODIN, Teutonic god, called WODAN by the Saxons and Wuotan by the High German. He held a high place among the "ases" or secondary gods of the Scandinavian mythology at first, and later came to be held the centre of the system, the ruler of the world, the patron and source of all sciences, inventor of runic writing, of poetry, and of magic (hence identified with Mercury Hermes by the Roman writers on Germanic customs and religions), and, Minerva-like, a protector and companion of all brave heroes. Probably in origin he was a storm-god; his name seems to mean "the mad, or raging one" and as such he is portrayed as riding the eight-footed horse Sleipner. As a wind-god his functions were various: he presided over the harvest and over the sailing of ships, and was god of battles and of the dead. In battle he was accompanied by the Valkyries, who brought to Odin's banqueting hall, Valhalla, the slain heroes. Sometimes, Apollo-like, he is the sun-god, the sun is his eye, the heaven his canopy, and the mountain of Hlidskjalk his throne, at the sides of which are his raven messengers, Huginn ("Thought" or "Reflection") and Muninn ("Memory"), who bring him news of all that happens in the world; and the two wolves, Gere and Freke. He had a wonderful eight-footed steed named Sleipner, a magic spear called Gungner and a talismanic ring, Draupner. In drinking at the fountain of Mimir he lost an eye but became the wisest and greatest of the gods. Odin's wives were three: Iord (the inhabited earth), Frigg (the cultivated earth), and Ring (the winter-flocked earth). Snorre Sturleson and Saxo Grammaticus make Odin a chief, who in alliance with Mithridates fought the Romans unsuccessfully. To the Roman identification of Odin with Mercury is due the use of his name for the fourth day of the week (French "Mercredi," German "Dienstag," English "Wednesday," that is, Odin's or Wodan's day). Consult Anderson, R. B., 'Norse Mythology' (Chicago 1875). See ÆSIR; SCANDINAVIAN MYTHOLOGY.

ODO, or EUDES, *ēd*, of Bayeux, Norman bishop, English earl and viceroy, half-brother of William I, of England: b. about 1036; d. Palermo, Italy, Feb. 1097. He became bishop of Bayeux in 1049, and participated in the Norman Conquest in 1066, gathering the ships for the expedition and taking part in the action at Senlac. He was made Earl of Kent in 1067, was a royal minister and, in the absence of William I, was frequently called upon to serve as viceroy. In 1083 he was accused of planning a military expedition to Italy for the purpose of making himself pope and was summarily disgraced and cast into prison, where he remained until just before the death of William I. He led a rebellion against William's Rufus for the purpose of gaining the throne for his nephew, Duke Robert, but was unsuccessful. He was permitted to leave the country and joined Robert in Normandy where he enjoyed considerable influence. He died while on the way to Palestine in the First Crusade. He rebuilt

the Cathedral of Bayeux, and it is supposed that he ordered the Bayeux tapestry. Consult Freeman, E. A., 'History of the Norman Conquest' (1870-76); Round, J. H., 'Feudal England' (1895).

ODO, or **EUDES**, *éd*, of Paris, king of France: b. about 857; d. 1 Jan. 898. His father was Robert the Strong, the first of the Capet line. As Count of Paris, Odo successfully defended Paris from the Norse in 886. Two years later he was made king of the West Franks in succession to Charles the Fat, who had been deposed. Charles the Simple made several unsuccessful attempts to regain the throne, but Odo held on and at his death recommended Charles as his successor. Consult Favre, Edouard, 'Eudes, comte de Paris et roi de France' (Paris 1893), and Lavissee, Ernest, 'Histoire de France' (Vol. II, ib. 1903).

ODOACER, *ō-dō-ă'sēr*, or **ODOVACER**, king of Italy: b. about 435; d. 5 March 493. The son of Edecon or Edicon who may be identical with one of Attila's lieutenants, and a Scyrian or Rugian of noble birth, he became a leader of a band of Rugians, Herulians, Scyrians and Turlilingians. He entered the Roman army about 470, and in 476 was a member of the Imperial bodyguard. When Orestes deposed Nepos and made his own son, Romulus Augustulus I, emperor, Odoacer headed the rising of the dissatisfied German soldiers, killed Orestes, forced Romulus to retire, received the title of Patricius from the Eastern emperor Zeno, but no recognition as king of Italy; yet in spite of this he played the part of king ably for a time. This was formerly looked upon as the date of the fall of the Western Empire. He took up his official residence at Ravenna which he made his capital. He conquered Dalmatia in 482 and defeated the Rugians in 487 and 488, but in 489 Theodoric, king of the Ostrogoths (q.v.), was sent against him by Zeno, who had become alarmed at the conquest made by Odoacer. He hoped by this move to get rid of not only Odoacer but of the Goths who had been threatening Constantinople for some time. Odoacer, defeated at the battle of Isontius (Isonzo) in 489, retired; but making a second stand at Verona, was again defeated. Hastening to Rome he found the city in insurrection; so he went to Ravenna, where he reassembled his army, marched against the Goths in 490, defeated and pursued them to Pavia. But later he was defeated for the third time on the banks of the Adda. He retreated to Ravenna where he was besieged by Theodoric for three years and forced to surrender, Theodoric promising him a share in the rule of Italy. The defeated king was assassinated at a banquet a week after his surrender. Consult Gibbon, Edward, 'Decline and Fall of the Roman Empire' (Vol. IV, London 1912); Hodgkin, T., 'Italy and her Invaders' (Vol. III, 1885).

ODOMETER, a small clock-like mechanism employed for registering the number of revolutions of a carriage, automobile, bicycle, or other wheel, to which it is attached. The workings of the odometer are very simple: Two wheels of the same diameter, and turning freely on the same axis, are placed face to face; the edge of one is cut into 100 teeth, and that of the other into 99 teeth, and an endless screw works into the notches in each wheel.

When the screw has turned 100 times around, the wheel having 99 teeth will have gained one notch on the other, which gain is shown by an index attached to one wheel, which passes over a graduated arc on the other. Every 100 turns are thus registered on the second wheel, and all turns less than 100 are shown by a separate index. Now, instead of the screw turning on its axis, it is found more convenient to have the screw fast, and to allow the weight of the machine to be suspended freely, so that as the carriage wheel turns, the effect is the same as turning the screw on its axis. Other forms of the odometer are now in use on bicycles, and motor vehicles of all kinds. It is also called "cyclometer" and "speedometer," and is made to indicate the distance traversed and the rate of travel.

ODONATA, an order of insects comprising the dragon flies. See DRAGON FLY.

O'DONNELL, Frank Hugh, member of the Irish parliamentary party: b. 1848; d. Nov. 1916. In 1888 he brought a libel action against the London *Times* claiming £50,000 (\$250,000) damages in respect of certain statements in the famous "Parnellism and Crime" articles published in that paper. Though he lost the action, it was mainly as a result of the case that the Parnell Commission was set up two months later.

O'DONNELL, *ō-don'ēl*, Leopold, DUKE OF TETUAN, Spanish marshal: b. Santa Cruz, Teneriffe, Spain, 12 Jan. 1809; d. Bayonne, France, 5 Nov. 1867. He entered the Spanish army and supported Maria Christina, the queen-mother, in her struggles against the Carlists, and by intrigue he secured the appointment of governor-general of Cuba in 1843, where he made use of his office to enrich himself. On his return to Cuba in 1848 he carried on his political intrigues against the ministers successively in power; and in 1854 he finally headed a military insurrection; but he was soon defeated and driven into Andalusia. There he made a deal with Espartero; declared himself a liberal; and became War Minister under Espartero in 1856 and 1858 was Prime Minister. In 1859 he led a successful expedition against the Moors, and as a result, was made Duke of Tetuan. He was recalled in 1863 and again in 1865-66, but never held the confidence of the country. Consult Alfaro-Manuel Ibo, 'La Corona de laurel' (Madrid 1860).

O'DONOGHUE, *ō-dōn'ō-hū*, David J., British biographer and editor: b. London, England, 22 July 1866. He was educated in Roman Catholic schools and entered journalism in which field he has written principally on Irish art, music and literature for leading Dublin newspapers. He founded the Irish Literary Society in London and is vice-president of the National Literary Society in Dublin. In 1909 he became librarian of University College, Dublin. He has published 'Ireland in London' (with F. A. Fahy, 1887); 'The Poets of Ireland' (1891-93); 'Traits and Stories of the Irish Peasantry' (4 vols., 1896-97); 'Irish Humourists' (1892); 'Minor Irish Poets' (1893); 'Humor of Ireland' (1894); 'Introduction to Reliques of Barney Maglane' (1894); 'Irish Poetry of the 19th Century'

(1894); 'List of 1,300 Irish Artists' (1894); 'James Fintan Lalor' (1895); 'Life of William Carleton' (2 vols. 1898); 'Life and Writings of James Clarence Mangan' (1898); 'Works of Samuel Lover' (1899); 'Richard Pockrich' (1899); 'Life of Robert Emmet' (1902), etc.; 'Poems and Prose Writings of James Clarence Mangan' (1903-04); 'Sir Walter Scott's Tour in Ireland' (1905); 'Essays of Thomas Davis' (1915).

O'DONOJU, Juan, hoo-än ò-dõn-ò-hoo', Spanish soldier: b. Spain, about 1755; d. Mexico, 8 Oct. 1821. He entered the Spanish army where he attained the rank of lieutenant-general and in 1821 appointed captain-general and acting viceroy of New Spain. Upon his arrival at Vera Cruz he found the country in the hands of the revolutionists and his authority only nominal. He accordingly resolved to treat with the insurgents and on 23 Aug. 1821 he signed with Iturbide at Córdoba a treaty which recognized Mexico as an independent state over which a Bourbon prince was to reign. The country remained in the hands of the revolutionists and O'Donoju died before the nullification of his treaty by the Spanish Cortes.

O'DONOVAN, ò-dõn-ò-van, John, Irish scholar: b. Attateemore, County Kilkenny, Ireland, 9 July 1809; d. Dublin, 9 Dec. 1861. He was educated in Dublin, entered the Irish Record office in 1826 and was appointed in 1829 to the historical department of the Irish survey. He was connected with the Irish Archæological Society from its foundation in 1840. In 1847 he was called to the Irish bar, and from 1852 was in the employment of the commission for the publication of the ancient laws of Ireland. He wrote very extensively on Irish history and antiquities and he was the editor of the publications of the Irish Archæological Society, and later became professor of the Irish language in Queen's College, Belfast. Of the many editions of Irish works issued by him, the greatest is that of 'The Annals of the Four Masters' (1848-51). He also wrote an authoritative 'Grammar of the Irish Language' (1845). Consult Carrigan, 'History and Antiquities of the Diocese of Ossory' (Dublin 1905); Gilbert, 'Memoirs' (London 1862); Hyde, D., 'Literary History of Ireland' (London 1906).

O'DONOVAN, William Rudolf, American sculptor and painter: b. Preston County, Va., 28 March 1844; d. 20 April 1920. He served in the Confederate army during the Civil War and at its close opened a studio in New York. His work, though his art is self-taught, soon gained a reputation and in 1878 he became an associate of the National Academy. He executed the statue of Paulding at Tarrytown, the statues of Washington for Caracas, Venezuela, Newburgh, N. Y., and for the Trenton battle monument. The equestrian statues of Lincoln and Grant for the Soldiers and Sailors' arch in Prospect Park, Brooklyn, are his work, also the memorial tablet to Bayard Taylor at Cornell University, a statue of Archbishop Hughes at Fordham University and many other public memorials. It is, however, in portraiture that he has gained more distinction. Of his many portraits may be noted that of William Page, N.A. for the National Academy of Design;

of Winslow Homer, N.A.; Thomas Eakins, N.A.; Swain Lyford, N.A.; Arthur Quartley, N.A.; General Joe Wheeler for the National Gallery at Washington, Walt Whitman and E. A. Steadman. Since the beginning of this century Mr. O'Donovan devoted most of his time in painting directly from nature in tempera — the oldest of mediums used by the Egyptians, the Greeks and early Italians. During that time, however, he made busts of Gen James Grant Wilson, of the distinguished art expert, A. W. Drake, and of Dr. Talcott Williams, sometime head of the school of journalism at Columbia University.

ODONTOGLOSSUM, an extensive genus of orchids of the tribe Vandeeæ and the sub-tribe Oncidicæ, natives of Central America, much prized by cultivators for their magnificent flowers, which are remarkable both for their size and the beauty of their colors. A considerable number of species have been introduced into Europe, and grow well in a moderate temperature. *O. crispum* or *O. Alexandra* is a superb flower, and was named after Queen Alexandra when Princess of Wales. There are over 100 species of this tribe, native of the Andes, from Bolivia to Mexico. They are all extremely handsome and so are much prized by collectors. They produce a pseudo-bulb, and spare, stiff, fleshy leaves and the plants are all epiphytes. Flowers in ample panicle and white, yellow or reddish. See ORCHID.

ODONTOLCÆ, a subdivision of the primitive subclass toothed birds, *Neornithes*, which has been variously limited. It is now held to comprise those (*Hesperornis*, *Enaliornis* and *Baptornis*) that have their teeth set in a groove in the mandibles; while the other genera, as *Icthyornis*, form the subdivision *Odontotormæ*.

ODONTORNITHES. A name proposed by the late Professor Marsh in 1885 for the extinct birds with teeth, *aves dentatae*. Because of the possession of teeth he considered them a subclass equivalent in rank to that of all other known birds combined dividing them into three chief groups or orders, the Saururæ, *Odontolcæ* and *Odontotormæ*. The first of these groups is known only from two very complete specimens of *Archæopteryx* from the Upper Jurassic deposits of Solenhofen preserved in the British and Berlin museums. *Archæopteryx* was a bird about the size of a common crow unique among birds in the possession of a long, vertebrated tail, each joint of which bore a pair of long quill feathers, impressions of which were perfectly preserved in the rocks. The wings of all other flying birds have the bones of the forearm, wrist and the united three middle fingers adapted for the support of the long quill feathers. The fingers of *Archæopteryx*, however, were free and movable, each, like the fingers of reptiles, ending in a sharp claw. The sternum or breastbone was absent or very small, and the vertebræ were more like those of reptiles than those of other birds, with the exception of the *Odontotormæ*.

The *Odontolcæ*, like the *Odontotormæ*, are known almost exclusively from the Cretaceous chalk rocks of western Kansas. They were swimming birds, standing about three feet high, with only vestiges of wings, but with powerful, webbed swimming feet. Their bones, unlike those of most other birds, are solid, and their

vertebræ are of the ordinary bird kind. The sternum, like that of the ostriches, has no keel on its under side. Impressions of their feathers preserved in the rocks prove that they too were like those of the ostrich, or *Apteryx*, that is plumulaceous. They swam, not like a duck or goose upon the surface, but in the water, coming to the surface to breathe. The teeth of the upper jaws are confined to the back part, and were inserted in a common deep groove, not in separate sockets. *Hesperornis* is the best known genus.

The Odontotormæ, on the other hand, were small birds about the size of a dove, or better of a tern which they resembled in habits. The wings were large and strong, in structure quite like the wings of modern birds, and the large sternum had a deep keel for the attachment of the muscles of flight. The teeth were inserted in separate sockets. The vertebræ, however, unlike those of all other known birds except *Archæopteryx*, are concave at each end like those of a fish, whereas the ordinary bird vertebra has its articulation at the ends saddle-shaped, that is convex in one direction, concave in the other. About a half dozen kinds of Odontotormæ are known from Kansas, the most famous of which is the one first discovered by Marsh in 1872 which he called *Ichthyornis*, because of its fish-like vertebræ. Other forms from the Cretaceous of New Jersey and England may belong with them, but their teeth and vertebræ if so, are unknown. The teeth of all Odontornithes are conical and slightly recurved like those of a snake or lizard though less slender, but unlike them they were not co-ossified with the jaws.

The classification of the Odontornithes proposed by Marsh has not been generally approved by ornithologists. The Saururæ, because of the more primitive structure of the tail and wings, are given a subclass rank by themselves while the Odontolcæ and Odontotormæ are considered to be two of the four chief groups of the other subclass, the Ornithuræ, of which the Ratitæ and Carinatæ, or as they are more properly known, the Dromæognathæ and Euornithes, are the two others, the last including more than 10,000 known species, the three others, recent and extinct, less than 100.

SAMUEL W. WILLISTON,

Walker Museum, The University of Chicago.

ODONTOTORMÆ. See ODONTOLCÆ.

O'DOWD, Bernard Patrick, Australian poet: b. Beaufort, Victoria, 11 April 1866. He was graduated from Melbourne University in arts and law and entered journalism in the interest of the labor party. Since 1887 he has been assistant librarian of the library of the Supreme Court of Melbourne. Among his published works are 'Dawnward' (1903); 'A Southern Garland' (1904); 'The Silent Land and Other Verses' (1905); 'Dominions of the Boundary' (1907).

ODDWYER, Joseph, American physician: b. Summit County, Ohio, 1841; d. New York, 7 Jan. 1898. He was educated at McGill University, Montreal, and at the New York College of Physicians and Surgeons, taking his M.D. in 1866. He became resident physician at the City Hospital of New York on Blackwell's Island in 1866 and later established himself in

practice in New York. He was appointed to the staff of the New York Foundling Hospital in 1872 and labored there for nearly 35 years, becoming a foremost specialist in the diseases of children. He perfected a system of intubation of the larynx, laboring 12 years to bring the idea to a stage of practical utility, and conferring a great service in the treatment of diphtheria and stenotic diseases of the larynx. He was among the first to adopt the use of the anti-toxin serum in diphtheria and threw himself whole-heartedly into the struggle with the early difficulties encountered in its use. He contributed extensively to medical periodicals and was author of 'Analysis of Fifty-six cases of Croup Treated by Intubation of the Larynx' (1888); 'Intubation in Chronic Stenosis of the Larynx' (1888).

ODYSSEUS, ò-dis'ús. See ULYSSES.

ODYSSEY, The. There is still no more plausible conjecture than the opinion that Homer composed the 'Odyssey' in his old age. In the phrase of a late Greek epigram it is "the setting sun, but still the sun." (Consult Stawell, F. M., 'Homer and the Iliad,' London 1909, ch. 10; and the analyses of Andrew Lang in his 'Homer and the Epic,' London 1893, p. 223ff). It is unnecessary, then, to repeat what was said in the articles HOMER and ILIAD on the unity of the two Homeric epics and their relation to one another. The literature of the higher Homeric criticism has been convicted of so many blunders and so much false reasoning that the burden of presumption now weighs heavily against the promulgator of any negative, separating or disintegrating hypothesis. An eminent scholar (Blass) said that even the 'Iliad' is as well composed as Plato's 'Republic.' A number of the greatest literary critics of the 19th century concur in the opinion that the 'Odyssey' is either the best or one of the best plots in existence and that it is certainly the world's most readable long poem. An abreviator of the familiar story, then, need not delay to reply to every foolish cavil that has been suggested by over-ingenious scholarship. It is enough to tell the tale in such a way as to bring out some of the excellencies of the plot and suggest some of the imaginative and poetic qualities that have held the attention of so many generations of readers.

Another order of inquiry, though hardly less conjectural than the divagations of the higher criticism, has more justification and more interest. What materials, what traditional motives of mythology, folklore and folktales, and early maritime adventure in the Mediterranean did Homer use and incorporate in the finished structure? Was Odysseus in some remote and mythological sense a solar divinity and have we a survival of this conception in the 350 cattle of the sun devoured by his men? What analogies may comparative literature or comparative folklore discover between the return of Odysseus or the journey of Telemachus and other legends of the "Return of the Husband or the Hero," and "The Quest of the Son for the Father," (Lang, p. 227). In what proportion do the adventures of Odysseus in western seas combine poetic invention, folklore, the sailor's gossip in the ports of Asia Minor and Western Greece, authentic traditions of early Greek commercial enterprise or the "sail-

ing directions of Phœnician mariners"? Can we localize on the map Scylla and Charybdis and that Ægean isle of Circe, and the Lotus Eaters and the land of the Phæacians? Is the big round eye of the Cyclops a symbol of the craters of the extinct volcanoes of the Solfatara region? Is Southern Provence as a reader of Anatole France suggests the true Phæacia, or is it Scheria or Ischia or Trepani in Sicily the home of Nausicaa, "authoress of the *Odyssey*?" Is Calypso's isle at the heel of Italy or at the foot of Monkey Mountain outside the straits of Gibraltar? Is Ithaca itself the little island that has traditionally borne the name or is it as Dörpfeld and an immense literature of his controversial adherents maintain Leukas? (Consult the exhaustive chapter on "Homeric Cosmography and Geography," in 'Seymour's Life in the Homeric Age,' New York 1907). What proportion of conscious allegory blends with the romance and the wonder and the folktales of the 'Odyssey'? (Consult Stawell, p. 149). Those who like to let the winged fancies loose in the haze of conjectural conceivabilities will enjoy the monstrous literature that has gathered about these questions. (Consult for example Harrison, J. E., 'Myths of the Odyssey'; and Thompson, J. A. K., 'Studies in the Odyssey,' Oxford 1914). It would be idle to discuss them in the space of this article.

In the sober history of Greek literature the 'Odyssey' like the 'Iliad' is merely the supreme example of a recognized type. The 'Iliad' was the best epic on an episode of the Trojan War, the 'Odyssey' the best story of the return of the heroes from Troy, their adventures by land and sea and the state of affairs they found at home after their long absence. The bards of the 'Odyssey' are represented as singing lays of both types. In the 'Odyssey' the central theme and the subordinate motives of folktale and mythology not only combine into an artistic plot, but yield larger dramatic and spiritual unities. It is not necessary to pronounce which of the three or four chief moral suggestions absolutely dominates the whole. The 'Odyssey' has been plausibly described as the poem of homesickness. The 58th line of the first book and the 28th line of the ninth book with Ovid's imitation almost anticipate "Home, Sweet Home." And a famous sentence of Cicero repeated by Bacon celebrates the loyalty of Odysseus who "preferred his old woman to immortality." Other critics have described the 'Odyssey' as the poem of wisdom corresponding to the 'Iliad,' the poem of bravery. For Horace its main lesson is the character of the sagacious, faithful, much-enduring Odysseus, equal to every emergency and patient of every stroke of fortune. Horace had not read Professor Wilamowitz' pronouncement that to speak of the character of Odysseus at all is sheer nonsense. (On Odysseus consult Jebb, 'Classical Greek Poetry,' New York 1893, pp. 48-53). In the present time readers who go as far as line 351 in book 24 where

"Justice through the world's first mouth of song
Proclaims the gods still live for these have paid."

will take it, as the Greeks did, as the poem of righteous judgment long deferred but at last fulfilled. The plot, though better composed, resembles that of the 'Iliad' in that it plunges in *medias res* and postpones the dramatic climax

by digressions and artful delay. (Consult Stawell, pp. 119-121ff.). What distinguishes the 'Odyssey' is the skilful interweaving throughout the first 12 books of the adventures of Odysseus and the situation in his Ithacan home with the voyage of his now grown-up son, Telemachus, in quest of his father. The poem opens with a council of the gods: Athene, the protectress of Odysseus, complains to Zeus that the hero because of the anger of Poseidon whose son the Cyclops, Polyphemus, he has blinded is still after 10 years of wandering from Troy detained by the nymph Calypso in a far off isle, while the suitors in Ithaca woo his wife and devour his substance. Zeus gives Athene a free hand. She descends to Ithaca disguised as Mentes and presents herself as a guest to Telemachus who sits glowering at the riotous suitors in his father's halls. She counsels him to call an assembly of the people and formally forbid his home to the suitors, and himself to go on a voyage to enquire about his father. Other episodes in this book portray the entire situation, introduce us to the leaders of the suitors, to the bard Phemius who sings episodes from the tale of Troy to them, to the tearful but slightly coquettish Penelope who presents herself in the men's hall and is rebuked by her son who now feels himself a man, to the old nurse Eurycleia. Odysseus, though absent, is throughout present to imagination as the centre of interest and the destined hero of the poem. (Stawell, p. 132). The story of Telemachus continues through the next three books. He summons an assembly, denounces the suitors, procures a ship with the aid of Athene disguised as Mentor, provisions it with the assistance of Eurycleia and without the knowledge of his mother. Accompanied by Mentor he visits old Nestor at Pylos, and learns much of the Trojan War and the return of the heroes. He then visits the splendid palace of Menelaus at Lacedæmon, hears of Menelaus' adventures in Egypt, sees the fatal beauty of Helen of Troy face to face and is recognized by her womanly instinct. When they weep at old memories their tears are stayed by the mingling in the wine of a portion of

"that Nepenthe which the wife of Thone
In Egypt gave to Jove-born Helena."

Then, as he is preparing to depart laden with gifts, the scene suddenly changes to the palace of Odysseus, where we learn of the distress of Penelope at her son's absence and the beautiful dream which Athene sends to console her, of the angry suspicions of the suitors and the ship which they station in ambush to intercept Telemachus on his return—thus preparing us to acquiesce in the awful retribution that overtakes them in the end. In this interesting suspense we are left until the resumption of the story of Telemachus in the fifteenth book. The fifth book takes up the story of Odysseus with a repeated council of the gods. Athene again complains of his hard fate and Hermes is dispatched to Calypso's isle to bid the nymph release him. She yields unwillingly, assists him to build a raft, which is minutely described and on which he embarks only to be wrecked by the wrath of Poseidon. Rescued by the wimple of the sea-goddess Leucothea he is finally cast ashore at a river's mouth on the coast of the Phæacians where he sleeps naked under a bed of leaves as a spark of fire is hidden in the

ashes. "The sea had soaked his heart out." (Chapman).

In the sixth book next morning by a dramatic coincidence the princess Nausicaa, daughter of Alcinoos, king of the Phæacians at the instigation of Athene drives with her mule car and attendant maidens to do her laundering at the river's mouth. The girls play ball and their cries when the ball falls into the river awaken Odysseus whose aspect terrifies all but the demure and dignified princess. She bids them clothe him and invites him to accompany her to the hospitality of her father's palace or rather as she naively explains her mother's, since queen Arete really rules the house. But to forefend gossip she bids him linger behind and enter after her. The city of the Phæacians, Odysseus' approach to the palace, and the gardens of Alcinoos are minutely described. When Alcinoos rebukes his daughter for her inhospitality in bidding the, stranger lag behind, Odysseus "lies like a gentleman" and avers that it was by his suggestion.

"If there be trouble to herward and a lie of the blackest can clear,
Lie while thy lips can move and a man is alive to hear."
—(Kipling).

The eighth book in a series of vivid scenes describes the entertainment of Oysseus by the Phæacians with song and dance and sports. The day closes with a banquet, and Odysseus about to enter the banquet hall meets Nausicaa and bids her goodbye in a scene of exquisite delicacy and reserve lightly touched with the faint sweet, unreal attraction of the maiden toward the interesting middleaged stranger. At the banquet the bard's songs of the Trojan War move Odysseus to tears. The king tactfully stops the singing and asks the stranger's name and story. Perhaps he had lost a friend or a brother at Troy. Thus we are introduced to the motive of a story within the story adopted by Virgil in Æneas's narrative to Dido and copied in all later classical epics. In artful dramatic climax the long withheld name is at last pronounced. "I am Odysseus, son of Laertes" (Stawell, p. 143), and for three books the auditors hearken enthralled to the tale of his 10 years' wanderings after the fall of Troy as he unfolds what Horace called his *speciosa miracula*. We are in fairy land where anything may happen, where magic casements open upon the foam of perilous seas whose entrance is guarded by clashing rocks, where Scylla and Charybdis lurk for the unwary mariner, where the song of the Sirens lures him to coasts strewn with the bleaching bones of old time heroes, where the witch Circe amid her fawning leopards and tigers brews her potent draughts and burns the odorless cedar by midnight as the shuttle flies through her magic loom, where Calypso the veiler proffers immortal youth to Odysseus if he will forget the discreet Penelope awaiting his return to rocky Ithaca, where dwell these kindly Phæacians whose self-steering ships will bring the weary mariner to his haven at the last.

Amid all these marvels stands out the journey to the Cimmerians' land where at the entrance to the pit of hell Odysseus consults the ghost of the seer Teiresias and sees the shades of those who have "gone west." For comparative literature it is the motive of Æneas' descent to the shades and of so many earlier myths and later epics. For comparative religion it is an

inextricable jumble of "survivals" and anticipations. For the lover of poetry it contains the ineffable pathos and tenderness of Odysseus' meeting with his mother's spirit and a hint of the mediæval motive, the ballad of dead ladies:

"They that in days long past were fair-tressed maids of Achaia." (2, 119; consult Lang, p. 312).

We share the breathless interest of the audience

"Hushed by the spell of his words as they sit in the shadowy dim hall" (Consult Stawell, p. 163).

and repeat with King Alcinoos (11, 276ff.,) "These nights are everlasting and I could listen to thy tale even to the coming of the dawn."

The next morning dawns with the bustle of preparation for Odysseus' return. The magic ships of the Phæacians bear him in oblivion of all he had suffered in

"Rest undisquieted, likest to death, unawakening sweet sleep."

to his island home where the swifter, closer-knit dramatic action of the last 12 books begins. Athene in the guise of a shepherd appears to him, reassures him in his first confused doubts, transforms him into the likeness of a beggar and directs him to the hut of his faithful swineherd Eumæus while she speeds to Sparta to hasten the homecoming of Telemachus. The fourteenth book describes with touches of humorous realism the conversation of Odysseus and the swineherd. The fifteenth brings Telemachus safely home, evading the ambush of the suitors. The sixteenth opens with Telemachus' visit to the swineherd's hut and the dramatic "recognition" of son and father who plot vengeance on the suitors. The latter baffled in their designs form new schemes. The seventeenth and eighteenth books recount Telemachus' return to the palace, Odysseus later arrival there in the disguise of a beggar, the pathetic recognition of him by his old dog Argos who dies on seeing his master after 20 years, and various scenes which bring out the insolence of the suitors and justify the appalling vengeance of Odysseus. The nineteenth book contains the first direct conversation between Odysseus and Penelope and his recognition by the old nurse Eurycleia who in washing his feet perceives the scar of a wound he had received when hunting in his youth. In the twentieth book Odysseus tosses throughout a sleepless night and broods on his wrath and gladly hears at early dawn the omen of an old woman's curse on the suitors for whom she must grind corn. During the banquet of this day the suitors warned of their impending doom by a seer "stare with great eyes and laugh with alien lips," in Tennyson's imitation of the Homeric phrase.

The crisis is brought about by Penelope's challenge to the suitors to shoot with the bow of Odysseus which she brings forth. All fail and the supposed beggar is allowed to try despite the angry protests of the suitors. Meanwhile by a prearranged plot Eurycleia, Eumæus and the faithful goatherd Philoetius who had been taken into their counsels shut up the women and close the doors of the great hall. Odysseus draws the bow and sends the arrow home through the apertures in the axe-heads to the consternation of the suitors, while a thunder clap from Zeus gives augury of his success in the greater contest that impends. Then at the opening of the twenty-second book comes what

the ancients felt as the supreme climax of the poem.

- "Stripped from the rags of the beggar he stood forth,
lordly Odysseus,
"Sprang to the great stone threshold upholding the
bow and the quiver,
"Showered the shafts at his feet and spake to the
wondering suitors:
"Lo one test is accomplished, too hard ye deemed for
fulfilment;
"Now at a strange new target I'll aim my arrows to
know if
"Mine be the fortune to hit it and glory by grace of
Apollo."

Then begins a murder grim and great to which only the accumulation of outrage from the beginning of the poem can reconcile the reader. Homer feels this and represents Odysseus as checking Eurycleia's exultant cries and chiding her with the words

- "Piety suffereth not that we make vain boast over
slain men;
"Pate slew these and the judgment of God, and their
deeds that were evil."

Like the 'Iliad,' the 'Odyssey' continues after what the modern reader feels to be the culmination. But we could ill spare the twenty-third book in which the hard-hearted Penelope as her reproachful son calls her at last recognizes Odysseus, and which contains one of the sweetest, truest most intimate portrayals in all literature of that friendship of happy marriage of which Homer elsewhere says "they themselves know it best." The last book, which many critics reject as a later addition, recounts the descent of the suitors' souls to Hades, the visit of Odysseus to his old father Laertes at an outlying farm, the beginnings of a conflict with the kinsmen of the suitors and the final arrangement of a peace by the intervention of Athene in the form of Mentor.

PAUL SHOREY.

ÆCOLAMPADIUS, ĕk"ō-lām-pā'dī-ūs (‘Light-of-the-House’), Græcized name of Johannes Hüssgen, German religious reformer: b. Weinsberg, Württemberg, 1482; d. Basel, 24 Nov. 1531. He began by studying law in Bologna, and after a further course in philosophy, history and the classical tongues in Heidelberg, Tübingen and Stuttgart, he returned to Weinsberg. He was appointed preacher at Basel in 1515 and assisted Erasmus in producing his edition of the New Testament. After two years' residence at Augsburg (1518-20) he entered the monastery of Saint Bridget at Altenmünster, near Augsburg. Coming upon Luther's writings he left the monastery and, joining the reform movement, eventually went to Basel (1522), where he was appointed professor of theology and occasional preacher in Saint Martin's Church. He vigorously pushed forward the Reformation by his disputations, addresses and writings; especially by his controversial activity at Baden in 1526 and at Bern in 1528; he did the same service at Basel, where as rector of the cathedral he occupied the leading ecclesiastical position. He was in 1531 called to Ulm and worked there with Bucer and Blarer in the cause of ecclesiastical reformation. He entered upon a stubborn controversy with Luther on the subject of the Lord's Supper and espoused the view of Zwingli in his 'De Genuina Verborum Domini, Hoc est Corpus Meum, Interpretatione.' In 1529 he held a public disputation with Luther on the same subject at Marburg. He was one of the kindest-

hearted and most liberal-minded of the reformers. Weak in health from his early days, he overtasked his strength, and by his premature death was in some degree a martyr to his own zealous activity. He was buried in the cloister of the cathedral at Basel. Consult Herzog, J. J., 'Leben von Johannes Hüssgen' (1843); Hagenbach, K. R., 'Leben von Johannes Hüssgen, mit ausgewählten Schriften' (1859); Walker, Williston, 'The Reformation' (New York 1900); 'Cambridge Modern History' (Vol. 2, New York 1904).

ŒCUMENICAL, ĕk-ū-mĕn'ī-kal (Greek, *oikoumenikos*, of, or pertaining to, the whole inhabited or civilized world, generally the Mediterranean Basin, universal). This epithet is generally applied to the general councils of the Church, or councils to which all the bishops throughout the world were invited. According to the theologians of the English Church there have been only six Œcumenical councils, namely, that of Nicæa, 325 A.D.; Constantinople, 381 A.D.; Ephesus, 431 A.D.; Chalcedon, 451 A.D.; Second of Constantinople, 553 A.D.; and Third of Constantinople, 680 A.D. In the Roman Catholic Church it is applied to those councils whose members are convoked from the whole world under the presidency of the Pope or his legates, and whose decrees, confirmed by the Pope, bind all Christians. In the case of the first Œcumenical council, that of Nicæa or Nice, the Emperor Constantine summoned the bishops and Hosius presided as Pope Sylvester's legate. Toward the end of the 6th century the patriarchs of Constantinople assumed the title 'Œcumenical' in the same sense as the epithet Catholic in the Western Church but the Roman See always refused to sanction it. See COUNCIL; NICÆA, COUNCIL OF.

ŒDEMA. See DROPSY; PATHOLOGY.

OEDENBURG, ē'dĕn-boorg, a royal free city and capital of the district of the same name in Hungary. See ÖDENBURG.

ŒDIPUS, ēd'ī-pūs, the principal character in three tragedies of the Greek dramatist Sophocles. He was the son of Laius, king of Thebes, and his wife, Jocasta. As Laius had been warned before the child's birth that he was to die by the hands of his son, he ordered the infant to be exposed on Mount Cithæron, his feet having first been attached together by a transfixing pin. The effect of this cruelty was that he was afterward known as "the man with swollen feet" (Œdipus). The herdsman to whom the task of exposing the child was committed compassionately gave him to the shepherd of Polybus, king of Corinth, who was childless, and Œdipus became that monarch's adopted son. The young man, who considered himself a prince of the Corinthian royal house, was once taunted with his origin by a drunken companion; his suspicions were roused and he fled from Corinth. The oracle at Delphi in answer to his inquiries as to his birth would only tell him that he was fated to slay his father and marry his mother. Leaving the oracle he pursued his journey and met Laius and his servants. The king of Thebes in his chariot tried to force Œdipus from the road and was slain by the young man, who slew all the attendants also, as he supposed. In course of time he reached Thebes, where

Creon, brother of Laius, had succeeded to the throne, and was offering the hand of the widowed Jocasta as well as the kingdom to the man who should release the city from the sphinx, a monster which devoured every one failing to find an answer to her as yet insoluble riddle. Œdipus answered the riddle and slew the sphinx. He had many years of prosperity as king of Thebes and husband of Jocasta, but eventually a pestilence visited the land which, according to the Delphic oracle, could only be checked by expelling from the country the assassin of Laius. When at last it was brought home to Œdipus that he was the man he put out his eyes and Jocasta hanged herself. Then Œdipus went forth a wanderer led by the hand of his daughter Antigone, the Cordelia of the Greek stage, until he reached Athens, entered the grove of the Eumenides and there was called without death or pain into the other world. The legend of Œdipus is, however, much older than the drama of Sophocles. It seems to have been one of the primitive folktales; and it eventually, in the hands of the storytellers, became one of the earlier epics of the Greek people. It is briefly but clearly indicated in the *Odyssey*. It seems, as a folktale, to have varied very much according to the district and the storyteller. Consult Jebb, Sir R. C., 'Œdipus Tyrannus,' 'Œdipus Coloneus' and 'Antigone' (Introductions, Cambridge 1891-1900); Seneca, 'Œdipus' and 'Phœnissæ.'

ŒDIPUS COLONEUS, *kō-lō-nē'ūs*, ('Œdipus at Colonus,' Greek tragedy by Sophocles, first presented at Athens after his death by his grandson, Sophocles, in the archonship of Nicon, 402 B.C. (See ŒDIPUS). The play, replete with pathos and beauty, is staged in the Eumenidian grove, to which the faithful Antigone has led her father, the blind Œdipus, and where he dies. Legend says that Sophocles by reading aloud the finest passages in it proved his sanity when brought before judges by his children who were eager to administer his property.

ŒDIPUS COMPLEX, a concept used in psychoanalytic procedures meaning that every individual has deeply buried within his unconscious certain tendencies which were once conscious in the human race but have by cultural repression become unconscious and unthinkable. It derives its name from the Greek theme of the story of Œdipus, written by many dramatists in the Grecian period, chiefly Euripides and Sophocles, and, expressed very tersely, portrays the tragedy and catastrophe which result from incest with the mother — or father. Traces of this old racial taboo and the efforts made by the individual in controlling it are made the special concern of the psychoanalytic technic, since the hypothesis assumed is, that the individual's unconscious motives are best appraised, as to their social ethical values, in terms of the individual's greater or lesser conquest of this old racial struggle. The Christian terminology, "unless ye leave father and mother, ye shall not enter the kingdom of heaven," is a non-psychological rendering of the same problem. The Œdipus Complex has to do only with unconscious thinking. To state it, as some silly critics of psychoanalysis have

done, as the "son's love for the mother" as a conscious process is nonsense. The hypothesis is one of the broadest generalizations of the psychoanalytic technic and its discovery by Freud, in its various disguised and complicated distortions, one of the great psychological generalizations of modern science. Consult Jelliffe, 'Technic of Psychoanalysis'; Jones, 'Papers on Psychoanalysis'; Lay, 'Man's Unconscious Conflict.' See PSYCHOANALYSIS.

ŒDIPUS REX is the masterpiece of Greek drama. Sophoclean art is here at its highest. In subtlety of structure the play remains to this day unequalled. Among all the choral compositions of Sophocles the odes are distinguished for their variety. To sentiments most diverse the poet gives admirable lyric expression. The 'Œdipus Rex' is a magnificent psychological study of a great character suddenly meeting with an overwhelming reverse of fortune. From the first utterance of Œdipus to the very end of the play the action moves straight on to the goal. The past deed of Œdipus reveals to us the cause of his horror without putting him beyond the pale of our sympathy. The fact that the play received only the second prize furnishes food for thought. What must some of the thousand lost plays have been? No other drama shows mastery to an equal degree in the development of plot. Modern plays can more easily separate plot and character, since new scenes can be introduced and minor parts multiplied. Some of Voltaire's plays are models of ingenious construction; but they are uninteresting, whereas in the 'Œdipus Rex' the highest constructive skill is closely associated with a wonderful delineation of a few characters. The style is rich and flexible, the power of language marvelous. The whole fabric of the drama rests on an improbability, but, as Aristotle says, this falls outside the action of the play.

The scene is before the palace at Thebes. Œdipus comes forth and asks the suppliants the meaning of their frequent cries of dole. The priest replies: "a curse is on our land — Thebes is harried by a pestilence." But the king already knows their ailment. His soul groans for state, for self, for all. He has sent Creon, his wife's brother, to Delphi to learn how he may deliver the state. The messenger arrives and reports that the oracle commands him to drive out the man that slew the former king, Laius. Œdipus promises to search out the criminal. Fifteen Theban elders enter and sing an ode of supplication. Œdipus asks their assistance that he may obtain some clue to track the guilty man: no one is to speak to the murderer, share house, sacrifice or prayer with him. Even if he should prove to be a member of his own household, may the same curse rest on Œdipus himself, if he does not thrust the murderer forth. He avers that he will prosecute the case as for his own father. The chorus protest their innocence, but suggest that Œdipus would not go amiss if he sent for Teiresias. But Creon had already advised this course, and he wonders why the blind seer tarries. At this moment the soothsayer appears. The king entreats him to name the murderer, but Teiresias, loth to speak, turns to go: "I will not proclaim my secret grief — that I say not thine." "Sdeath! you know and will

not tell?" "Your questioning will be vain." "Arch villain! why you would turn a very stone to rage." "What is to come will come e'en if I refuse to unseal my lips." "Were you not blind, I'd say that you did the deed." "You are the man that defiles this land accursed." "Insolence surpassing insolence! How do you expect to escape?" "The truth is my strength. You slew the man whose slayer you seek." "Measureless liar! Not with impunity will you repeat that infamous charge." "You have been living with your dearest kin most foully and knew it not." "Presumptuous priest! Do you think you will say on and on and not smart for this?" Œdipus now inveighs against wealth and sovereignty for the envy that goes with them; his old friend Creon is seeking to overthrow him and grip the general sway by the merit of vile gold, hiring a scheming charlatan, blind in his art, but open-eyed for gain. The seer replies: "In all the world there is none that will be more miserably crushed than you." "Vengeance! Death! Confusion! Damnation seize you! Out of my sight! Ayaunt! Back whence you came and rid me of your presence!" The chorus waver. No prophet can be trusted if he prove false; but Œdipus was shown to be wise when the Sphinx came against him of old. Highly indignant, Creon enters as the king comes forth. After a warm altercation Creon declares that he never had a thought of aspiring to the throne. Jocasta comes out and urges her husband and brother to check their hideous rashness. Turning to Œdipus she bids him allay his fire of passion with the sap of reason: once an oracle came to her from Delphi declaring that the child born to her and Laius was destined to slay his father, but when only three days old the babe was exposed—so the oracle was not fulfilled, for the king was slain by robbers at three crossways. Mention of this spot startles Œdipus. "Who brought the report?" "A slave, the sole survivor. When he saw you crowned King he begged me to send him to the pastures far from town." The queen sends for the herdsman. Œdipus confides to her the story of his past life: "My father was Polybus of Corinth. One day a fellow drunk with wine declared I was not my father's son. I questioned my parents and they were angry at the man and answered me evasively. But the reproach haunted me, and I went to Delphi to ask Apollo, but he dismissed me with words of woe and terror that it was my fate to mate with my mother and slay my sire. I turned, avoiding Corinth, and went where you say the king was slain. There I met a herald and a man in a carriage. They tried to force me from the road. Furious, I struck the driver; but the old man fetched me a blow with his goad. Then I slew all." Jocasta reassures Œdipus: the herdsman cannot retract his story; besides, Apollo predicted the death of Laius at her child's hands.

The chorus sing an ode on the sanctity of the eternal laws that wane not away. A messenger enters. He brings good news: Polybus is dead, and the people desire to crown Œdipus king of Corinth. But Œdipus refuses: while his mother, Merope, still lives, he cannot hope for peace. The Corinthian then informs the king that Polybus and Merope were not his parents, for he had received the babe Œdipus from

a herdsman, in the winding glens of Cithæron, his ankles transfixd with spikes—hence his name "Swellfoot" (Œdipus). The king gives peremptory orders for the herdsman to be brought. Jocasta rushes into the house, and Œdipus is obliged to resort to rigorous measures before the old man consents to tell the truth: the queen had given him, Œdipus, as a babe, to expose on a mountainside, because she was afraid of the prophecy that he would kill his father. "O light, never will I look on thee again. Born accursed, living sinfully with those I should not, and murderer of my sire!" With these words Œdipus rushes into the palace. Jocasta has already realized that she can live no longer. She alone had discerned the whole truth and recognized that the awful dénouement was coming. For dramatic skill and power hardly any other drama contains any thing so fine as her exit. After the choral song a messenger comes out: "Oh, what deeds, what grief! Jocasta's dead. She rushed to her bridal bed, clutching her hair and calling on Laius. Then in burst Œdipus. To and fro he rushed begging for a sword and calling on his wife who was no wife. With a dreadful cry he sprang to the door, forced the bolts and rushed into the room. There he beheld his wife hanging in a noose of twisted cords. With a cry of woe he loosed the knot. Then from her vesture he tore the brooches and drove them full into his eye-balls, shouting: "No more shall ye behold the wrongs I suffered and all I wrought." Many times he smote and at each blow a dark shower of blood drenched his beard. "Look! The gates are opening." As the musicians play an overture, Œdipus comes forth: "Oh, how my soul is pierced by the stings of the sorrows I never can forget! O take me away, the damned, disgraced, accursed. O Cithæron, why didst thou shelter me? O ye three roads and secluded glen that drank my blood shed by these hands from my father's veins! O nuptials, ye brought me into life and produced fruit from the same soil—fathers, brothers, sons, brides, mothers, incestuous acts and all the foulest sins that men can name!" Creon enters and tells the wretched king that he has not come to cast reproaches. Œdipus entreats him to bury Jocasta with due rite: "but my two hapless, helpless girls—do thou care for them. If I could but touch them—O ye gods, do I hear them weeping? Are my darlings here? Come to these brother arms. I can but weep for you. To what gatherings will you go and not come home in tears? Wickedness and crime of every sort are here—your father slew his father, wed his mother and got children of her from whom he sprang. O Creon, do not suffer your poor little nieces to wander about as helpless waifs. They are so young and tender, so delicate." Creon finally prevails upon the unhappy man to go within. As the chorus march off they bid all behold how the mighty have fallen and the play ends with the Greek truism: "Count no man happy until he has reached the goal of life."

Œdipus is the ideal hero of all tragedy. He accords with Aristotle's conception of such a character—one not without human weakness, yet by no means a thoroughly bad man. The play also meets Aristotle's requirement that the reversal of situation should accompany the

recognition of identity of persons. In no other drama is the tragic irony so manifest. Œdipus himself opens the investigation which is to bring about his own destruction. The first disclosure is made in his wife's reassurance, and the last link in the chain of evidence is his examination of the chief witness, the herdsman. Apollo's oracle came to fulfilment. Human wisdom was proved to be foolishness with God.

King Œdipus is of all Sophocles' tragedies the one in which the unexpected plays the most prominent part. As soon as the investigation begins, the revelations come in throngs. What produces the great dramatic beauty of the play is the effect made on the chief character by these successive accusing revelations. No other dramatist has succeeded in an equal degree with Sophocles in portraying a great soul, overwhelmed with grief and suffering, bitterly meditating on its destiny and manifesting in the midst of tears firmness of judgment, consciousness of rectitude and majesty in the most terrible moral distress.

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ŒDIPUS TYRANNUS, tî-rân'ûs, ("Œdipus the King," the greatest drama by Sophocles (q.v.), played first at Athens about 415 B.C. (See ŒDIPUS.) It is considered the most representative of the Greek tragedies; and as such had very considerable influence upon subsequent Greek literature and upon European literature during the long classical period. The same theme was treated in Latin by Seneca, in English by Dryden and in French by Corneille, Voltaire, Chénier and Lacroix. The scene of the story is laid in Thebes which is being scourged by a fearful pestilence, which can be driven forth only by the punishment of the murderer of Laius upon whom a curse has been invoked by Œdipus. The plot gradually leads Œdipus to a realization of the fact that he himself, though he did not know it, is the murderer of his father. In horror at the revelation Œdipus blinds himself and begs Creon to send him into banishment.

OEHLenschläGER, é'lën-shlâ-gër, or **OEHLenschläGER**, Adam Gottlob, Danish poet and dramatist: b. Vesterbro, near Copenhagen, 14 Nov. 1779; d. Copenhagen, 20 Jan. 1850. He was son of the organist of the Danish royal palace at Fredericksburg; began to write poetry at nine; attracted the attention of Storm, who assisted in the boy's education; made unsuccessful ventures in commercial life and as a comic actor; and under the patronage of the Oersted brothers (qq.v.) again devoted himself to study and to literature. Strongly imbued with the spirit of the Old Norse sagas and with modern German romanticism, his first published poems, 'Digte' (1803); 'Tors Reise til Jotunheim'; 'Vaulundurs Saga' and 'Aladdin, eller den forunderlige Lampe,' gained him a national reputation at 26 and won from the government a pension for foreign travel. In Halle, where he lived with Steffens, he wrote the great historical tragedy, 'Hakon Jarl'; and upon his return to Denmark was elected professor of æsthetics in the University of Copenhagen (1810). His best work was done by 1830, the later volumes being far below the average. Oehlenschläger is the great national poet of

Denmark, a leader of the romantic movement, who did much for renewed interest in early Teutonic and Norse literature and legend and who was spiritually akin with the English romanticists of the first half of the 19th century. It is perhaps as a dramatist that he is of most importance in Danish literature, though his dramas show more strongly epic and lyrical qualities than dramatic. This however is a general characteristic of the Romantic movement of this period. They are important on account of their really national spirit and the fact that most of them have for their themes the popular sagas and folktales of the Norse countries to which Oehlenschläger's work gave a new life and a peculiar interest which has continued to grow since his day. Oehlenschläger's 'Aladdin' is accessible to the English reader in the excellent version by Sir Theodore Martin (1863). His other important works include 'Correggio,' a tragedy written in German (1809)—it is to be noted that Oehlenschläger himself translated all his works into German—a Norse romantic cycle 'Helge' (1814); another Oriental theme, 'Ali og Gulhyndi'; the tragedy 'Stärkodder' (1812); the poetic cycle 'Frederiksberg' (1817); the tremendous epic 'Nordens Guder' (1819), to which 'Hakon,' 'Baldur' and 'Tors Reise' paved the way; 'Erik og Abel,' a tragedy (1820); and 'Dina' (1842), almost the only one of his late works with a gleam of the old fire. See AXEL and VALBORG; HAKON JARL.

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OEHLER, é'lër, Gustav Friedrich, German theologian; b. Ebingen, Württemberg, 10 June 1812; d. Tübingen, 19 Feb. 1872. He studied at Berlin and Tübingen and subsequently taught at Basel and Tübingen. In 1840 he became professor in the theological seminary in Schöndal, was appointed professor of theology at Breslau in 1845 and in 1852 he became head of the theological seminary at Tübingen. He opposed the union of the Lutheran and Reformed churches, and he held aloof from the old Lutheran party, while subscribing to confessional Lutheranism. He was one of the most prominent Old Testament scholars on the conservative side. Among his works are 'Introduction to Old Testament Theology' (1845); 'Outlines of Old Testament Knowledge' (1854); 'Relation Between Old Testament Prophecy and Heathen Soothsaying' (1861); 'Old Testament Theology' (1873-74), English translation (1874-75), and 'Manual of Symbolism' (1876). Consult Knapp, 'Ein Lebensbild von Oehler' (1876).

OEHME, é'më, Ernst Erwin, German painter: b. Dresden, 18 Sept. 1831; d. 1914;

son and pupil of Ernst Friedrich Oehme, the landscape painter. He attended the Dresden Academy of Art, and for a short time worked under Ludwig Richter; after which he made an artistic tour through Germany, Switzerland, England and France. He painted, in oils and water-colors, landscapes, architectural views, genre and portraits. The Court Theatre at Dresden was decorated by him; a series of tapestries was also painted by him in water-color, in imitation of Gobelin tapestry. His 'Stone Quarry in Saxony' (1860) is in the Dresden Gallery; and he executed for Queen Carola of Saxony a collection of views of Compiègne. The most important of his remaining pictures include 'Funeral in Spreewald'; 'Bear Hunt' (in water-colors); 'The Valley of Montafont.'

CEIL-DE-BŒUF, é'y'-dē-bél (ox's eye), a small round or oval window. Such a window in the palace of Versailles gave the name *Salle de l'Oeil de Bœuf* to the king's ante-chamber. Since the Renaissance the window has been used frequently with decorative intent as in friezes along the upper parts of buildings, and it is largely with such significance that the term is used in English.

OELAND, é'länd, Sweden. See ÖLAND.

OELWEIN, ôl'wîn, Iowa, city in Fayette County, Iowa, on the Rock Island and Pacific and on four lines of the Chicago Great Western railroads, about 65 miles in direct line west by north of Dubuque. It was settled in 1873 by August Oelwein; was incorporated January 1888, and chartered as a city March 1897. It is in an agricultural region but it has considerable manufacturing interests. The Chicago Great Western Railroad has repair shops there. The government is vested in a mayor and a council of eight members, who are elected biennially. The city owns and operates its waterworks. Pop. (1920) 7,455.

CENANTHOL, ē-năn'thōl, in chemistry, a product of the dry distillation of castor-oil preferably in a vacuum. The immediate product of the distillation is mixed by shaking with a solution of carbonate of potash and then heated, when cenanthol ($C_{18}H_{36}CHO$) separates as an oily colorless fluid with a strong aromatic odor, slight solubility in water, a boiling point of $155^{\circ}C.$, and at $17^{\circ}C.$ a density of 0.827. By oxidation of cenanthol, or by direct oxidation of castor-oil, cenanthylic acid ($C_{18}H_{36}COOH$) is prepared; this is a fatty volatile acid, the esters of which were formerly supposed to give wine its odor, although it is now known that this odor is due to a mixture of esters of capric and caprylic acids.

CENANTHYLIC ACID, one of the volatile fatty acids. See **CENANTHOL**.

CENEUS, ē'nūs, in Greek mythology, the king of Pleuron and Calydon in Ætolia. He was the husband of Althæa, and by order of Diana his country was ravaged by the Calydonian boar. He was dethroned and imprisoned by the sons of his brother Agrius, but was rescued by his grandson, Diomedes, who restored the kingdom to his son-in-law Andræmon, Ceneus being then too old to rule. He was afterward killed by the sons of Agrius. The city of Cenoë was built over his burial place. Legend says he received the grape vine from

Bacchus; hence the juice of the grape was called "oinos," the Greek form of his name. Consequently he is the reputed introducer of vine culture into his own land, from whence it spread first over all Greece and then over the civilized world.

CENONE, ē-nō'nē, a nymph, daughter of the river-god Cebren, or Kebren, and wife of Paris. She was gifted with powers of prophecy and warned Paris not to undertake the journey which resulted in the rape of Helen. Upon his refusal to heed her cautions she told him that she alone could heal him if he were wounded. Angered by the faithlessness of Paris, however, she refused to minister to him when he returned after the fall of Troy, although some accounts state that her father would not permit her to heal him. Paris returned to Troy, where he died. Cenone, repenting, or escaping from her father's authority, hastened after him with medicines, but arrived after his death. Frenzied with grief she is supposed to have cast herself upon his funeral pyre; while other accounts represent her as flinging herself from a tower, or as hanging herself. The story is told in Ovid's 'Heroides' (v) and in Tennyson's 'Enone' (1832).

CENOPIDES, ē-nōp'i-dēz, Greek astronomer: b. Chios, 5th century B.C. He is reputed to have studied under the Egyptian priests, and is said to have known of the obliquity of the ecliptic. Ælian credits him with inventing the cycle of 59 years in order to make the lunar year accord with the solar year.

CENOTHERA, a genus of plants of the family *Onagraceæ*, popularly known as the evening primrose (q.v.).

OERSTED, ér'stēd, Anders Sandøe, Danish statesman, brother of Hans Christian Oersted: b. Rudkjøbing, 21 Dec. 1778; d. Copenhagen, 1 May 1860. He studied philosophy and law at Copenhagen and was admitted to the bar in 1799. He became a famous jurist, was appointed Attorney-General in 1825 and drew up the Constitution granted in 1831. He was cabinet minister, 1842-48 and from October 1853 to December 1854 was Prime Minister, his speedy resignation being forced by his unpopular conservatism, a distinct departure from his earlier politics. He was impeached with his entire cabinet, but all were acquitted. Oersted wrote on Hegelian philosophy, on Danish and Norwegian law (1822-23), on Scandinavian politics (1857) and has left an interesting autobiography (1856).

OERSTED, Hans Christian, Danish physicist: b. Rudkjøbing, 14 Aug. 1777; d. Copenhagen, 9 March 1851. His father was an apothecary and the boy assisted him, studied at Copenhagen, where he became assistant in the medical faculty in 1800, traveled in Europe 1801-04 and again 1812-13 and in 1806 was appointed professor of physics at Copenhagen. In 1829 he became director of the new Polytechnic of the same city and in 1850 a privy councillor. His greatest work written in Berlin was the result of experiments on the magnetic needle with the electric current, which established the intimate interrelation of electricity, galvanism and magnetism and which were described in his 'Experimenta circa Effectum Conflictus Electrici in Acum Magneticam' (1820). In 1819

he discovered experimentally that a magnetic needle was deflected by a current in a wire passed over it or below it. This is the earliest recorded experiment in electric magnetism; and is of great importance because it opened the way to many brilliant experiments and finally led to the subjugation of electricity to industrial and other uses. As a reward for this and other experiments and discoveries in electricity Oersted was awarded the Copley medal by the Royal Society of England and the highest mathematical honors of the Institute of Paris. Oersted also wrote a valuable 'Manual of Mechanical Physics' (1844) and various studies in chemistry, physics, metaphysics, æsthetics and popular science, all pervaded with his predominating thought of the unity of sciences and their position as the servants of religion. His style is clear, picturesque and attractive and his works have been popular in the original and in German versions. Oersted endeavored to make scientific subjects popular, and with this end in view he wrote very many periodical articles and numerous books and his university lectures were thrown into popular form. Consult Alexander, C. A., 'Memoir of Oersted' (a translation of Beaumont's life of Oersted, published in the Annual Report of the Smithsonian Institution 1868 and in book form 1869); Hauch and Forchhammer, 'Biography of Oersted' (1853).

OERTEL, ɛr'tɛl, Johannes Adams, German-American Episcopal clergyman and artist: b. Fürth, Bavaria, 3 Nov. 1823; d. 1909. After studying art in Germany he practised engraving until 1848, in which year he set up as a painter in New York. He painted 'Rock of Ages,' which became vastly popular and was reproduced in millions of photographs and chromolithographs. He took holy orders in 1867, has had more than one pastoral charge and was appointed professor of Christian art in the University of the South. He painted a series of four large pictures entitled 'The Plan of Redemption' which he presented to the university. He is also a successful wood carver, confining himself to ecclesiastical and religious subjects in both departments of his activity.

OERTEL, Max Joseph, German laryngologist: b. Dillingen, 20 March 1835; d. 19 July 1897. He was educated at Munich, was docent in laryngology there in 1867-76 and thereafter was professor of that subject. He discovered the diphtheria bacillus in 1868, devised a famous system for the correction of respiratory troubles and invented the laryngoscope. Author of 'Respiratorische Therapie' and 'Therapie der Kreislaufstörungen' in 'Handbuch der allgemeinen Therapie' (1883); 'Ueber Terrainkurorte zur Behandlung von Kranken mit Kreislaufstörungen' (1886); 'Pathogenese der epidemischen Diphtherie' (1887), etc.

OESEL, ɛ'zel, a Russian island. See **ÖSEL**.

OESER, ɛ'zɛr, Adam Friedrich, German painter, etcher and sculptor: b. Pressburg, Saxony, 17 Feb. 1717; d. Leipzig, 18 March 1799. He was trained as a sculptor under Raphael Donner and as a painter, in the Vienna Academy, 1730-39. He afterward was a pupil of Mengs and Dietrich at Dresden where he designed the decorations of the court theatre and

mural paintings in Castle Hubertsburg (1749). In 1759 he went to Leipzig where, in 1764, he was appointed director of the newly-founded art school. Besides his professional activity as a teacher he did a great deal of decorative work and won a reputation as a painter of ceilings. Among other things he executed a picture for the church of Saint Nicholas and a number of minor decorative panels and drawings. As a sculptor he shows to advantage in the statue of Frederick Augustus the Just in Leipzig and of the Danish Queen Matilda in Celle (Aisne-et-Nord). His versatility is proved by his masterly etchings, 45 in number, some after the manner of Rembrandt, some in a highly original style of his own. He was a strong opponent of mannerisms in art and he shared in Winckelmann's efforts after a reform in art through a study of the antique; but his own canvases give little evidence of Greek influence. By his passion for allegorical compositions he is sometimes betrayed into the extravagances of the rococo school. He was one of the great art teachers of his day and among his pupils was Goethe, with whom he kept in touch after the latter had become the leading spirit at Weimar. Among his numerous paintings, which are mainly of religious and mythological subjects and portraits, are 'The Artist's Children' (1766, in the Dresden Gallery); 'Marriage at Cana' (1777); 'The Painter's Studio' (Weimar Museum) and several in the Leipzig Museum. Consult Dürr, 'Biography of Oeser' (Leipzig 1879).

ŒSOPHAGOTOMY, ɛ-sɔf-a-gɔt'a-mī, a surgical operation for the relief of stricture of the œsophagus and the removal of foreign bodies lodged in it, when dilation and other measures are of no avail. There are two forms of the operation, external and internal. External œsophagotomy consists in cutting into the œsophagus in front between the thyroid cartilage and the sternum, and extracting the foreign body with forceps, or dividing the stricture with a knife. Internal œsophagotomy is usually resorted to for the relief of stricture, especially when of cicatricial origin. The stricture is divided by a cutting instrument (the œsophagotome) passed through the mouth. After the operation bougies are used to prevent recontraction. When the œsophagotome cannot be used, or inanition is imminent, gastrotomy or opening the stomach so that food can be given is resorted to.

ŒSOPHAGUS. See **DIGESTION**.

OESTERLEY, ɛs'tɛr-li, Karl, son of Karl Wilhelm Oesterley (q.v.), German painter: b. Göttingen, 23 Jan. 1839. After studying in the Hanover Polytechnic under his father, he went to Düsseldorf (1857), and began under Deger his essays as a religious painter. On a visit in Lübeck (where he copied Hans Memling's 'Passion of Christ,' 1865) he was attracted to landscape and architectural pieces and was so successful in this domain that he thenceforth devoted himself to landscape. Since 1870 he has generally derived his *motif* from Norwegian scenery. His pictures are distinguished for their dazzling color, transparent atmosphere, distinctness in light and texture and grandeur of conception. Among them are 'Midnight near Lofoden'; 'Mountain Gorge in

Norway'; 'Romsdalsfiord'; 'Scene on the Coast of Northern Norway' (1879, in the Museum at Breslau); 'Raft Sound' (1879, Breslau Museum); 'Fishing on the Norwegian Coast,' 'View on Salten Fiord' (1882, Hamburg Gallery); 'Lodenwand on North Fiord' (1885, National Gallery, Berlin); 'Romsdal Fiord' (1891, Leipzig Museum).

OESTERLEY, ẽ'stẽr-lĩ, **Karl Wilhelm**, German painter: b. Göttingen, 20 June 1805; d. Hanover, 28 March 1891. He was a pupil of Matthæus in Dresden, studied in Rome 1824-29, in 1831 was appointed professor of the history of art in the university of his native town and in collaboration with Ottfried Müller published 'Monuments of Art.' Meanwhile he was extending his artistic studies in Düsseldorf, Munich and Paris. On the completion of his picture, 'Christ and Ahasuerus' (1844), he was appointed court painter of Hanover. The chief of his remaining works are 'Jephtha's Daughter' (1836); 'Christ Blessing Little Children' (1841); 'The Ascension' (in the chapel royal at Hanover, completed 1838; 'Scene from Bürger's "Lenore."') He produced also altar-pieces and portraits and designed stained-glass windows.

OETINGER, ẽ'ting-ẽr, **Friedrich Christoph**, German theologian: b. Göppingen, Württemberg, Germany, 1702; d. Murrhardt, Germany, 10 Feb. 1782. He was educated at the University of Tübingen and became reader of theology at the University of Halle. In 1738 he took charge of the parish of Hirschau and gained the leadership of the Pietists in that section. His translation of several of the works of Swedenborg brought upon him ecclesiastical censure, but he was protected by the Duke of Württemberg and latter was appointed superintendent of the churches in the district of Weinsberg. He subsequently held the same position in Herrenberg and afterward became prelate in Murrhardt. He wrote many theological treatises which have been edited by Ehmann, over 70 in all (1858-63). Among these is 'Earthly and Heavenly Philosophy,' which on account of its religious views raised a storm in Germany. Consult monographs by Auberlin (1847), Ehmann (1859) and Wächter (1885).

O'FARRELL, Michael Joseph, American Roman Catholic bishop: b. Limerick, Ireland, 2 Dec. 1832; d. Trenton, N. J., 2 April 1894. He was educated at the Seminary of Saint Sulpice, Paris, and ordained to the priesthood in 1855. He went to Montreal where he was pastor of Saint Patrick's and Saint Bridget's churches and in 1869 accepted a call to New York as assistant in Saint Peter's Church. In 1881 he became the first bishop of the then newly-formed diocese of Trenton, N. J.

OFFA, a king of Mercians in Anglo-Saxon England: d. 796. He succeeded to the throne after Ethelbald, on defeating the usurper Beornræd, 757 A.D. Kent and the East Saxons were brought under his rule, and the power of Wessex was crushed by a defeat in 779. He likewise defeated the Welsh, wrested from them part of their border lands and to retain them within their own limits erected here the rampart known as Offa's Dyke (q.v.). With the consent of Pope Adrian I he raised the see

of Lichfield to the position of an archbishopric; and he had diplomatic intercourse with Charlemagne. Ethelbert, king of East Anglia, was murdered by his instigation and Offa then seized his kingdom. He founded the abbey of Saint Albans, and a grant by him to the see of Rome is supposed to have been the origin of Peter's Pence (q.v.). He promoted trade between England and the Continent. Consult Hodgkin, Thomas, 'Political History of England' (Vol. I London 1906); Oman, C. W. C., 'England before the Norman Conquest' (New York 1910).

OFFA'S DYKE, an ancient earthwork extending along the whole border between England and Wales, said to have been built by King Offa of Mercia in the 8th century, as a boundary between his dominions and those of the Welsh. It extends from the vicinity of Newmarket, in Flintshire, and traverses the counties of Flint, Denbigh, Salop, Radnor, Hereford and Monmouth to Beachey, at the mouth of the Wye. Another dyke of a similar kind called Watts' Dyke runs at distances of from one-fourth mile to three miles apart from Offa's Dyke, in the same direction, through the counties of Flint and Denbigh. These dykes are supposed to mark the neutral ground on which the Welsh and Britons were at liberty to meet for transacting business.

OFFENBACH, Jacques, zhāk õf-ẽn-bāk, French Hebrew composer: b. Cologne, 21 June 1819; d. Paris, 5 Oct. 1880. He entered the Paris Conservatoire in 1833, became proficient on the violoncello and for some time played this instrument in the orchestra of the Opera Comique. Later he was conductor of the orchestra at the Théâtre Français, and in 1855 opened the Bouffes Parisiens, where he enjoyed immense popularity. There were presented many of his most popular works, 'Orphee aux Enfers' (1858); 'Geneviève de Brabant' (1860); 'La Belle Hélène' (1865); 'La Barbe Bleue' (1866); 'La Grande Duchesse' (1867); 'La Princesse de Trebizonde' (1870); 'Madame Favart' (1878). From 1866 he devoted himself entirely to composition. His last opera and the one that he considered his best was 'Les Contes d'Hoffman' (1881), successfully produced at the Opéra Comique after his death. Offenbach was a clever musician; his music is natural and has a verve and swing which made it immensely popular. This, combined with the excellent librettos of all the Offenbach operas and operettas, easily makes their author the master spirit in his own field. He was the originator of the opera-bouffe, and was imitated by many who never attained his melody or comic force. Consult Bekker, Paul, 'Jacques Offenbach' (Berlin 1909); Martinet, 'Offenbach, sa Vie, et son Œuvre' (1892).

OFFENBACH, õf'fẽn-bāk, Germany, town in the state of Hesse, five miles southeast of Frankfurt, on the left bank of the Main. It is well and regularly built, and has an old castle, formerly the residence of the princes of Isenburg, the modern palace of the prince of Isenburg-Birstein, a townhouse, several churches, a synagogue and theatre. Offenbach is the most active manufacturing town in the state. Its industries include fancy leather goods, such as pocket-books, portfolios and traveling bags;

and there are manufactures of aniline, celluloid, perfumery, stearin, vaseline, lacquer and other chemical products, sewing and other machines, and machine tools; paper of various kinds, boots and shoes, type-founding and printing. Offenbach was founded in the 10th century and in 1685 the Isenburg-Birstein family took up its official residence there. Pop. about 80,000.

OFFENBURG, öf'ën-bürk, Germany, city in the state of Baden, on the river Kinzig, 27 miles by rail southwest of Baden and 12 miles southeast of Strassburg. It is mentioned as early as 1100 and became a town in 1223 and a part of Baden in 1802. There are remains of old fortifications and many fine works of sculpture. There are manufactures of textiles, agricultural machinery, leather goods, dyes and cement and the town has some importance as a trade centre. Pop. 16,848.

OFFERINGS AND SACRIFICES, gifts offered to the Deity. Sacrifice differs from almsgiving as a religious service, or from contributions made merely for the purpose of supporting a system of external religion, in being offerings made directly from the worshipper to the Supreme Being. They may, however, under proper authority, be applied to charitable or religious uses; to the maintenance of the priesthood, or to the celebration of solemn feasts.

The origin of sacrifice is a point much disputed; the two opposed views being that of a primæval appointment by the Deity, and that of a spontaneous origination in the instinctive desire of man to draw near to God. The universality of sacrifice has been urged in favor of the hypothesis of a primitive institution by Divine command, but the more legitimate inference from this circumstance appears to be in favor of the opposite view. Of the symbolic character of sacrifice there are various kinds or degrees, all having in common the acknowledgment of dependence on the one hand and of protective power on the other. These may be represented under three heads — (1) propitiatory, or designed to conciliate generally the favor of the Deity; (2) eucharistic, or symbolical of gratitude for favors received; (3) expiatory, or offered in atonement for particular offenses. To a different class may be assigned deprecatory sacrifices designed to avert the arbitrary wrath or appease the wicked disposition of deities.

The origin of the Jewish sacrifices is traced to the earliest times. We are told in the book of Genesis (ch. iv), that "in process of time" Cain and Abel brought each an offering to the Lord, and the different characters and results of these offerings are recorded. After the flood Noah offered a sacrifice "of every clean beast and of every clean fowl," an apparent intimation that the distinction between clean and unclean animals had already been made, and consequently of a prior Divine appointment of sacrifice. Abraham, Isaac and Jacob offered sacrifices in which appeared a circumstance peculiar to the Jewish economy, that of a covenant between the offerer and the Divine being, of which the sacrifice was accepted as a sign. When Moses demanded the manumission of the Israelites from their bondage in Egypt, the plea which he presented to Pharaoh was that they might go three days' journey into the wil-

derness to sacrifice to the Lord. It was when the deliverance had actually taken place, and during their sojourn in the wilderness, that the Jewish ceremonial law with its elaborate ritual of sacrifice was given (accepting the ordinary traditional view regarding the so-called Mosaic legislation). The details of this ritual, with its surrounding observances, are amply set forth in the book of Leviticus. The burning upon the altar of animals is among the commonest of the forms of sacrificial rites both among the Jews and Gentiles. The Jewish sacrifices consisted mainly of burnt-offerings (of clean animals) daily, with double offerings on Sabbaths, and special offerings at festivals, unlimited in extent, and which, being partaken of by the people, were called peace-offerings. Such sacrifices, called hecatombs, were also common among the Greeks and Romans. Meat-offerings (of flour, oil and wine) accompanied the burnt-offerings. Sin-offerings (various) at special feasts and at each new moon were general expiatory offerings, besides which trespass-offerings were made privately on certain specified occasions, as well as in expiation of particular offenses. The most remarkable sin-offering was that of the two goats on the great day of atonement. Incense was offered every morning and evening. Offerings were made separately, first for the priests and afterward for the whole people. What is most noteworthy about the Jewish sacrifices was their restriction to one particular place, the tabernacle, and later the temple (but consult Ex. xx 24). Offerings on high-places were forbidden, and are always noticed with reprobation as the indication of a rebellious spirit. The view of Maimonides among the Jews, and of Warburton and others among Christian divines, was that sacrifices were not so much divinely appointed, as divinely permitted under restraints among the Jews, "lest," as it is expressed by Ephraim Syrus, "they should despise a naked religion and attach themselves to false gods." It is added, in support of this view, that when religion was more fully established the prophets constantly deprecated sacrifice, but this is hardly a fair account of what the prophets did. The prophets, indeed, with one voice unite in affirming the views of sacrifice represented by Samuel in his exhortation to Saul, that "to obey is better than sacrifice," and of our Lord, who, according to Saint Matthew, repeatedly cited the authority of the prophets for the saying that God will have mercy and not sacrifice, but it is clear that these statements were not directed against the established usage of sacrifice, but against an unreasonable reliance on it as a substitute for moral virtues.

The sacrifices of the Gentile nations were the result of natural impulses developed by tradition, or cultivated by priestly care into a system. The powers of nature, or the most prominent objects, celestial or terrestrial, in which those powers resided, were commonly their exciting causes; while the terror of natural convulsions, and still more the disorders and miseries of human life, conjured up malevolent beings, whose wrath was only to be deprecated by blood, and sometimes by the blood of those dearest to the offerer. Not animals alone, but slaves and captives, were sacrificed freely. Among many of the Eastern nations surrounding the Jews human sacrifices were common.

particularly among the Phœnicians. Some traces of this custom may be found in legendary times even among the Greeks and Romans. Numerous legends hang upon the circumstance that the wrath of some divinity is only to be appeased by the sacrifice of a human victim to be recognized in some special way, or sometimes of a continued series of such victims. In one other respect only do the heathen sacrifices, including those of the Greeks and Romans, demand special notice, as differing materially from those of the Jews in the frequent inclusion among them as a sacrifice acceptable to the Deity of the chastity of women. This is always denounced in the strongest terms by the Hebrew prophets. The sacrifices of the Greeks and Romans, like those of the Jews, were either bloody or bloodless, the former usually accompanied by libations of wine and by incense. They were frequently used as a means of consulting the gods, procuring omens, etc., and for political purposes.

Of the universality of sacrifice the annals of almost every people bear record. The ancestors of nearly all the existing races in Europe practised human sacrifices, and similar usages widely prevailed in Africa and America, as well as in Asia. Few religions, whether ancient or modern, have omitted sacrifices from among their rites. The Buddhists offer only first-fruits and flowers; the Mohammedans give alms, but offer no direct sacrifices. The Roman Catholic, Greek and Anglican churches make the service of the Eucharist a service of sacrifice each in a somewhat different sense or degree. The introduction of Christianity had the effect of indirectly putting an end to Jewish sacrifices, and of directly abolishing heathen sacrifices in the Roman Empire. These latter were prohibited by the Emperor Theodosius in 381. It was this final destruction of the temple by the Romans that abolished the Jewish sacrificial system which had been limited to its precincts.

OFFERTORY, in the Roman Catholic Church, is that portion of the service of the Mass in which the priest offers to God upon the altar the bread and wine which are to be consecrated. In the music of the mass the term offertory is used to designate the antiphon or music appropriated to that part of the service above designated. In the Anglican Book of Common Prayer the term offertory is applied to that portion of the service during which the alms are collected among the people, whether during the service of the Holy Communion or not, while certain prescribed sentences from Scripture are being said or sung. The alms are then offered by the officiating clergyman, being laid on the altar usually with an ascriptive address to God. When the Lord's Supper is celebrated the unconsecrated bread and wine are offered at the same time. In general the term offertory has the modern sense, in Protestant churches, of the collection of money made at a religious service; and it is also used to designate the music rendered at the same time.

OFFICE, Divine (Lat. *Officium divinum*) in the Roman Catholic Church, a general designation since the 9th century for the services of the canonical hours (q.v.). These services or offices are prescribed to be said each day by bishops, priests, deacons and subdeacons in the

Roman Catholic Church. See **BREVIARY**; **LITURGY**; **MISSAL**.

OFFICE, Qualifications for. See **ELECTORAL QUALIFICATIONS**; **TERMS OF AND QUALIFICATIONS FOR OFFICE**.

OFFICE LABOR-SAVERS. Man goes from barbarism to civilization by learning to do things better, quicker, easier or cheaper. Some labor-savers combine two or more of these improvements. America leads the world in prosperity because it led in adopting standard sizes for machine parts and in other labor-saving methods and devices. Obviously by as much as services of high salaried desk workers are more valuable than those of mechanics, by so much are literary labor-savers worth more than highly prized machines of manufacture and commerce. Yet it was not till the Library Bureau was founded in Boston as part of the national library movement started in 1876 that this was practically recognized. Since then there has been marvelous development, till now a device for saving time, labor or money in office, library or study is valued as highly as one for factory, shop or farm.

Hundreds of ingenious, practical labor-savers for technical uses will be urged by their promoters. Electric tabulating, computing, bookkeeping, addressing and other machines illustrate immense savings possible by devices, as important to desk workers as sewing-machines to seamstresses or modern tools to mechanics. If we admit that time and labor should be saved for brain work as for hand work, then the minutest saving is worth attention. Many factories make their entire profit by using an improved method or machine, or by utilizing waste in some by-product. In large offices, a method by which 4 motions do what formerly took 5 saves a large yearly aggregate in salaries.

Writing and Printing.—Writing is easily greatest of human inventions. All nations in traditions attribute to it divine origin. Some 5000 years ago Egyptian priests evolved pictures of things into ideograms or pictures of abstract qualities and ideas, then pictures for sounds of words or syllables (where some Eastern languages still stop); and finally pictures for sounds of final elements or single letters. These were written on stone, horn, clay, metal, wood, wax, bamboo, birch-bark, skins and papyrus, till we reached that wonderful product, paper. The first writing implement, of flint, was followed by stylus, fine brush of hair, split reed, quill, steel and gold dip pens, now in turn superseded by fountain pens and typers. After writing, the ancients invented abbreviation systems as labor-savers. Then came for cursive writing faster small or lower case forms of letters. Taking less space and being both written and read quicker, they will in time displace capitals entirely and avoid the foolish waste of having to learn two alphabets.

Avoid capitals. They take more time and space, are less legible. All recognized experts advise against them, and the best printers are cutting them out more and more. In signs, labels, bulletins, etc., lower case can be read easier and farther; for the small forms with their ascenders and descenders have been

proved by the marvelous instruments in psychologic laboratories to be much more legible. The uneducated tend to sprinkle their writing full of capitals. The next step was greater abbreviation and greater simplifying of forms by stenography, revolutionized and systemized by Isaac Pitman. (See SHORTHAND). The greatest invention after writing was printing, followed by telegraph, cable, telephone and wireless, which show what the human mind has already done and suggest future possibilities.

Model Office or Study.—A southeast corner room is best; north light is most uniform; west least desirable. Hygiene forbids carpets in public rooms. Use hardwood floors, or corticine, which is cheap, durable, easily washed, deadens noise and is warm. Atmospheric steam is best for heat. It is regulated as easily as hot water, heats or cools much quicker and is free from danger of freezing. For ventilation, have both inlet and outlet flues, with open fire if practicable. If not, insure circulation through flues by gas jets, steam pipes or motor fans. Desks should have window at left so the hand will not shadow the writing. Left-hand writers would reverse this rule. Roll-tops darken the desk, tempt to disorder and are forbidden in some offices. The roll, if used, is better over pigeonholes, which are best in front of the chair if one has many papers, as this allows most boxes to be reached quickest. Open pigeonholes allow quickest work, but catch more dust than drawers and take more space than vertical files, which hold on edge papers, pamphlets and clippings, and are cleanest, cheapest and best for most storage. Space not needed for pigeonholes in front and all under the desk is best used for vertical files or drawers. Telephone and desk lights (with metal shade to protect eyes), on arms, swing aside when not in use, and save desk space. Standard size pigeonholes, drawers, trays and shelves fill all blank wall space at left and behind, within reach from the swivel-and-spring desk chair.

Chairs with curved spring back give a grateful support to tired backs. Upholstered chairs are heating and sometimes dangerous.

A model desk is 78 cm high, not 75 as usual. Short men can use higher chairs but tall men cannot cut off their legs. The higher desk is better for eyes. Many stoop over desks because they are too low for natural eye focus.

Drawers run to floor without baseboard and clear through to back have side runs with no cross pieces and at no extra cost, give easier action and maximum storage. All drawers are at least 9 cm deep inside to hold standard card trays. A desk 78 cm high with no cross bars gives 1 drawer for V size, 4 for P and 1 for Q (see p. 601).

The middle opening for the feet is at least 60 cm wide with a centre drawer over it holding 50 by 60 cm sheets for large charts and tables. Above drawers each side are slides as long as width of top allows. On small desks may be added to either end extension leaves supported by folding brackets. Tops are 60 to 100 cm wide; 150 cm (60 in.) is the longest top whose ends can be easily reached from the chair.

Office bells are buzzers, not single stroke,

to allow simpler codes of time-saving signals. Buzzers allow short and long signals like telegraph dot and dash. Barometer or fountain sponge cup and mucilage stands save labor. Use only inkstands like Perfect or Capitol that prevent evaporation and so require no refilling till ink is all used. Self-inking rubber stamps for any words or dates often written save much time and give more distinct entries. If several are used keep in racks plainly labeled, or it takes as long to find the right one as to write the words. A metal straight edge exactly P size is much quicker than shears and ruler in fitting clippings and parts of sheets for trays.

Blanks.—Have printed blanks for everything much used, with alternatives both printed so that instead of filling in words, a single stroke crosses out those not wanted. Printing is cheap, clerical labor costly. A letter sheet with months at the head of 12 columns, ruled with 31 numbered lines, gives a square for each day in the year and is invaluable for statistics or records. Each sheet is thus a diary for 2 years. As they cost perhaps 1c, they may be used almost as freely as blank paper. For longer, or 2 or more column, entries use 6, 3, 2 or 1 month to the page, thus giving needed room for tables. Where summaries and charts are needed for shorter periods than a month use decimal blanks, i.e., decades instead of weeks. Leave a blank line for footing after each 10 days. This total is also day average by moving decimal point. In 31 day months it gives 3 decades and 1 single day, so every sheet shows, without figuring, totals and averages for each 10 days and also for the month. If working by week much duplicate figuring is necessary because except in February month and week have no common divisor.

Writing.—Vertical writing disjoined is more like print and some can write it as fast as sloping hand, which is so much less legible that libraries prohibit it on catalog cards.

Ink should dry naturally, blotting blurs sharp lines of writing and takes away some color.

Envelopes.—Odd size envelopes are a nuisance and go less safely in mails than standard sizes, as they project and are torn or crumpled by post office when tied in bundles. For notes and post cards use No. 5; for Q or 4P sheet (15 x 25 cm) No. 6¾; for letter-sheet No. 8½; if enclosing these, use No. 9. Never use for manuscript a sheet wider than 20 cm. Science proves this line much too long for easiest reading. The best width of paper is about 15 cm.

Typers.—As typing is more legible, easier, faster and cheaper, thus combining all 4 labor-saving elements, it is foolish and costly to allow clerks to write by hand. Many high salaried men have learned that ease and speed make it wise to type such writing as they do with their own hands. If one writes at all, by as much as his time is more valuable than a \$10 clerk is the typer worth more for his personal use. Visible typers have driven out the blind and remove a serious objection, as each letter is in sight as written. By touch system in growing use, operators never look at keys but strike right ones by touch, like a skilled pianist. See TYPEWRITER.

Fountain Pens.—Dip pens are as absurd for a constant tool as a muzzle-loading rifle for a modern soldier. Thousands have tried fountain pens and discarded them as failures, when they would have found them invaluable by observing these rules: (1) Select from a full line a pen exactly suiting your hand. More than 100 varieties of each first-class pen are regularly made. (2) Keep gold pen bright by cleaning it often on a wet sponge. (3) Use free-flowing standard ink, preferably filtered. Never mix inks or fill from a bottle open to air and dust. If clogged by poor or mixed inks or dirt, soak barrel and feeder thoroughly in water or wash out with alcohol. If you wish different colors for checking, black, red and blue are best. (See *Colors* below). (4) To avoid top-heavy effect for sensitive hands, do not put cap on top of holder when writing. (5) Buy a make of pen of established reputation. \$1 watches occasionally keep good time but no one expects it. \$1 pens will usually disappoint. Large holders are easier to sensitive hands. Prove this by holding a knitting needle or very small pencil. Instead of the common clip, it is much quicker and as safe to sew the deep watch pocket into 3 or 4 narrow pockets. If you carry pens not clearly distinguished at a touch by size, buy different shaped caps or have lines cut on the cap so touch tells you instantly which pen it is without looking at it. Use your fountain pen constantly. If kept for traveling or use away from the desk, it will not work as well. To use a dip pen for any purpose is as silly as to refuse to use a telephone or other modern labor saver.

Duplication.—Copying by hand was costly and untrustworthy. The copypress banished it and in turn this was largely superseded by rubber roller copiers, worked as easily as a clothes wringer and giving, without copying ink, 5 or more good copies if needed. This has given way to the carbon sheet, usable with pencil or stiff, smooth-pointed pen, but best with typer which makes with one writing 10 good copies on thin paper, or on cobweb paper 15 to 20. The best duplicator is the stencil typed on wax paper or a substitute and printed on a simple press giving 1,000 copies, if needed, as permanent as other printing. A tiny motor attached to any electric light furnishes power. As wax is costly, many use pans of composition on which anilin ink from pen or typer ribbon offsets. These use only common paper, are cheapest and quickest for temporary use if more copies are wanted than can be carboned, but anilin ink soon fades. A practical duplicator is a great labor-saver to desk workers, most of whom often greatly need extra copies that time and cost forbid printing.

Card System.—This is easily chief of literary and business labor-savers. With the modern library movement dating from 1876, its growth has been phenomenal and the saving effected is more than money can measure. Instead of bound books, separate cards or sheets are used, on edge with frequently projecting guides, which enable one to find any item almost instantly in its exact alphabetic or classified place.

Matter may be added or removed at any point without recopying or disarrangement, so

that material is always up to date. The plan is invaluable for every growing record, and has been adopted successfully for thousands of uses. Its usefulness is diminished or destroyed unless cards are cut to more exact height than common machines allow. A minute variation results in "bridging," that is, a low card between two higher ones is missed by the finger in turning. The best patterns of trays, supporting blocks, and locking rods are necessary to give greatest speed in reference. Most patent devices for these purposes are useless. Library experience has shown what gives best results.

Sizes.—The international standard P or postal size card is 7.5 cm. high, 12.5 wide. The U. S. government prints its postcard, size K, and all its catalog cards on this size, and the National and International Library and Bibliographic societies use this standard, which has in 43 years established itself beyond possibility of change. It is enough smaller than 3 x 5 inches, for which the inexpert often mistake it, to make inch cards worthless in a standard index. They must be recopied or cut down to standard size at large expense, or serious trouble results. However glibly recommended by salesmen who know little beyond their desire to sell, never use 3 x 5 inch cards which grew out of ignorance of international standards, for it is impossible to mix these 2 sizes.

This P size is very often found better to use in place of larger sheets for short bills, receipts, bank checks, etc., as they can be handled much quicker. The saving of space occupied seems trifling, but grows serious. Originally cards were over 3 times as large and were kept in a single row of covered boxes. Gain in number of cards stored on a given floor space was 3-fold when 3 rows of drawers replaced these boxes and 15-fold for standard cases 15 rows high; 2-fold more when cards were made half thickness, 2-fold more with trays twice as long. Thus 180 times as many cards are stored on given floor space. Single column trays with sides cut down to give more light and with label-holders in the pull are better than the heavier 2-column drawers. In a standard unit case of 2 to 3 pigeonholes wide, 15 high, each hole 9 x 29 cm and 50 cm deep, just holds 2 standard trays. Between rows 6 and 7 are slides on which to rest drawers from pigeonholes too high or low to allow convenient reading. Short desk trays 25 cm long with sides and partitions, if any, only 5 cm high, give better light and easier handling than if full height of cards. All desk drawers should be full 9 cm deep to hold these trays. All cards have an 8 mm hole near the lower edge, in the middle. For private use locking rods needed in public indexes may be omitted, but the hole is often needed to tie cards together or for special uses. Rods are to prevent removal and loss, so a notch in place of a hole is bad, as cards can be bent a little and readily removed without tearing.

A pocket binder with eyelets opposite the card holes and a tie cord and bar is handy to carry cards. The best card stock, weighing 200 grams to a square meter, is as good as the older 300 or 400 gram stock which took twice the space. Heavier cards are needed

only for guides. These with projecting tabs double usefulness. Cards as well as guides can be had with these tabs, affording immense possibilities of double, triple and quadruple classing by tab, card color, ink color, and number or heading. For lighter cards 133 gram or 28 lb demy stock, $\frac{2}{3}$ the weight of the light standard, is best. With it 300 times as many cards can be put in a floor space as with old outfits. 100 gram stock, 5 lb commercial note-paper, is used where space saving and cheapness are more important than ease of handling.

The largest standard card index is L size, for cards 25 cm high by 20 cm wide. The drawers are 21.5 wide and 28 cm high inside, and outside are 27.5 x 30 cm by 60 cm long. They have rods and blocks with sides cut away like P size, but drawers are on extension slides so they can be opened full length. The unit is 4 drawers high from the floor, the highest that can be readily consulted standing. The best low unit is two L drawers high with a P drawer and an extension slide and table top above, making a case 78 cm high, 32 cm wide and 50 cm long. This stands at the end of a desk as an extension, or better at right angles, so all cards may be read without rising from the chair. Heavy manila guides 27 cm high have tabs 4 cm wide projecting 1 cm higher. Another projection from middle of bottom runs in a groove in drawer bottom and has a stout eyelet thru which locking rod runs, a necessity for so large guides. For these large sheets 2 folios not used in P size are needed. A manila envelop 20.5 x 25.5 cm, open at the top and right side, holds together stiffly enough to hold thin papers on edge. The long folder is of manila 20 cm wide, 51 cm long, folded with front 27 cm, back 24 cm high. In the top, smaller subdivisions than indicated in projecting tabs of guides are written and closer classing of papers is maintained. Manila, white, blue, buff and other colors are used for these folios when more than one classing is wanted in the same series, e.g., personal papers mingled with office or firm papers on the same subject. Thus papers belonging to several different parties can be closely clast together by subjects without confusing ownership which is instantly recognized by folio color. This L size index fits most magazines, pamphlets, letters and typed documents and is the best working unit for all papers too large for P trays. It is better than filing on long edge because papers may be read in the drawer with letter-heads, titles of articles, etc., at the top in the best light, exactly like library catalogs. The more widely used commercial vertical files, 12 in. wide, 10 in. high are slower in use because papers are kept on sides instead of ends and folios must be lifted out and opened before consultation. So many use objectionably large sheets with a line too long for easy reading that the larger file will be used commercially till we learn the advantages of never using a sheet larger than 20 x 25 cm. For all other uses L size drawers and files are better. When letters or papers on larger size come in, they are quickly folded once or margins cut down with photo cutter and dropt into regular place.

For one seeking maximum efficiency for great quantities of notes, pamphlets, clippings and papers of the most convenient working

size, to use commercial letter files, 12 x 10 inches, is like using a card catalog tray big enough to hold business envelopes on end. It wastes space, works badly because of loose fitting and chiefly has lines running perpendicularly instead of horizontally as they must be read.

Intermediate sizes are seldom needed. B or billet (10 x 15 cm), N or note (12.5 x 20 cm) are largely used, but a single size, D or double P (15 cm high by 12.5 cm wide), is best and has the great advantage that a single fold makes it exactly fit standard P trays now universally used. Large sheets for card index stock 50 x 60 cm save waste so aliquot parts of this are best. 99 times out of 100 P, D, Q or L size will be best. Odd sizes cost more and waste badly when indexes are combined or re-arranged. If other sizes must be had for special use, choose from this full series:

Symbol	Name	Size in cm.
V	Visiting card	5 x 7.5
H	Half P	6.25 x 7.5
I	Index	5 x 12.5
P	Postal	7.5 x 12.5
B	Billet	10 x 15
D	Double P	12.5 x 15
N	Note	12.5 x 20
Q or 4P		15 x 25
L	Letter	15 x 20
2L	Double letter	25 x 40
4L		40 x 50
S	Standard	50 x 60

Recent experiments confirm the theory that the most pleasing proportion in a sheet or pamphlet is in the ratio of 1 to $\sqrt{2}$; i.e., 1 to 1.414 or nearly 5 to 7. This has the advantage of always keeping the same ratio with successive bisection, so paper can be cut to any size in the series without waste. This would change the standard large sheet from 50 x 60 to 50 x 70.7 cm and standard letter size to 17.7 x 25 cm, a better length of line, while height still fits standard library shelves. The P card is so firmly established thruout the world that it could not be changed.

Arrangement in any card system is either A to Z, like a dictionary, or 1, 2, 3, or clast, both numeric and clast plans having alphabetic indexes on P cards. The numeric system is best for correspondents writing many letters or for special contracts or other business distinct but not obviously clast under any subject or name. Use short numbers 1 to 9 or 99 for heaviest correspondence. Assign and index the rest as subjects arise, the folios being kept in 1, 2, 3 order. They can be filed or found much quicker than by any other than arabic notation, which is the simplest known to the human mind. The numeric file scatters by accidental order matter on allied subjects which ought to stand side by side. Every system needs an alphabetic supplement for miscellaneous correspondents who write few letters, since it is self-indexed and its few papers are put away and found again quicker than if clast or numbered and indexed.

Classification.—A great file of papers is like a library in miniature. Experience the world over has proved that while alphabetic and numeric systems are invaluable for many purposes, usefulness demands close classing as material grows. The best plan is to combine simplicity of numeric and utility of clast as in the 'Decimal Classification and Relativ

Index' used by most libraries. The simplest possible printed index of 35,000 heads tells instantly by what number to mark or to find any paper. Bees are marked 638. This means class 6, Useful Arts, division 3, Agriculture, section 8, Bees. Every paper about bees is marked 638 and goes in the drawer in numeric order where it can instantly be found by the printed index. 43 years' use in 30 countries has proved this numeric system, with its relative index, a marvelous labor-saver. Classing is a necessity if all material on any given subject is to be readily found. The labor of making one's own classification is usually prohibitive if well done. By adopting the scheme in general use by libraries this labor is saved and subject numbers are in harmony with thousands of other catalogs and indexes in which each number has the same meaning; for as pointed out at a recent international congress, these numbers are an international language of perfectly definite meaning among all civilized nations, and also cheapest and quickest in application. Copies of this great labor saver can be found in any library.

Dead Matter.—Individuals like libraries may often wisely separate "dead" from "live" material. Correspondence and topics no longer often consulted are transferred to duplicate drawers of cheaper construction for storage. Working drawers and trays near the desk will thus be filled with matter oftenest used, while that removed is not tied in bundles or packed in boxes, but is kept best and cheapest in P and L drawers, in a single series, so that matter removed at different times is all found in its exact class, numeric or alphabetic order regardless of date of removal. The index entry shows by an underscore, topic removed to storage, so no time is lost in double reference.

This system has grown marvelously as people learned its economy of time and space. Formerly papers were folded, endorsed and tied in bundles. Flat filing in cabinets, minutely self-indexed without labeling, drove out that costly system. Vertical filing, like a library catalog, has now driven out most flat filing cabinets.

Loose Leaf System.—This started in Amherst College library in 1872 as a shelf list and is only a variation of the card index of which the essential is unlimited intercalation. Instead of standing on edge in drawers, loose leaves are put in a binder which holds them like a book, opening flat but allowing leaves to be added or removed at any point almost instantly. For certain desk uses this is preferable to trays, but most records go best in regular trays. Fear of losing detached pieces proves practically groundless and saving over books is very large. 9/10 of matter usually kept flat in drawers is better kept on edge in vertical files, handier and cheaper except for papers in constant use in open pigeonholes, cards in P trays and books and pamphlets on shelves.

Shelves.—The best library shelf is 75 cm long, 20 cm deep and 25.5 cm high, thus taking all books up to octavo, 25 cm. Book cases are 7 or 8 shelves high with 15 or 20 cm ledge, if wisht, above the 3 lower shelves. The best pamphlet case is a plain wood box covered with marble paper, open only on the back. This is handier and more durable than costly patent boxes. Read shelves, pigeonholes and

blanks all from top to bottom and from left to right like columns of a newspaper, never jumping the upright.

Colors.—These may have mnemonic values in binding, paper or ink. Languages, not subjects, should guide in bindings if books are arranged, as almost universally, by subjects, for variety of color on each shelf is important in finding and replacing books quickly. The library language scheme used for 40 years is:

- | | |
|-------------------------------|----------------------------------|
| 1. American, light brown | 6. Spanish, olive |
| 2. English, dark brown | 7. Latin, light green |
| 3. German, black | 8. Greek, dark green |
| 39. Minor Teutonic, dark blue | 91. Minor Aryan, light blue |
| 4. French, red | 92. Semitic, yellow |
| 5. Italian, maroon | 93-99. Hamitic, etc., light drab |

Colors beginning with the same letter as the subject are easier remembered, but should not be chosen if a distinctly better color is available. Libraries use blue for bibliography, canary for criticism, green (life color) for biography.

DAY COLORS.

Sunday	sage green	Thursday	turquoise
Monday	melon		or manila
Tuesday	terra-cotta	Friday	fawn
Wednesday	white	Saturday	straw

MONTH COLORS.

January	white	July	blue
February	fawn	August	apple green
March	melon	September	straw
April	azure	October	orange
May	manila	November	nile green
June	jonquil	December	dove or drab

PAPER COLORS FOR 26 LETTERS.

Omit most of those often confused or too dark to be written on. Avoid second colors named as they may confuse with others first in the list elsewhere. Letters with no available color are assigned the best unused, so to give colors for all 26 letters if needed.

A	azure, apple green, amber
B	blue, buff, brown
C	canary, cherry, carmin, cream, café-au-lait
D	dove, drab
E	ecru
F	fawn
G	green, gold, gray, granit
H	heliotrope, hazel
I	ivory, indigo
J	jacqueminot, jonquil
K	corn
L	lilac, lavender, lemon
M	melon, mauve, marigold, manila
N	nile green
O	orange, old gold, olive
P	pink, primrose, pearl gray, purple
Q	Quaker drab
R	red, rose, robin egg
S	sage, straw, salmon, sky blue, steel
T	terra-cotta, turquoise, tea, tan
U	ultramarine, buff
V	violet, mauve
W	white
X	granit
Y	yellow
Z	zenith (pale greenish blue), manila

The favorite distinct colors to write on are white, buff, blue, canary, green, cream, manila. Melon or salmon soils worst from handling. As cards must be of uniform size to fit trays and drawers, distinction of various circulars and blanks often made by shape is best made by color tho it may also be made by projecting tags, clipped corners or color of ink.

Ink Colors.—The best colors in order are: Black, red, blue, green; and less permanent, violet or lilac. Colors are used chiefly for figures or other short entries or for checking lists. 2, 3 or 4 pens or pencils can be carried between the fingers so that a check mark may be

made instantly in either of 4 colors. Red is used for receipts, returns, income, renewals; blue for the reverse, payments, outgo, issues; green for gain; lilac for loss. Special meanings are assigned to check marks for each case and are always written as a key at the beginning of the list for future reference. Inks or pencils of different colors assigned to different people working over the same lists show who made each mark. Where classification may change, color is better in ink than in paper as recopying can be saved by underscoring the first words in the new color.

Exact Reference.—In indexes and other exact work indicate by superior figures the particular ninth of page or column in which the passage referred to begins; 5:34⁹ means vol. 5, p. 34, beginning in third ninth of the page (about $\frac{1}{3}$ the way down). Of superior figures, odd numbers 1, 5 and 9 denote top, middle and bottom of pages; 3 and 7, points half way between top and middle or middle and bottom, while even numbers are mere modifiers of these positions, 2 denoting a point a little below the top, 8 a point a little above the bottom; 4 and 6, points just above and below middle. If there are several columns on a page, use 2 superior figures, the first denoting column and the second position in column; e.g., 7:89¹³⁻²⁸ means vol. 7, p. 89, beginning in the third ninth of column 1 and ending near the bottom (in the eighth ninth) of column 2.

L. B. Dates.—In condensed matter use the library date system (1) Day of week, (2) day of month, (3) month, (4) year:

Months				Days	
Ja	Ap	Jul	O	Su	Th
F	My	Ag	N	M	F
Mr	Je	S	D	Tu	St
				W	

For Wed. 9 Sept. 1885, write W9S85.

Numbers for months are dangerous. As usage is about equally divided, no one can tell whether 6-7 means July 6 or June 7. The L. B. dates above are exact, average fewer marks and are used for compactness and accuracy.

Colon Forenames.—Where space is important, indicate most common full names by initials followed by a colon or double period, thus C:H:Smith is Charles Henry Smith, while C. H. Smith may have any names beginning with C or H. With no extra space or cost full names are accurately given by this library list:

A: Augustus.	A. Anna.
B: Benjamin.	B. Beatrice.
C: Charles.	C. Charlotte.
D: David.	D. Delia.
E: Edward.	E. Elizabeth.
F: Frederick.	F. Fanny.
G: George.	G. Grace.
H: Henry.	H. Helen.
I: Isaac.	I. Isabella.
J: John.	J. Jane.
K: Karl.	K. Kate.
L: Lewis.	L. Louisa.
M: Mark.	M. Mary.
N: Nicholas.	N. Nancy.
O: Otto.	O. Olivia.
P: Peter.	P. Pauline.
R: Richard.	R. Rebecca.
S: Samuel.	S. Sarah.
T: Thomas.	T. Theresa.
U: Ulrich.	U. Ursula.
V: Victor.	V. Victoria.
W: William.	W. Wilhelmina.
	Z. Zenobia.

Roman numerals; write v. 88, not Vol. LXXXVIII. Never spell out numbers even at beginning of sentences. 88 is quicker written, quicker read, takes less space and is vastly better than "Eighty eight" with 11 letters to do badly what is done perfectly by only 2 figures.

Newspaper Clippings.—These are almost useless unless closely clast. Plain manila sheets 20 x 25 cm are better than patent scrapbooks. Clast like other papers with subject number on left upper corner and keep laced in binders or much better in L drawers like thin pamphlets, thus bringing clippings, circulars, letters and notes on each topic all together in one folio.

Metric System.—John Quincy Adams reported to Congress that metric weights and measures generally used would be a greater labor-saver to the human race than steam. Since then nearly all civilized nations have adopted them, and America and England are both nearing such adoption. The international decimal system, agreeing perfectly with our arithmetic, stands near the head as a labor-saver. Computation showed that a single railroad could save \$50,000 a year in clerical labor by its use. A committee of 20 normal school experts report that it would save a year in the school life of each child if we had only metric system (q.v.) instead of compound numbers.

Language.—The most practical, cheapest and oftenest needed labor-saver is to use the fewest words and marks that will convey meaning readily and accurately. See SIMPLIFIED SPELLING; SHORTHAND.

MELVIL DEWEY,
President National Efficiency Society; formerly
Director New York State Libraries.

OFFICIAL GROUP BALLOT. See
BALLOT.

OFFICIAL PLANTS (Lat. *officinalis*, of the shop, from Lat. *officina*, shop), plants which are used in medicine, and therefore sold in the druggists' and apothecaries' shops. The term "official" was formerly—though erroneously—used as a synonym of "official," meaning preparations recognized by the officials in charge of the compilation of pharmacopoeias. Many drugs and plants which are not official are sold in the shops, and are therefore official. (See PLANTS and related subjects). Consult 'United States Dispensatory' (19th ed., Philadelphia 1907).

OG, according to the Hebrew Scriptures, the king of Bashan, defeated by the children of Israel at Edrei (Num. xxi, 33). He is said by rabbinical writers to have been one of the giants who lived before the flood, and escaped the deluge by climbing to the roof of Noah's ark. Noah, according to tradition, fed the giants that they might be to men of after times a proof of the power of God, who had created and destroyed such monsters. In the war of Og against the Israelites he took up a mountain four miles in circumference to throw down upon Israel, when it was honeycombed by ants sent by Jehovah, fell and overwhelmed him. His teeth grew so quickly that they entered the mountain and held him fast, so that Moses could kill him. To give an idea of his gigantic size, the rabbins say that Moses, who according to their account was six ells high, and had a battle-ax of the same length, was obliged to make a leap of six ells in order to strike his ankle-bone. He bled to death of the wound.

Numbers.—Use only arabic numerals and letters and avoid the clumsy and easily misread

OGAM, ōg'ām, or **OGHAM**, an ancient alphabet or system of lettering, formerly in use among the Celtic peoples of Ireland, Scotland and Wales, chiefly found in inscriptions on stone, but also, though more rarely, in books.



• Ogam Inscription, From a Stone Found Near Ennis.

The ogams were supposed by the Irish to be the invention of the god Ogam. Ogams consist chiefly of straight lines, mostly vertical and oblique, horizontal lines and curves being sparingly used. They derive their significance partly from their position on a continuous horizontal stem-line along which they are written, some of the characters being drawn resting on the horizontal line as a base, others depending from it and others intersecting it. This horizontal line, however, really represents a perpendicular line, namely, that formed by the angle of the upright stone on which ogams were originally cut. The total number of letters represented in the alphabet is 21. According to some scholars a single vertical stroke resting on the line represents *h*; two contiguous strokes *d*; three *t*; four *c*; five *qu*. A single horizontal stroke depending from the line stands for *b*; two for *l*; three for *w* or *f*; four for *s*; five for *n*. The letters *m*, *g*, *ng*, *z* are represented by one to five oblique strokes right to left crossing the line; the vowels *a*, *o*, *u*, *e*, *i*, by one to five vertical strokes crossing the line. A cross on the line stands for *p* or *e*.

Diphthongs are represented by curves or compound letters.

The age of this alphabet has been the subject of considerable discussion. The best authorities seem now to be agreed that it cannot be traced beyond the introduction of Christianity.

Recent investigation tends to link the ogams with similar characters found in the Orient, and of relatively late date. The object of its construction seems not to be explained, but the most ancient ogams are all inscribed on stone. Ogams are found chiefly in Ireland, but some have been found also in Scotland, Wales, the Shetland Islands, and even in England, the total number known only amounting to about 300. The Celtic names which constitute the greater part of the inscriptions are frequently Latinized. There are numerous papers and discussions regarding them in the publications of archaeological societies.

Consult Abercromby, 'The Ogham Alphabet,' in the *Academy* (London 1880); 'd'Arbois de Jubainville, L'alphabet irlandais primitif et le dieu Ogmios,' in *Académie des inscriptions et des belles-lettres* (Paris 1881); Brash, R. R., 'The Ogam Inscribed Monuments of the Gael-hil in the British Islands' (London 1879); Loth, 'Le sort et l'écriture chez les anciens Celtes,' in the *Journal des savants* (Paris 1911); History, Grammar and Import of the Irish Epigraphy' (London 1897-1907); Mac Neill, 'Oghmoracht,' in the *Gaelic Journal* (Dublin 1908-09); id., 'Notes on the Distribution, History, Grammar and Import of the Irish

Ogham Inscriptions,' in the *Proceedings of the Royal Irish Academy* (Dublin 1909); Nicholson, W. B., 'Celtic Researches' (London 1904); Rhys, Sir John, 'Lectures on Welsh Philology' (2d ed., ib. 1879); id., 'The Inscriptions and Language of the Northern Picts,' in *Proceedings of the Society of Antiquarians of Scotland* (Edinburgh 1892); id., 'Celtic Britain' (3d ed., London 1904).

OGDEN, Aaron, American soldier: b. Elizabethtown, N. J., 3 Dec. 1756; d. Jersey City, 19 April 1839. He was graduated at Princeton College in 1773 and in 1777 he joined the army and served with distinction during the whole Revolutionary War, at one time under Lafayette, and obtaining the personal commendation of Washington. At the close of the war he was discharged with the rank of major. He afterward practised law, and was a Presidential elector in 1800. He was one of the commissioners for adjusting the disputed boundary between the States of New York and New Jersey; from 1801 to 1803 was United States senator, and in 1812 governor of New Jersey. He was president of the Society of the Cincinnati during the last decade of his career. Consult Dayton, A. O., 'Addresses before the Whig and Closophic Societies of the College of New Jersey' (Princeton 1839); 'Collections of the New Jersey Historical Society' (Vol. VII, Newark 1872).

OGDEN, Francis Barber, American inventor: b. Boonton, N. J., 3 March 1783; d. Bristol, England, 4 July 1857. He was aide-de-camp to General Jackson in the battle of New Orleans; is said to have been the first to apply the principles of the expansive power of steam and the use of right angular cranks in marine engines. In 1813 he obtained a patent for condensing engines of low pressure and with two cylinders, in which the above principles were utilized. In 1817 the first engine ever built on these lines was constructed by him in Leeds, England. The first screw propeller successfully introduced into practical use was launched by John Ericsson on the Thames, May 1837, and was called the *Francis B. Ogden*. The building of the first screw propeller for American waters, the iron vessel *Robert F. Stockton*, was superintended by Mr. Ogden in Liverpool, where he was United States consul (1829-40). From 1840-1857 he was consul at Bristol.

OGDEN, Frederick Nash, American military officer: b. Baton Rouge, La., 25 Jan. 1837; d. New Orleans, La., 25 May 1886. After engaging in mercantile life from boyhood he entered the Confederate army at the outbreak of the Civil War, and subsequently became major of heavy artillery and lieutenant-colonel of cavalry. At the close of the war he resumed commercial life, and in 1868 founded the Crescent City Democratic Club, a powerful political organization. He was made major-general of State militia; and was president of the Red Cross Association of Louisiana during the yellow fever epidemic of 1878.

OGDEN, Herbert Gouverneur, American cartographer: b. New York, 4 April 1846; d. 1907. He was educated in private schools; in 1863 was appointed an aid in the United States Coast and Geodetic Survey and an assistant in 1869. He served with the army on the defenses of Washington in 1864, accom-

panied the Nicaragua expedition in 1865, and the earliest naval exploring expedition to the Isthmus of Darien in 1870 as topographer, and had charge of the party sent to locate the international boundary between British Columbia and Alaska, in 1893. He was a recognized expert in topography and cartography.

OGDEN, Peter Skene, British-American fur-trader: b. Quebec, 1794; d. Oregon City, Ore., 27 Sept. 1854. His people had resided in New Jersey until the Revolution, when they removed to Canada, his father becoming a judge in the Admiralty Court at Quebec. He entered the service of the Hudson Bay Company in 1821 after several years' connection with the Northwest Company. His travels for the company extended through many practically unexplored portions of northwestern United States and southwestern Canada, particularly along the great rivers. He named Mount Shasta, and his explorations extended east into Nevada and Utah. The present Humboldt River, Nevada, was originally named for him, and in Utah there are Ogden City, Ogden Canyon, Ogden Hole, Ogden River and Ogden Valley. From 1845 until his death his headquarters were at Fort Vancouver, and after the retirement of Dr. John McLoughlin (q.v.) he became the ranking chief factor of the Columbia. He was said to be the best-known white man west of the Rocky Mountains among the Indians. He was a man of high courage and resourcefulness and was warmly regarded by both his men and the Indians. His rescue of the women and children captured by the Indians after the massacre at Whitman Mission in 1847, was among his last achievements, and the Indians themselves declared that they would not have surrendered the captives to another. He remained a British subject until his death. Author of 'Traits of American Indian Life' (London 1853), a rare and quaint little volume dedicated to Lady Simpson, wife of Sir George Simpson of the Hudson Bay Company. Consult Elliott, T. C., 'Peter Skene Ogden, Fur Trader' (1910); Laut, A. C., 'Conquest of the Great North-West' (1911).

OGDEN, Robert Curtis, American merchant and philanthropist: b. Philadelphia, Pa., 20 June 1836; d. 1913. From 1885 he was a retail merchant, a member of the John Wanamaker firm. He is best known by his work in behalf of the cause of education in the South. He was president of the board of trustees of Hampton Institute, a trustee of Tuskegee Institute and president of the Southern Educational Board and the Conference for Education in the South. His efforts were directed chiefly toward providing education for both negroes and illiterate whites through Southern agencies and in friendly co-operation between Northerners and Southerners. In 1903 Tulane University gave him the degree of LL.D. in recognition of his services, and Union College and Yale University accorded him like recognition. He published 'Samuel Chapman Armstrong,' the Founder's Day address at Hampton Institute (1894); 'Pew Rents and the New Testament' (1892); 'Sunday School Teaching' (1894).

OGDEN, Rollo, American clergyman and newspaper editor: b. Sand Lake, N. Y., 19 Jan. 1856. He was educated at Williams College,

Andover Theological Seminary and the Union Theological Seminary and was ordained in the Presbyterian ministry in 1881. He was associate pastor at First Church, Cleveland, Ohio, in 1880-81; was a missionary in the City of Mexico in 1881-83 and in 1883-87 he was pastor of Case Avenue Church, Cleveland. In 1887 he engaged in literary work in New York. He joined the staff of the New York *Evening Post* in 1891, and since 1 Feb. 1903 he has been editor of that publication.

OGDEN, Ruth, the pen name of Fannie Ogden Ide, an American writer of juvenile stories: See IDE, FANNIE OGDEN.

OGDEN, William Butler, American railroad president: b. Walton, N. Y., 15 June 1805; d. New York, 3 Aug. 1877. He entered upon a business career at an early age, was a member of the New York State legislature in 1834, and in 1835 he removed to Chicago where he established a real estate business. Upon Chicago's incorporation as a city in 1837 he became its first mayor, and he was closely identified with the early development of the city. He was an active promoter of the Chicago and Galena Railroad, of which he became president in 1847. He was deeply interested in canal improvements and advocated the construction of a ship canal across the Michigan Peninsula. He became president of the Chicago, Saint Paul and Fond du Lac Railroad in 1855, and was instrumental in merging it in 1864 with the Chicago and Galena and other smaller railroads into the Chicago and Northwestern Railroad, of which also he was president. He was the first president of the Union Pacific Railroad and a believer in the expansion of railroad service to the Pacific. He was largely interested in the lumber trade and connected with many hospitals, educational and charitable institutions as an officer and benefactor.

OGDEN, Utah, city, county-seat of Weber County, at the junction of the Ogden and Weber rivers, and on the Southern Pacific, Union Pacific, Rio Grande Western, Oregon Short Line and Salt Lake and Ogden railroads, about 35 miles north of Salt Lake City and 10 miles from Salt Lake. It was founded in 1848, and in 1850, under the direction of Brigham Young (q.v.), it was laid out as a city. In 1851 it received its charter. Ogden is in a fertile agricultural region, and in the vicinity of valuable mines. The opening of the Ogden Cañon is at the city limits, and its grand and picturesque scenery brings many tourists to the place. The water power of the falls is used for the electrical works which supply power, light and heat for Ogden and Salt Lake City. The chief industrial establishments are canneries, pickle factories, beet-sugar factory, woolen mills, cement mills, can factories, cereal establishments, broom factory and brick and tile yards. It has an extensive trade in manufactures and farm products, and is the distributing centre of quite a region with which it is connected by railroads. The educational institutions are the State Industrial School, State Institutions for the Deaf, Dumb and Blind, the Weber State Academy (Mormon), the Sacred Heart Academy (Roman Catholic) and public and parish schools. The government which is vested in a mayor, who

holds office two years, and a council is of the commission form, which replaced that of 1898. The mayor appoints, subject to approval by the council, the administrative officials except the treasurer, clerk, auditor, police justice and attorney, who are elected by the people. Pop. (1920) 32,804.

OGDENSBURG, N. Y., city, port of entry, in Saint Lawrence County, at the confluence of the Saint Lawrence and Oswegatchie rivers, and on the New York Central and Hudson River and the Rutland railroads, about 170 miles, in direct line, northwest of Albany, the State capital. It is connected by ferry with Prescott, Ontario. It is at the foot of the deep-water navigation of the Great Lakes, has unusual facilities for transportation, has direct connection by rail with New York City and Boston, and steamer connection with all the lake and river ports. Shipping and wholesale dealing in lumber, grain and coal are its most prominent industries. Several fleets of vessels are owned here. Other important industries are the manufacturing of silk, flour, gloves, dress skirts, leather and brass goods, lumber and lumber products. The importations at the port of entry amount to about \$22,000,000; exportations, about \$7,000,000. The prominent public buildings are the custom-house, a fine town-hall, an opera-house, two handsome club-houses, a state armory and seven large churches, including the Roman Catholic cathedral. Among the charitable institutions the most prominent is the Saint Lawrence State Hospital for the Insane, established and equipped at a cost of several millions, and supervised and superintended by specialists. Other institutions are the City Hospital, United Helpers' Home, Saint John de Deo's Hospital (quarantine hospital), an orphanage and a home for the aged. The educational institutions are Saint Mary's Academy (free), public school free academy, public and parish schools and a public library. The library is built on a site of great beauty on the river front and surrounded by several acres of green lawn and trees. The building cost \$50,000 and was paid for by the citizens of the city. By an act of the legislature in 1901 the corporate limits of the city were extended. Pop. (1920) 14,609.

OGÉ, Jacques Vincent, zhăk vãn-sôn ô-zhă, Haitian revolutionist: b. Donon, Haiti, about 1755; d. Haiti 1791. He was a mulatto, but was born free and as a young man served in a German army there. In 1789 he represented Haiti in the Constitutional Assembly and when he returned to Haiti he took up the cause of the slaves. Unsuccessful in his petitions to the assembly, he formed a company in the United States in 1790 and led a revolt in 1791. He was victorious in several battles, but was ultimately defeated; the plea that his life should not be forfeited if he surrendered was disregarded and he was tried and sentenced to death and executed.

OGEE, ô-jē', in architecture, a molding consisting of two members, one concave and the other convex. An ogee arch is a pointed arch, the sides of which are each formed with a double curve. It is generally introduced over doors, niches, tombs and windows, its inflected curves weakening it too much to permit of its application for the support of a great weight.

OGEECHEE, ô-g'é-chē, a river in Georgia, has its headwaters in Greene County, flows southeast into Ossabaw Sound, a course of about 200 miles. Savannah is 17 miles north of the mouth of the river. Where the waters enter the sound a number of islands have been formed, largest of which is Ossabaw. The river is navigable for small steamers for some distance from the ocean.

OGGIONE, öd-jō'nē, or **OGGIONO**, Marco da, Italian painter: b. Oggiono, Lombardy, about 1470; d. between 1530 and 1540. He studied religious painting under Leonardo da Vinci as early as 1490 and was the oldest of that master's scholars. One of the finest of his pictures is 'The Three Archangels' in the Brera at Milan. He is, however, best known for his copies of 'The Last Supper' of Leonardo, one of which is in Burlington House, London; another in Santa Maria della Grazie, Milan, and a third at Louvre. The pretty picture at Hampton Court of 'The Infant Christ and Saint John Kissing,' generally attributed to Leonardo, is undoubtedly the work of Oggione whose creations are not unfrequently credited to his greater teacher. A 'Salvator Mundi,' in the Detroit Museum, is said to be the work of Oggione.

OGILBY, ô'g'l-bī, John, British writer: b. in or near Edinburgh, November 1600; d. London, 4 Sept. 1676. His father was of a good family but lost his fortune and became a prisoner in the King's Bench; but young Ogilby hoarded small savings, adventured in the Virginia lottery and won sufficient money to free his father and start himself in life. He was tutor to the children of the Earl of Stafford, lord deputy of Ireland, and afterward he owned a prosperous little theatre in Saint Werburgh street, Dublin. The misfortunes of the Civil War ruined him and he made his way to Cambridge, where he gained the interest of scholars there and taught Latin. He translated Virgil and received a considerable sum for it, and later realized a further sum by a translation of Æsop. He then learned Greek and made translations of the 'Iliad' and 'Odyssey' of Homer, in which he is supposed to have been assisted by Shirley. After the Restoration he gained the favor of Charles II, established another theatre in Dublin and later removed to London where he set up a publishing business. His plant was destroyed in the great fire of 1666, but he was enabled to rebuild his establishment and was known for the fine work produced. Many of the books were in folio form with engravings by Hollar and others of note. He produced sumptuous editions of his own translations from the classics, and later issued many profusely illustrated volumes on geography and typography. His translations and his verse were ridiculed by Dryden and Pope, but Pope is credited with borrowing from the despised translations of Virgil.

OGILVIE, ô'g'l-vī, Clinton, American painter: b. New York, 28 Dec. 1838; d. 1900. After studying under James McDougal Hart (q.v.), he started on his student-travels in Europe and spent much time in the art galleries and studios of Paris (1866-67, 1872-73). In 1864 he was elected an associate of the National Academy. He has been successful as a landscape painter and has generally gone to

Switzerland or France for his subjects. His best-known pictures includes 'The Valley of Schwytz, Switzerland'; 'Lake Como near Bellagio'; 'Among the Adirondacks'; 'At Eaux Bonnes, France'; 'Argelès'; and 'Saint Barthelemy, near Nice.'

OGILVIE, William Henry, Australian poet and journalist: b. Holefield, Scotland, 21 Aug. 1869. He went to Australia at the age of 20, where he was soon in the bush, breaking horses and driving, at which he spent 11 years, also sampling sheep and experiencing station life in all its phases. He finally became overseer of the station. While there he wrote verses for the *Sidney Bulletin*. In 1905-07 he was professor of agricultural journalism in Iowa State College in the United States. Among his published works are 'Fair Girls and Gray Horses' (1891); 'Hearts of Gold' (1901); 'My Life in the Open' (1908); 'Whaup o' the Rede' (1909); 'The Land we Love' (1910); 'The Overland and Other Verses' (1913); 'The Honor of the Station' (1914).

OGILVIE-GORDON, Mrs. Maria M., Scottish geologist: b. Aberdeen, 19th century. She was educated at Ladies' College, Edinburgh, University College, London, London University and at the University of Munich. She was the first woman to be awarded a Ph.D. at the University of Munich. She has specialized in observations of the volcanic and dynamic phenomena of the dolomites, South Tyrol, and disproved the applicability of Darwin's coral-reef theory to the dolomite reefs in this area. She has also made investigations of the microscopical structure of the skeletons of both fossil and recent corals. Author of 'The Wengen and Cassian Strata in South Tyrol' (1893); 'Coral in the Dolomites' (1894); 'Microscopic and Systematic Study of the Madreporian Types of Corals' (1895-96); 'The Torsion Structure of the Dolomites' (1898-99); 'The Geological Structure of Monzom and Fassa' (1902-03); 'Overthrust Structure in the Langkofl' (1907); 'The Thrust-masses in the Western Districts of the Dolomites' (1910).

OGLESBY, ō'glz-bī, Richard James, American soldier and lawyer: b. Oldham County, Ky., 25 July 1824; d. Elkhart, Ill., 24 April 1899. He removed with an uncle to Decatur, Ill., in 1836, studied law there while engaged in the carpenter's trade and gained admission to the bar in 1845. He served in the Mexican War with the rank of lieutenant and later entered the Louisville Law School, where he was graduated in 1848. In 1851 he resumed his law practice in Decatur, Ill., and in 1860 was elected to the State senate from which he resigned to enter the Union army. At Forts Donelson and Henry he performed distinguished service and in 1862 was promoted brigadier and later major-general of volunteers. He was at the battles of Pittsburgh Landing and Corinth and was compelled to resign in 1864 because of his wounds. In 1865-69 he was governor of Illinois and in 1872 was re-elected but declined the office to become United States senator in 1873-79. He was again governor in 1885-89.

OGLETHORPE, ō'gl-thôrpe, James Edward, English soldier and colonist: b. London, 21 Dec. 1696; d. Cranham Hall, Essex, 1 July

1785. In 1714 he joined the army of Prince Eugène as aide-de-camp, whom he served with distinction in the campaign against the Turks, 1716-17, especially at the siege and capture of Belgrade (q.v.). In 1722 he was sent to Parliament as member for Haslemere. Becoming acquainted with the abuses of the debtor's prison in London, he made them known to Parliament and was appointed chairman of a committee for their investigation. His work in behalf of insolvent debtors, thus begun, was continued in his project for their colonization in North America, in connection with which he also aimed at an asylum for oppressed Protestants of the European continent. With others in 1732, he obtained a charter for a tract of land between the Altamaha and Savannah rivers and in January 1732 Oglethorpe with a party of 120 colonists arrived at Charleston. Soon afterward he founded Savannah (q.v.) and for 10 years he served as governor of the colony of Georgia, named in honor of George II. By his defense of the colony and neighboring territory of the South against encroachments of the Spaniards and Indians from Florida and his efforts to secure the trade of the Cherokees, he rendered services to England quite beyond the ordinary work of colonial administration and laid for Georgia the foundation of a stable commonwealth. Besides the defenses which he gathered in the colony, in 1738 he brought a regiment of volunteers from England, and in the war of Jenkins' Ear (see COLONIAL WARS IN AMERICA), he vigorously laid siege to Saint Augustine, with 2,000 men, but the inadequacy of his force prevented him from capturing the place. He achieved an important success in holding Amelia Island against the Spanish attack, and another by his victory at Frederica, in 1742. In 1743 Oglethorpe returned to England, and two years later was made major-general. He had brought himself into financial straits by advancing money for defensive needs in Georgia. In 1745 he served against the Stuart invaders, and pursued the Jacobite fugitives. He was court-martialed for failing to overtake them, but honorably acquitted. Oglethorpe and his fellow-trustees of Georgia surrendered their charter in 1752, and the colony became a royal province. In 1765 he was raised to the rank of general in command of all the king's forces. His interest in American affairs never abated, and he was one of the first to wait upon Mr. Adams, after his arrival in England as Ambassador, to whom he expressed his esteem and regard for America, and his satisfaction at the termination of the difficulties between Great Britain and her colonies. Consult Bruce, Henry, 'Life of General Oglethorpe' (New York 1890); Cooper, H. C., 'James Oglethorpe, the Founder of Georgia' (New York 1904); 'Journal of the Earl of Egmont' (Atlanta 1908); Sparks, 'American Biography,' 2d series, Vol. II, for a memoir of Oglethorpe by W. B. O. Peabody; Wright, 'Memoirs of James Oglethorpe' (1867); and Lecky, 'England in the 18th Century' (Vol. I, 1879).

OGLETHORPE UNIVERSITY, Atlanta, Ga., a coeducational institution established under the auspices of the Southern Presbyterian Church, with a Presbyterian directorate. It is a successor of the former Oglethorpe University which was established in 1835 and had a suc-

cessful existence until the disturbances of the Civil War interrupted its operation and resulted in its closing in 1872.

OGMORE AND GARW, ōg'mōr and gār'oo, Wales, town in Glamorganshire, near Bridgend. There are the Norman ruins of Ogmores Castle, and those of the fortified priory of Ewenny, dating from 1146. The town is situated in an important coal-mining district. Pop: 26,741.

O'GORMAN, James Aloysius, American jurist and politician: b. New York, 5 May 1860. He was educated at the College of the City of New York and at New York University, and was admitted to the bar in 1882. He was justice of the District Court of New York in 1893-1900, and of the Supreme Court of New York in 1900-11. He served in the United States Senate in 1911-17, and in 1912 was a member of the executive committee of the Democratic National Committee. He resumed his law practice in New York in 1917.

O'GORMAN, Thomas, American Roman Catholic prelate: b. Boston, Mass., 1 May 1843; d. Sioux Falls, S. Dak., 18 Sept. 1921. His early education was obtained in Chicago and Saint Paul, and from his 10th to his 22d year he studied in France. From 1867-78 he was pastor at Rochester, Minn., from 1878-82 a member of the Paulist community, New York City, and from 1882-85 pastor at Faribault, Minn. Chosen first president of Saint Thomas' College, Merriam Park, Saint Paul, he was for four years its professor of dogmatic theology, and in 1890 was called to the chair of Modern Church History in the Catholic University, Washington, D. C. On 19 April 1896 he was consecrated bishop of Sioux Falls by Cardinal Satolli in Washington. Bishop O'Gorman was an authority on mooted historical questions and the author of a 'History of the Roman Catholic Church in the United States.' When, in 1902, President Roosevelt sent a commission to Rome to treat with the Vatican on Philippine matters, Bishop O'Gorman was chosen a commissioner.

OGOWAI, ō-gō-wā', or **OGOVE**, ō-gō-vā', the principal river of the French Congo, equatorial West Africa. It has a densely forested and wide delta on the western coast near Cape Lopez. Its sources are in the Cristal Range, about 130 miles west of Stanley Pool, and it reaches the Atlantic after a northwesterly, circuitous course of about 700 miles, 200 miles of which from the mouth are navigable by small steamers. It has several tributaries, the chief of which are the Ivindo and the Lolo. The river was discovered by Du Chaillu in 1857 and explored by him (1857-59). It flows through a densely populated country; and along its banks are a number of European posts and trading stations.

O'GRADY, Standish, Irish author: b. Castletown Berehaven, County Cork, 18 Sept. 1846. He was educated at Trinity College, Dublin, was called to the bar and later abandoned law for literature. He has devoted himself chiefly to the romances and history of Ireland, and is generally credited with the initiation of the movement known as the Celtic Renaissance. He is editor of *Pacata Hibernia*, and author of 'History of Ireland, Heroic Period'; 'History of Ireland, Critical and Philosophical Period';

'The Flight of the Eagle'; 'The Bog of Stars'; 'Finn and His Companions'; 'Lost on Du-Corrig'; 'The Coming of Cuculain,' etc.

O'GROWNEY, Eugene, Irish Gaelic scholar: b. Ballyfallon, County Meath, 25 Aug. 1863; d. Los Angeles, Cal., 19 Oct. 1899. He was educated at the Diocesan Seminary at Navan, and at Maynooth College, and was ordained in the Roman Catholic Church, 24 June 1889. He was appointed curate at Ballynacargy, County Westmeath, immediately after his ordination and remained there until 1891, when he became editor of the *Gaelic Journal* and was appointed professor of Irish at Maynooth College. He had from his student days taken a keen interest in the Irish language and spent many of his holidays in the Isles of Aran and in the sections of Connemara and Cork where the language remains pure. Under the strain of his many duties at the college, together with the editing of the *Gaelic Journal* and attending to its wide correspondence, Fathér O'Growney's health began to fail. He nevertheless succeeded in preparing a summary of Irish grammar, two parts of a series of Irish readers, and one part of a manual on Irish composition. He is credited with being one of the leaders of the Irish language awakening; was actively connected with the establishment of the Gaelic League in 1893, and that year inaugurated the 'Easy Lesson in Irish,' which appeared in *Freemans' Journal* and in the *Gaelic Journal*; and afterwards were published in book form as 'Simple Lessons in Irish,' forming an important contribution to the Irish language movement. In 1894 he was granted leave of absence and went to Arizona for his health. He failed steadily, however, and died at Los Angeles in 1899. Four years later his body was taken to Ireland for interment. Consult O'Farrelly, Agnes, 'Leabhar an Athar Eoghan, the O'Growney Memorial Volume' (Dublin 1904).

OGSTON, ōg'stōn, Sir Alexander, British surgeon: b. Edinburgh, 1844. He was educated at Aberdeen University, was assistant professor in forensic medicine there in 1866-73, lecturer in surgery in 1874-82, professor of surgery in 1882-1910, and since then professor emeritus. He is famous for operations correcting knock-knee and flat foot and for frontal sinus disease. He was with the British army in the Sudan in 1885, and again in the South African War in 1899-1900, receiving rank as honorary colonel in the Royal Army Medical Corps. He was honorary surgeon in Scotland for Queen Victoria and King Edward VII, and is surgeon in ordinary for King George V in Scotland. He was knighted in 1912 and in 1914-15 he was president of the British Medical Association. In the European War he served in Serbia in 1915 and in Italy in 1916-17. Author of 'Contributions to Medical Science' (1869); 'Surgical Papers' (1871); 'The Peace Conference and the Dum Dum Bullet' (1899).

O'HARA, ō-hār'a, John Bernard, Australian poet: b. Bendigo, Victoria, 29 Oct. 1864. He was graduated from Melbourne University in 1885 and four years later he became principal of Melbourne College, a position he has retained ever since. He is the author of 'Songs of the South' (1891-95); 'Lyrics of Nature'

(1899); 'Sonnets' (1902); 'Odes and Lyrics' (1906).

O'HARA, Theodore, American soldier and poet: b. Danville, Ky., 11 Feb. 1820; d. near Guerryton, Barbour County, Ala., 6 June 1867. He studied law and was admitted to the bar; but quitted it to become an officer in the United States navy. He was connected with the Lopez and Walker movements, and served as captain and major in the Mexican War. In the Civil War he was a colonel in the Confederate service. His famous poem, 'The Bivouac of the Dead,' was written in commemoration of the Kentuckians killed in the battle of Buena Vista during the War with Mexico. Consult Rauck, G. W., 'O'Hara and his Elegies' (Baltimore 1875).

O'HIGGINS, ò hig'inz (Sp. ò-é'gēns), **Ambrosio**, South American administrator: b. County Meath, Ireland, about 1730; d. Lima, Peru, 18 March 1801. His real name was Ambrose Higgins. His uncle, who was a Spanish priest, had charge of his education and sent him to South America. He went to Buenos Ayres first and then to Chile, where he was a trader and peddler for several years. He entered the Spanish army, distinguished himself in the Araucanian wars, where he had command of the frontier against the Indians, with the title of intendant. He rapidly rose in rank until in 1788 he was made captain-general of Chile. His rule there proving very successful, he was given the title of Marquis of Orsino and appointed viceroy of Peru in 1796, where he also proved an excellent ruler and retained this latter office until his death. His son Bernardo O'Higgins (q.v.) also played an important rôle in Chilean history.

O'HIGGINS, Bernardo, Chilean soldier and dictator: b. Chillan, Chile, 20 Aug. 1776; d. Lima, 24 Oct. 1842. A natural son of Ambrosio O'Higgins (q.v.), he was educated in England, where he became a republican under the influence of Miranda and others. He returned to Chile in 1802, and in 1810 joined the Chilean revolutionists. In 1813, when Carrera was deposed from the supreme command of the army, O'Higgins was appointed to succeed him. He met with constant opposition from Carrera and his faction and civil war was imminent, when a Spanish army from Peru entered the country and the two factions combined to withstand the Spanish attack. The Chileans under the command of O'Higgins met the Spaniards at Rancagua, 2 Oct. 1814 and were defeated on account of Carrera's failure to bring the reinforcements expected. The leaders fled across the Andes, but O'Higgins, in 1817, joined the invasion under San Martín as one of the chief lieutenants. The charge under his leadership decided the Chilean victory at Chacabuco, 12 Feb. 1817. He was then made dictator of Chile, after San Martín had declined the office. Under his rule the independence of Chile was formally declared and the Spaniards driven out. His administration was efficient but his republican sentiments and his attempts to establish a representative constitutional government aroused the opposition of the aristocratic party, which, aided by the adherents of Carrera, rebelled and finally deposed him in 1823; he then went to Lima, Peru, where he spent the rest of his life. Consult Chisholm, A. S., 'The Inde-

pendence of Chile' (Boston 1911); Vicuña-Mackenna, 'Vida de Don Bernardo O'Higgins' (Santiago 1882).

O'HIGGINS, Chile, an inland province bounded north and west by Santiago, by Argentina on the east and by Colchagua on the south. Area, 2,342 square miles. Capital, Rancagua (q.v.). The surface in the west is level and is devoted to agriculture and pasturage; in the east the country is on the slope of the Andes and in this mountainous region gold and other metals are mined. The principal rivers are the Maipo and the Raipe. Pop. about 100,000.

OHIO (Iroquois, *Ohionhiio*, "beautiful river." Popular name, **BUCKEYE STATE**), a State in the north central part of the United States; bounded on the north by Michigan and Lake Erie, on the east by Pennsylvania and West Virginia, on the south by West Virginia and Kentucky, on the west by Indiana. The boundary lines dividing Michigan and Indiana from Ohio, and Pennsylvania from Ohio to the Ohio River, are straight lines, the southern and southeastern boundaries are formed by the Ohio River. The State is between lat. 38° 27' and 41° 57' N. and long. 80° 34' and 84° 49' W. The maximum length, north and south, is 210 miles and east and west 215 miles. The area is 41,060 square miles, of which 300 square miles are water surface. In size it ranks 32d among the States and was the fourth State admitted into the Union.

Topography.—That portion of the State bordered by the Ohio River and Lake Erie has an irregular boundary. The course of the Ohio along the border is 436 miles; the lake shore is 230 miles, giving the State a navigable water front of 666 miles. The largest inlets from Lake Erie are Sandusky and Maumee bays. In the portion of the lake between those bays are a number of islands, several of which belong to Ohio. The general surface of the State is a rolling plain, from 300 to 500 feet above Lake Erie, or from 900 to 1,200 feet above the sea. Some portions have an altitude of 1,500 feet; in Logan County, the western part of the State, is the highest point, 1,540 feet altitude, and the lowest is the shore of the Ohio near Cincinnati. The divide between the rivers of Lake Erie and those of the Ohio River is a low ridge which crosses the State from the middle of the western border, in Mercer and Darke counties, to near the northeastern boundary, in Trumbull County. The river channels are cut deep in many parts of the State and many of the banks are massive rugged rocks and huge boulders. The best harbors on the lake shore are Ash-tabula, Cleveland, Sandusky and Toledo.

Hydrography.—There are two drainage basins in the State; the one sloping north toward Lake Erie, and the other south toward the Ohio. The rivers flow through valleys, some of which were at one time flood plains, but many of the streams have cut channels from 100 to 200 feet in depth and flow through low valleys. The Ohio River is in some places from 500 to 600 feet below the hills on either side and a considerable distance below the tops of the banks. The streams which flow south are the longest and deepest. The largest are the Muskingum, Mahoning, Hocking, Scioto, Little Miami and Great Miami. The longest wholly within the State is the Muskingum.

This river has been made navigable by slack-water and other improvements for about 100 miles from its mouth. The chief rivers in the northern basin are the Maumee, Portage, Sandusky, Huron, Vermilion, Black, Rocky, Cuyahoga and Chagrin. Many of the rivers of the State furnish considerable water power and are a great aid in the development of manufacturing industries. There are no large lakes in the State, but in many parts there are groups of small lakes noted for their beauty. In Summit County there are several small lakes. The buried river channels which are found in many places in Ohio are of interest to the geologist. These channels have been filled in by sand, gravel, etc., and now the waters of rivers that once followed deeply excavated channels are flowing over beds far above their former bottoms.

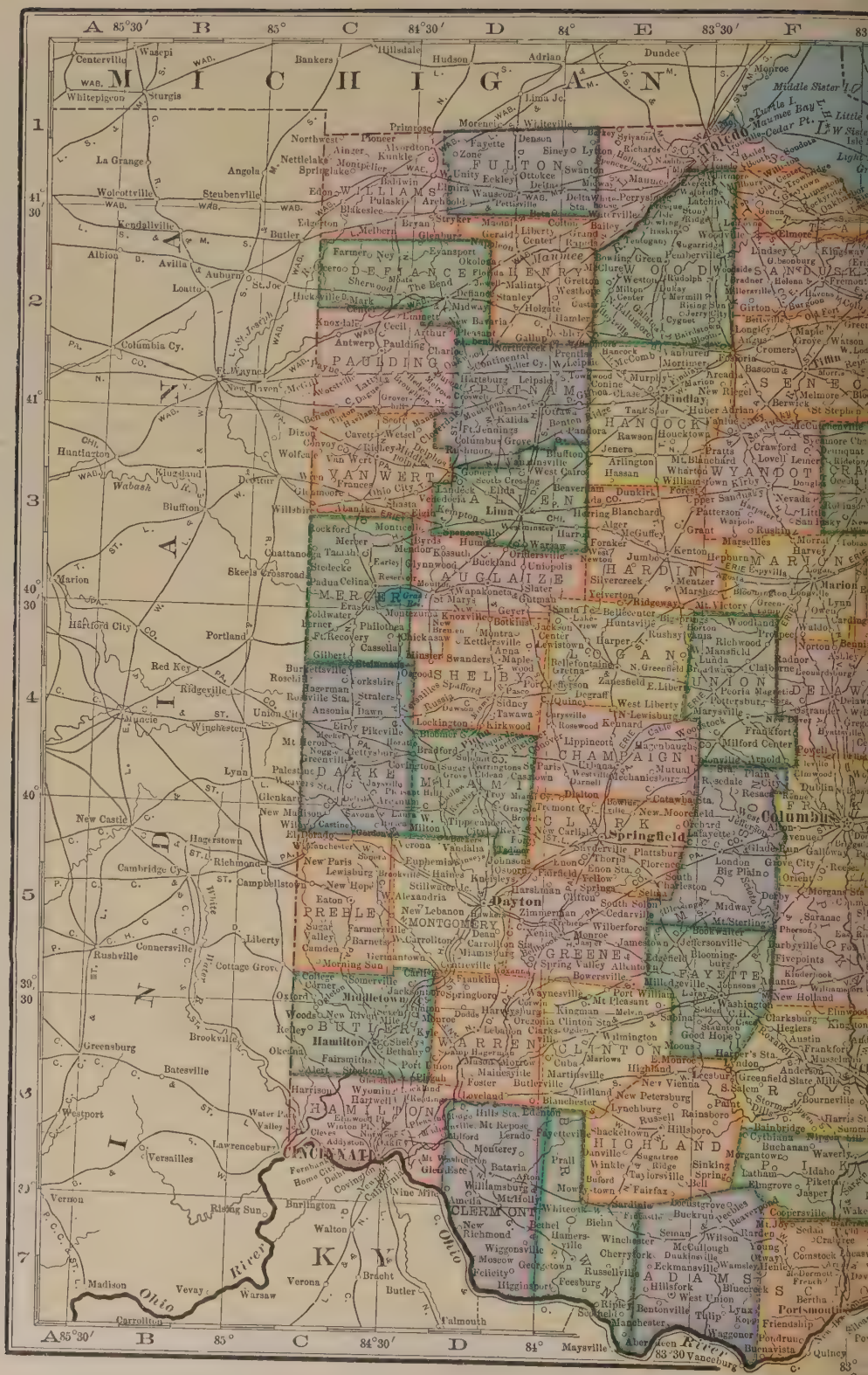
Geology.—There are no great breaks of the strata, nor any great variations in the geological structure of the whole State; the underlying sedimentary rocks show only a slight inclination from the horizontal. There is a broad fold whose axis extends from the northeastern part of Indiana southeast to near Cincinnati, then crosses into Kentucky, extending to about the central part. This is called the Cincinnati Arch or anticlinal. From this arch the strata dip westward to the coal fields of Illinois and south and southeast under the Alleghany coal fields. The elevation of this arch must have occurred at the close of the Lower Silurian period and prior to the beginning of the Upper Silurian period. The geological formations which are exposed are the Lower and Upper Silurian, the Devonian, the Carboniferous and the drift. In the Lower Silurian near Cincinnati may be found the oldest rocks, called the Cincinnati Group. In but few localities is there found such a variety and richness of the fossil remains as in the beds of limestone and clay or marl in this vicinity. On the crown of the Cincinnati Arch, near the northern part, the formations of the Upper Silurian area may be seen. Near Sandusky is the Salina group, the formation containing salt as at Syracuse, N. Y. Here also are beds of gypsum. In the western part and on the islands of Lake Erie is the water lime which is found in the Helderberg region of New York State. It flanks the Cincinnati Arch on each side. The corniferous limestone, the chief element of the Devonian in the State, forms two outcropping belts on opposite sides of the Cincinnati Arch, one crossing the northwest corner of the State and the other extending from Sandusky to Columbus. Corniferous limestone forms the surface rock of Kelley's Island. This same rock is quarried at Kelley's Island, Sandusky, Columbus and other places in the State. The capitol at Columbus is built of this stone. In the corniferous rocks at Sandusky and Delaware are found the remains of fossil fish. The black shale, similar to that found in the Genesee Valley in New York State, is in the northwest corner of the State, and also a belt from 10 to 20 miles wide, extends from the mouth of the Huron River to the Ohio. It is a black bituminous shale containing from 10 to 20 per cent of carbonaceous matter. It is the source of a large part of the oil and gas of Ohio. In this shale are found the remains of large fossil fishes. Bordering on the lake shore from the Pennsylvania line is

a mass of shale, the upper member of the Devonian, and the continuation of the formations found in the Portage and the Chemung Valley of western New York. The eastern part of the State is underlain by the Carboniferous formation, an extension of the great Alleghany coal fields. The coal measures are composed of strata of shale, sandstone, coal, limestone and fire clay with iron ores are found in the eastern and southeastern part. These coal measures have an area of 10,000 square miles in Ohio. There are no formations later than the Carboniferous until the period of the Glacial drift. All the State except the southeastern portion was covered with ice. The drift deposit in many places is several hundred feet deep. The Great Lakes once overflowed much of the State, as may be traced by the existing raised beaches.

Minerals and Mining.—According to the Fourteenth Census of the United States, Ohio which ranks thirty-fifth among the States in size and fourth in population, ranked seventh in the value of mineral products in 1919. The State ranked fourth in the total number of persons engaged in the mining industries and in the average number of wage-earners employed. The gross value of the mineral products of the State that year was \$134,518,505. The net value, after deducting \$3,092,567 (the value of natural gas sold by some producers for use as materials and by others for resale) was \$131,425,938, an increase of 125.1 per cent as compared with the value of the mineral products reported at the census of 1909. The Fourteenth Census report states that whereas this increase was perhaps largely due to general price increases, it was also due in part to growth of the mining industries. The industries reported for 1919, ranked according to value of products, were coal mining, petroleum and natural-gas production, limestone quarrying, sandstone quarrying, clay mining and gypsum mining. The production of salt was an important mineral industry in Ohio in 1919 but, for reasons not stated, was not included in the census of mines and quarries. Four industries—coal, petroleum and natural gas, limestone and sandstone, together reported 98.9 per cent of the total value of products and 98.8 per cent of the total number of wage earners employed in mining and quarrying in Ohio in the year under review. The principal mining industry, coal, reported products valued at \$77,988,602, or 58 per cent of the total value of the products of all mining industries. Ohio ranked fourth among the coal-producing States. The coal producing area of this State is part of the Northern Appalachian Coal Province, which extends into adjoining States. In Ohio it covers approximately 12,500 square miles in eastern and southeastern counties, 28 of which reported production in the year referred to. The petroleum and natural gas industry ranked second with an output valued at \$42,390,958, net, Ohio being seventh among the States in the production of these commodities. The petroleum and natural gas operations were in two fields—the Appalachian field in the eastern half of the State, from which 36 counties reported production; and the Lima-Indiana field in Northwestern Ohio, wherein 14 counties reported production. In 1919 limestone held third rank among the mineral industries of the State and sandstone fourth. In both of these industries Ohio ranked

OHIO

Aberdeen, (E7).....	477	Brooklyn, (J2).....	1,700	Coolville, (J6).....	457	Findlay, (E2).....	17,021	Holmesville, (J3)...	359
Ada, (E3).....	2,321	Brooklyn Hgts. (J2).	605	Corning, (H5).....	1,628	Flat Rock, (G2)....	350	Homer, (G4).....	400
Addyston, (C6)....	1,448	Brook Park, (J2)....	861	Cortland, (D5).....	750	Fletcher, (D4).....	369	Homeworth, (K3)...	400
Adena, (L4).....	724	Brookside, (L4)....	426	Coshocton, (J4)....	10,847	Floodwood, (H6)...	450	Hopedale, (L4)....	561
Akron, (J2).....	208,435	Brookville, (D5)...	1,336	Covington, (D4)...	1,885	Flushing, (K4)....	1,026	Howard, (H4).....	300
Albany, (H6).....	465	Brownsville, (H5)...	350	Crestline, (C3)....	4,313	Folger, (H2).....	400	Hoyleville, (E2)....	367
Alexandria, (G4)....	415	Bryan, (C1).....	4,252	Creston, (J3).....	894	Forest, (F3).....	1,143	Hubbard, (L2)....	3,320
Alger, (E3).....	787	Buchtel, (H6).....	1,178	Cridersville, (D4)...	493	Fort Loramie, (D4)...	472	Hudson, (K2).....	1,134
Alliance, (K3).....	21,603	Buckeye City, (H4)	310	Crooksville, (H5)...	3,311	Fort Recovery, (C2)	1,092	Huntington, (H2)...	650
Amanda, (G5).....	531	Bucyrus, (G3)....	10,425	Croton, (G4).....	400	Foster, (D6).....	320	Huntsburg, (K1)...	800
Ambroy, (L1).....	300	Buena Vista, (F7)...	400	Crown City, (H6)...	288	Fostoria, (F2).....	9,987	Huntsville, (E4)...	339
Amelia, (D6).....	658	Buffalo, (K5).....	950	Crystal Spring, (K3)	400	Frankfort, (F6)....	776	Huron, (G2).....	1,703
Amherst, (H2).....	2,485	Burbank, (J3).....	300	Cumberland, (J5)...	636	Franklin, (D5)....	3,071	Independence, (J2)	1,074
Amsterdam, (L4)...	1,271	Burghill, (L2)....	400	Curtice, (F1).....	400	Franklin Sq., (L3)...	300	Irontdale, (L3)...	1,258
Andover, (L1).....	921	Burlington, (H7)...	300	Custar, (E2).....	316	Frazeyburg, (H4)...	667	Ironspot, (H5)....	400
Anna, (D4).....	463	Burton, (K2).....	592	Cuyahoga Falls,		Fredericksburg, (J3)	480	Ironton, (G7)....	14,007
Ansonia, (C4).....	807	Butler, (H3).....	622	(K2).....	10,200	Fredericktown, (G4)	1,194	Ivorydale, (C6)...	700
Antiquity, (J7)....	300	Byesville, (J5)....	2,775	Cuyahoga Heights,		Freeport, (K4).....	626	Jackson, (G6)....	5,842
Antwerp, (C2).....	1,096	Cadiz, (L4).....	2,084	(J2).....	739	Freeport, (F2)....	578	Jackson Center, (D4)	578
Apple Creek, (J3)...	382	Caldwell, (J5)....	1,706	Cygnest, (E2).....	589	Fremont, (F2)....	12,468	Jacksonville, (H6)	1,046
Arcadia, (F2).....	376	Caledonia, (G3)....	492	Dalton, (J3).....	611	Frost, (J6).....	390	Jamestown, (E5)...	1,039
Arcanum, (C5).....	1,311	Cambridge, (J4)...	13,104	Damascus, (L3)....	400	Fulton, (G4).....	330	Jefferson, (L1)...	1,532
Archbold, (D1)....	1,125	Camden, (C5).....	904	Danville, (H4)....	383	Fultonham, (H5)...	340	Jeffersonville, (E5)	790
Arlington, (E3)....	666	Camp Dennison,		Dartmouth, (C6)...	300	Gahanna, (G4)....	347	Jeromesville, (H3)	408
Arlington Hts., (D6)	730	(D6).....	365	Dayton, (D5)....	152,559	Galen, (G4).....	640	Jewett, (K4).....	852
Ashtland, (H3)....	9,249	Canal Fulton, (J3)...	1,057	Decatur, (E7).....	300	Galion, (G3).....	300	Jobs, (H6).....	700
Ashley, (G4).....	786	Canal Lewisville,		Deerfield, (K2)...	480	Gallipolis, (H7)...	6,070	Johnsonville, (L2)	600
Ashtabula, (L1)...	22,082	(J4).....	300	Deer Park, (D6)...	824	Gambier, (H4)....	433	Johnstown, (G4)...	906
Ashtville, (G5)....	1,032	Canal Winchester,		Defiance, (D2)...	8,876	Garfield Heights,		Junction City, (H5)	890
Athens, (H6).....	6,418	(G5).....	791	DeGraff, (E4)....	932	(J2).....	2,550	Justus, (J3).....	380
Attica, (G2).....	658	Canfield, (L2)....	806	Delaware, (F4)....	8,756	Garrettsville, (K2)	1,119	Kalida, (D3).....	583
Ava, (J5).....	500	Cannerville, (J5)...	389	Delhi, (C6).....	872	Gates Mills, (K1)...	300	Kansas, (F2).....	400
Avon, (H2).....	1,460	Canton, (K3).....	87,091	Dellroy, (K3)....	338	Geneva, (L1).....	3,081	Kelleys Is., (G1)	708
Avon Lake, (H1)...	904	Carbondale, (H6)...	500	Delphos, (D3)....	5,745	Genoa, (F1).....	971	Kelloggsville, (L1)	300
Bainbridge, (F6)...	862	Carbon Hill, (H6)...	600	Delta, (D1).....	1,543	Georgesville, (F5)	300	Kennmore, (J2)...	12,683
Baltic, (J4).....	406	Cardington, (G4)...	1,109	Dennison, (K4)...	5,524	Georgetown, (E7)...	1,670	Kensington, (L3)	400
Baltimore, (G5)...	566	Carey, (F3).....	260	Derby, (F5).....	300	Germano, (D4)....	300	Kent, (K2).....	7,070
Baltimore, (D5)...	400	Carlisle, (D5)....	260	Derwent, (J5)....	500	Germantown, (D5)	1,827	Kenton, (E3)....	7,690
Barborton, (J3)...	18,811	Carroll, (G5)....	348	Deshler, (E2)....	1,514	Gettysburg, (C4)...	375	Killbuck, (J4)...	575
Barnesville, (K5)...	4,865	Carrollton, (K3)...	2,192	Dillonvale, (R9)...	1,643	Gibsonburg, (F2)...	1,737	Kings Mills, (D6)	750
Barnhill, (K4)....	513	Carthage, (D6)....	3,618	Dixon, (C3).....	300	Girard, (L2).....	6,556	Kingsport, (G6)...	800
Barton, (L4).....	800	Caststown, (D4)...	291	Doanville, (H6)...	700	Glandorf, (D2)...	499	Kingsville, (L1)	600
Bascom, (F2).....	380	Castalia, (G2)....	500	Dover, (J3).....	8,101	Glenale, (C6)....	1,759	Kinsman, (L2)...	900
Basil, (G5).....	606	Catawba, (E4)....	258	Dover Center, (J2)	1,754	Glenroy, (G6)....	800	Kunkle, (B1)....	450
Batavia, (D6).....	1,088	Catawba Island, (E4)	500	Doylestown, (J3)...	1,037	Glouster, (H5)...	3,140	Lafayette, (E3)...	383
Bay Village, (J1)...	751	Cedarvale, (E5)...	1,028	Dresden, (H4)....	1,434	Gnadenhutten, (K4)	530	Lagrange, (H2)...	500
Beach City, (J3)...	658	Celina, (C3).....	4,226	Drill, (L4).....	300	Goshen, (D6)....	400	Lakeview, (E4)...	549
Beallsville, (K5)...	555	Centerville, (G4)...	775	Dundee, (J3).....	350	Grafton, (H2)....	900	Lakewood, (J1)...	41,732
Beaverdam, (E3)...	394	Centerville, (D5)...	335	Dunkirk, (F3)....	894	Grand Rapids, (E2)	517	Lancaster, (G5)...	14,706
Bedford, (J2).....	2,677	Chagrin Falls, (K2)	2,237	East Canton, (K3)	574	Grandview Hts.,		Larue, (F3).....	795
Bellaire, (L4)....	15,061	Chandlersville, (J5)	300	E. Cleveland, (J1)	27,292	(F4).....	1,185	Laureville, (G6)...	425
Belle Center, (E4)...	909	Chardon, (K1)....	1,566	E. Columbus, (G5)	1,328	Granville, (G4)...	1,440	Lebanon, (D6)...	3,396
Bellefontaine, (E4)	9,336	Charlestown, (K2)...	600	East Fultonham,		Gratis, (C5).....	372	Leesburg, (E6)...	849
Belle Valley, (J5)...	1,050	Chatham, (H2)....	950	(H5).....	300	Greenfield, (F6)...	4,344	Leetonia, (L3)...	2,688
Bellevue, (G2)....	5,776	Chauncey, (H6)...	1,178	E. Greenville, (J3)	400	Greenspring, (F2)	830	Leipsic, (E2)....	1,788
Bellevue, (H3)....	998	Cherry Valley, (L1)	250	East Liberty, (E4)	500	Greentown, (K3)...	350	Letart Falls, (J7)...	500
Belmont, (K4)....	680	Chesapeake, (H5)...	821	East Linden, (G4)...	724	Greenville, (C4)...	7,104	Lewisburg, (C5)...	1,103
Beloit, (L3).....	589	Chesterhill, (J6)...	427	E. Liverpool, (L3)	21,411	Greenwich, (H2)...	827	Lexington, (G3)...	634
Belpre, (K6).....	1,317	Cheviot, (C6)....	4,108	East Orwell, (L1)...	700	Groesbeck, (C6)...	350	Libility Center, (E2)	635
Berea, (J2).....	2,959	Chillicothe, (G6)...	15,831	E. Palestine, (L3)	5,750	Grove City, (F5)...	905	Lightsville, (C4)...	300
Bergholz, (L3)....	1,215	Chillicothe, (D7)...	260	E. Sparta, (K3)...	500	Groveport, (G5)...	671	Lilly Chapel, (F5)	400
Berlin Heights, (H2)	514	Christiansburg, (D4)	473	E. Springfield, (L4)	315	Grover, (L4).....	1,694	Lima, (D3).....	41,326
Berne, (K5).....	514	Cincinnati, (D6)...	401,247	East View, (J2)...	606	Grover Hill, (C3)	530	Linden Heights,	
Bethel, (D7).....	1,340	Circleville, (G5)...	7,049	E. Youngstown,		Gypsum, (G1)....	660	(G4).....	1,731
Bethesda, (K4)....	1,182	Claridon, (K1)....	800	(L2).....	11,237	Hamden, (H6)....	837	Lindsey, (F2)....	456
Bettsville, (F2)...	451	Clarington, (L5)...	607	Eaton, (C5).....	3,210	Hamilton, (C6)...	39,675	Lindale, (J2)....	490
Beverly, (J5).....	566	Clarksburg, (F6)...	420	Edenton, (D6)....	330	Hamler, (D2)....	560	Lisbon, (L3)....	3,113
Bexley, (K4).....	1,342	Clarksfield, (H2)...	300	Edgerton, (C2)...	987	Hammondsville,		Little Hocking, (J6)	350
Bidwell, (H7)....	500	Clarksville, (E6)...	410	Edison, (G3)....	386	(L3).....	400	Lockland, (D6)...	4,007
Birmingham, (H2)	300	Clay Center, (F1)...	300	Edon, (C1).....	610	Hanging Rock, (G7)	591	Lockwood, (L4)...	300
Bladensburg, (H4)	300	Clayton, (D5)....	430	Elba, (K5).....	350	Hannibal, (L5)...	500	Lodi, (J2).....	1,240
Blanchester, (E6)...	1,671	Cleveland, (J1)...	796,841	Eldorado, (C5)...	322	Hanover, (H4)....	321	Logan, (H5)....	5,493
Bloomdale, (E2)...	509	Cleveland Hgts.,		Elida, (D3).....	509	Harrison, (C6)...	1,309	London, (F5)....	4,080
Bloomington, (E5)...	552	(J1).....	15,236	Elizabethtown, (C6)	300	Harrisonville, (H6)	356	Longstreth, (H6)...	500
Bloomington, (L4)	300	Cleves, (C6).....	1,454	Ellsworth, (L2)...	600	Harrisville, (L4)...	364	Lorain, (H2)....	37,295
Bloomville, (G2)...	645	Clinton, (J3).....	312	Elmore, (F2)....	937	Harrod, (E3).....	389	Lore City, (K5)...	784
Bluffton, (E3)....	1,950	Clyde, (G2).....	3,099	Elmwood Pl., (C6)	3,891	Hartsgrove, (L1)...	800	Loudonville, (H3)	1,887
Bolivar, (J3).....	519	Coalburg, (L2)....	300	Elyria, (H2)....	20,474	Hartsville, (K3)...	350	Louisville, (K3)...	2,008
Botkins, (D4).....	557	Coalgrove, (G7)...	1,851	Empire, (L3).....	491	Hartwell, (C6)...	2,823	Lowland, (D1)...	1,557
Bowerson, (K4)....	500	Coalton, (G6)....	790	Englewood, (D5)...	351	Harveysburg, (E6)...	355	Lowell, (J5)....	516
Bowersville, (E5)...	312	Coldwater, (C4)...	1,531	Etna, (G5).....	300	Haskins, (E2)....	427	Lowellville, (L2)...	2,214
Bowling Green, (E2)	5,788	Colebrook, (L1)...	400	Euclid, (J1).....	3,363	Haviland, (C2)...	270	Lucas, (H3)....	337
Bradford, (D4)....	2,356	College Corner, (C5)	348	Evansport, (D2)...	350	Havilandville, (H6)	400	Lucasburg, (J5)...	400
Bradner, (F2).....	786	College Hill, (D6)...	1,979	Fairfield, (D5)...	329	Hebron, (G5)....	683	Lucky, (E2)....	500
Bratenahl, (J2)...	1,000	Collins, (G2)....	300	Fairport Harbor,		Hemlock, (H5)...	497	Luhig, (H6)....	400
Brecksville, (J2)...	950	Coolwood, (J1)...	4,850	(K1).....	4,211	Hendrysburg, (K4)	450	Lynchburg, (E6)...	898
Bremen, (H5).....	1,134	Columbiana, (L3)...	2,114	Fairview, (J2)....	642	Hensley, (K6)....	300	McArthur, (H6)...	1,307
Brewster, (J3)....	928	COLUMBUS,		Farmdale, (L2)...	300	Hicks, (C2).....	300	McClure, (E2)...	433
Bridgeport, (L4)...	3,977	(F5).....	237,031	Farmer, (C2)....	370	Higginsport, (D7)...	353	McComb, (E2)...	1,012
Brilliant, (L4)....	1,500	Columbus Grove,		Farmersville, (D5)	479	Hilliards, (F4)....	451	McConnellsville,	
Brimfield, (K2)...	500	(D3).....	1,768	Fayette, (D1)....	936	Hillsboro, (E6)...	4,356	(J5).....	1,618
Brinkhaven, (H4)...	342	Conesville, (J4)...	400	Fayetteville, (E6)	349	Hiram, (K6).....	453	McCutchenville, (F3)	350
Bristol, (L2).....	950	Conneaut, (L1)...	9,343	Felicity, (D7)...	606	Holgate, (D2)....	1,039	McDonald, (L2)...	621
Broadwell, (J6)...	350	Continental, (D2)	1,093	Fidelity, (C6)...	305	Hollister, (H5)...	500	McGuffey, (E3)...	688
Brookfield, (L2)...	900	Convoy, (C3)....	932	Fidelity, (D5)...	300	Holloway, (K4)...	974	Macedonia, (K2)...	581





Hammond's 8 x 11 Map of Ohio
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W. 82 Longitude J West 81°30' from K Greenwich 81° L 80°30' M 80°

OHIO - Cont'd.

Macksburg, (K5)...	389	Newburg, (J2).....	5,813	Pickerington, (G5)...	358	Shaker Heights, (J2).....	1,616	Valley View, (J2)...	403
Madeira, (D6).....	600	Newburg Heights, (J2).....	2,957	Pikeeton, (G13).....	664	Shandon, (C6).....	350	Vanue, (F3).....	368
Madison, (K1).....	893	New Carlisle, (D5)...	1,019	Piqua, (D4).....	15,044	Shanesville, (J3)...	352	Van Wert, (C3).....	8,100
Madisonville, (D6),	593	New Comerstown, (J4).....	3,389	Pittsburgh, (C5)...	302	Sharonville, (D6)...	753	Vaughnsville, (D3)...	300
Magnolia, (K3).....	605	New Concord, (J5)...	889	Plain City, (F4)...	1,330	Sharples, (E1).....	345	Vermilion, (H2)...	1,436
Maineville, (D6)...	694	New Hampshire, (E3)	300	Pleasant City, (J5)...	781	Shauk, (G3).....	300	Verona, (D5).....	317
Malinta, (D2).....	348	New Holland, (F5)...	810	Pleasant Hill, (D3)...	682	Shawnee, (J5).....	1,918	Versailles, (C4)...	1,563
Mallet Creek, (J2)...	400	New Knoxville, (D4)	537	Pleasant Ridge, (C6).....	1,769	Shelby, (G3).....	5,578	Vienna, (E5).....	392
Malta, (J5).....	887	New Lexington, (H5).....	3,157	Pleasantville, (G5)...	479	Shepherd, (G5)...	400	Vinton, (H7).....	407
Malvern, (K3).....	979	New London, (H2)...	1,470	Plymouth, (G3)...	1,374	Sherodsville, (K4)...	377	Wabash, (C3).....	300
Manchester, (E7)...	1,824	New Madison, (C5)...	608	Poland, (L2).....	561	Sherwood, (C1)...	543	Wadsworth, (J2)...	4,742
Mansfield, (G3)...	27,824	New Marshfield, (H6).....	400	Pomeroy, (H6)...	4,294	Shiloh, (G3).....	430	Wainwright, (K4)...	350
Mantua, (K2).....	764	New Matamoras, (K5).....	896	Portage, (E2).....	408	Shreve, (H3).....	1,904	Wakeman, (H2)...	930
Maple Heights, (J2).....	1,732	New Paris, (C5)...	907	Port Clinton, (G1)...	3,928	Sidney, (D4).....	8,590	Walbridge, (F1)...	584
Marblehead, (G1)...	1,048	New Philadelphia, (K4).....	10,718	Portsmouth, (F7)...	33,011	Silverton, (D6)...	795	Waldo, (F4).....	344
Maria Stein, (D4)...	500	New Pittsburg, (H6)	300	Port Washington, (K4).....	382	Smithfield, (L4)...	620	Wapakoneta, (D3)...	5,295
Marietta, (J6).....	15,140	New Richmond, (D7).....	1,714	Powhatan Pt., (L5)...	406	Smithville, (J3)...	482	Warren, (L2).....	27,050
Marion, (F3).....	27,891	New Springfield, (L3)	400	Prairie Depot, (F2)	1,000	Sodom, (L2).....	350	Warrenton, (L4)...	300
Mark Center, (C2)	300	New Straitsville, (G5).....	2,208	Prall, (E6).....	510	Somerset, (H5)...	1,339	Warsaw, (H4).....	488
Martin, (F1).....	400	Newton Falls, (L2)	1,100	Proctorville, (H7)...	629	Somerville, (C5)...	305	Warwick, (J3)...	500
Martins Ferry, (L4).....	11,634	Newtown, (D6).....	534	Prospect, (F4)...	949	South Amherst, (H2)	944	Washington, (K4)...	383
Martinsville, (D6)...	397	New Vienna, (E5)...	704	Prymont, (D5)...	300	So. Charleston, (E5)	1,267	Washington Court House, (F5)...	7,962
Marysville, (F4)...	3,635	New Washington, (G3).....	919	Quaker City, (K5)...	732	So. Euclid, (K1)...	1,605	Washingtonville, (L3).....	823
Mason, (D6).....	816	New Waterford, (L3)	438	Quincy, (E4).....	474	So. Lebanon, (D6)...	675	Waterford, (J5)...	300
Massillon, (J3)...	17,428	Niles, (L2).....	13,080	Racine, (J7).....	472	So. Point, (G7)...	406	Waterville, (E1)...	779
Maumee, (E1).....	3,195	No. Baltimore, (E2)	4,439	Randolph, (K2)...	300	So. Solon, (E5)...	442	Wauseon, (D1)...	3,305
Mayfield, (K1).....	500	No. Bend, (C6)...	597	Rarden, (F7).....	302	So. Webster, (G7)...	604	Waverly, (F6)...	1,625
Maynard, (L4)...	400	No. Bloomfield, (L2)	780	Ravenna, (K2)...	7,219	So. Zanesville, (H5)	1,010	Waynesburg, (K3)...	978
Mechanicsburg, (E4).....	1,470	North Canton, (K3).....	1,597	Rawson, (E3).....	416	Spencer, (H2).....	527	Waynesfield, (E3)...	584
Medina, (J2).....	3,430	North College Hill, (C6).....	1,104	Rayland, (L4)...	300	Spencerville, (D3)...	1,543	Waynesville, (D3)...	668
Mendon, (C3).....	571	No. Fairfield, (G2)...	500	Raymond, (F4)...	350	Springboro, (D5)...	341	Wellington, (H2)...	2,245
Mentor, (K1).....	851	Northfield, (J2)...	861	Reading, (D6)...	4,540	Springfield, (E5)...	60,840	Wellston, (G6)...	6,687
Mesopotamia, (L2)	800	No. Hampton, (E5)...	400	Reid, (C6).....	390	Springvalley, (D5)...	444	Wellsville, (L3)...	8,849
Metamora, (E1)...	484	No. Jackson, (L2)...	400	Rendville, (H5)...	515	Steel, (L4).....	500	Welshfield, (K2)...	950
Miami, (C6).....	400	No. Kingsville, (L1)	598	Republic, (G2)...	393	Sterling, (J3).....	380	W. Alexandria, (C5)	994
Miamisburg, (D5)...	4,383	No. Lawrence, (J3)	1,200	Reynoldsburg, (G5)	491	Steubenville, (L4)	28,508	W. Andover, (L1)...	300
Middleburg, (E4)...	350	No. Lewisburg, (E4)	720	Rhodesdale, (L4)...	300	Stewart, (J6).....	340	Westboro, (E6)...	300
Middlefield, (R2)...	706	No. Liberty, (E7)...	300	Richmond, (L4)...	358	Stewartville, (L4)...	500	W. Brookfield, (J3)...	300
Middle Point, (D3)	700	No. Lima, (L3).....	300	Richmond Dale, (G6).....	350	Stockport, (J5)...	455	W. Cairo, (D3)...	380
Middleport, (H6)...	3,772	No. Olmsted, (J2)...	1,419	Richwood, (F4)...	1,601	Stony Ridge, (E1)...	300	W. Carrollton, (D5)	1,430
Middletown, (D6)	23,594	No. Randall, (J2)...	652	Ridgeway, (E3)...	456	Stoutsville, (G5)...	400	W. Chester, (D6)...	300
Midland, (E6).....	312	No. Ridgeville, (J2)	400	Ripley, (E7)...	1,529	Strasburg, (J3)...	917	W. Dover, (J2)...	300
Midvale, (K4).....	680	No. Norwalk, (G2)...	7,379	Risingun, (F2)...	479	Stratton, (L3)...	593	Westerville, (G4)...	2,480
Milan, (G2).....	653	No. Norwood, (D6)...	24,966	Rittman, (K3)...	1,803	Struthers, (L2)...	5,847	W. Farmington, (L2)	317
Milford, (D6).....	1,525	Nottingham, (J1)...	2,387	Robins, (K5).....	500	Stryker, (B2).....	1,014	W. Jefferson, (F5)...	1,170
Milford Center, (F4)	671	Oakbarham, (F1)...	1,858	Rockbridge, (G5)...	350	Sugar Creek, (J4)...	618	W. Lafayette, (E4)...	921
Miller, (A7).....	350	Oak Hill, (G7).....	1,394	Rock Creek, (L1)...	483	Sugar Grove, (G5)...	420	W. Lebanon, (J3)...	300
Millersburg, (J3)...	2,098	Oakley, (C6).....	1,639	Rockford, (C3)...	1,075	Sulphur Springs, (G3).....	350	W. Liberty, (E4)...	1,347
Millersport, (H5)...	310	Oakwood, (D3)...	1,473	Rome, (L1).....	600	Summerfield, (K5)...	484	W. Manchester, (C5)	409
Mineral, (H6).....	370	Oakwood, (D2)...	443	Roscoe, (J4).....	629	Sunbury, (G4).....	827	W. Mansfield, (F4)	737
Mineral City, (K2)	800	Oberlin, (H2).....	4,236	Ross, (C6).....	330	Swanton, (E1).....	1,248	W. Middletown, (D5)	300
Mineral Ridge, (L2)	759	Ohio City, (C3)...	848	Rossford, (E1)...	1,000	Sycamore, (F3).....	839	W. Milton, (D5)...	1,256
Minersville, (J6)...	950	Olmsted Falls, (J2)	374	Rossmoyne, (D6)...	300	Sylvania, (E1).....	1,222	Weston, (E2).....	300
Minerva, (K3)...	2,261	Omega, (G6).....	300	Roswell, (K4)...	420	Syracuse, (E1)...	1,000	W. Park, (J2)...	8,581
Mingo Jc., (L4)...	4,616	Orbiston, (H6)...	600	Roundhead, (E3)...	400	Tallmadge, (K2)...	500	W. Salem, (H3)...	636
Minster, (D4)...	1,538	Orwell, (L1).....	4,107	Rudolph, (E2)...	500	Carlton, (G5)...	270	W. Toledo, (E2)...	2,500
Mogadore, (K2)...	751	Osborn, (D5)...	1,059	Ruraldale, (H5)...	300	Taylorville, (see Phila).....	417	W. Union, (E6)...	992
Monday, (H6).....	400	Ostrand, (F4)...	391	Rushsylvania, (E4)	479	Tedrow, (D1).....	350	W. Unity, (D1)...	906
Montford, (C6)...	500	Ottawa, (D2).....	2,167	Russellville, (E7)	435	Terrace Park, (D6)	410	Westmyer, (J2)...	600
Monroeville, (G2)	1,183	Ottoville, (D3)...	435	Russia, (D4).....	350	Thornville, (H5)...	451	Wharton, (F3)...	361
Montgomery, (D6)	378	Owens, (F3).....	600	Rutland, (H6)...	500	Thurman, (H7)...	500	White Cottage, (H5).....	300
Montpelier, (C1)...	3,052	Oxford, (C6).....	2,146	Sabina, (E6).....	1,504	Thurston, (G5)...	394	Whitehouse, (E1)...	513
Montville, (F3)...	600	Painesville, (K1)...	7,272	St. Bernard, (C6)...	6,312	Tiffin, (F2).....	14,375	Wickliffe, (K1)...	1,508
Morrat, (F3).....	387	Palmyra, (K2)...	300	St. Clairsville, (L4)	1,561	Tippecanoe, (K4)...	450	Willerforce, (E5)...	300
Morristown, (K4)...	315	Pandora, (E3)...	669	St. Henry, (C4)...	561	Tippecanoe City, (D5).....	2,426	Willard, (G2)...	3,889
Morrow, (D6).....	803	Paris, (K3).....	300	St. Johns, (D3)...	350	Toledo, (E1).....	243,164	Williamsburg, (D6)	969
Mountairy, (C6)...	497	Parkman, (K2)...	300	St. Marys, (D3)...	5,679	Tontogany, (E2)...	303	Williamsport, (F5)...	554
Mt. Blanchard, (E3)	427	Parma, (J2).....	310	St. Patrick, (E4)...	1,226	Toronto, (L4)...	4,648	Willoughby, (K1)...	2,656
Mt. Gilead, (G3)...	1,837	Pataskala, (G5)...	771	Salem, (L3).....	10,305	Tracy, (K4).....	400	Willshire, (C3)...	546
Mt. Healthy, (C6)	2,255	Paulding, (C2)...	1,068	Salinville, (L3)...	2,700	Tremont City, (E4)	287	Wilmington, (E6)...	5,037
Mt. Orab, (E6).....	545	Payne, (C2).....	984	Sandrun, (H5)...	350	Trenton, (D6)...	618	Winchester, (E6)...	913
Mt. Pleasant, (L4)	635	Peebles, (F7).....	1,008	Sandusky, (G2)...	22,897	Trimble, (H6)...	806	Windham, (K2)...	314
Mt. Sterling, (F5)...	1,143	Pemberton, (D4)...	300	Santoy, (H5)...	976	Trinway, (H4)...	300	Windsor, (L1)...	700
Mt. Vernon, (G4)...	9,237	Pemberville, (F2)...	938	Sardinia, (E7)...	561	Trotwood, (D5)...	422	Withamsville, (D6)...	390
Mt. Victory, (E3)...	723	Peninsula, (J2)...	520	Sedalia, (F5)...	500	Troy, (D4).....	7,260	Woodington, (C2)...	300
Mt. Washington, (D6).....	984	Perry, (K1).....	473	Sekatan, (C6)...	1,448	Tuscarawas, (K4)...	499	Woodfield, (K5)...	2,394
Mowrystown, (E6)...	350	Perryssburg, (E1)...	2,429	Senecaaville, (K5)...	947	Uhrichsville, (K4)...	6,428	Woodstock, (E4)...	336
Moxabala, (H5)...	400	Perrysville, (H3)...	575	Seven Mile, (C6)...	369	Union, (D5).....	250	Woodville, (F2)...	910
Monroe Falls, (K2)	300	Pettitsville, (D1)...	300	Seville, (J2).....	691	Union City, (C4)...	1,534	Wooster, (J3)...	8,204
Murray, (H5).....	1,493	Phillipsburg, (D3)...	348	Shadyside, (L5)...	3,084	Union Furnace, (H6).....	300	Worthington, (F4)...	705
Napoleon, (D2)...	4,143	Philo, (J4).....	417					Wren, (C3).....	314
Navarre, (K3).....	1,385							Wyoming, (D6)...	2,323
Negley, (L3).....	520							Xenia, (E5).....	9,110
Nelsonville, (H6)...	6,440							Yellow Springs, (E5).....	1,264
Nevada, (F3).....	793							Yorkville, (L4)...	1,754
Newark, (H4).....	26,718							Youngstown, (L2)...	132,358
New Athens, (K4)...	408							Zaleski, (H6)...	395
New Bavaria, (D2)	400							Zanesville, (H5)...	29,569
New Boston, (G7)...	4,817								
New Bremen, (D4)...	1,502								

second among the States of the Union with products valued at \$6,742,496 and \$2,759,352 respectively. The limestone operations were well distributed over the State and were reported from 32 counties; sandstone quarrying was reported from only 12 counties in the eastern half of the State.

The number of mining enterprises in the State was 2,283, capitalized at \$256,057,996 and employing 49,298 wage-earners whose wages totaled \$58,109,904. These figures compare with 1,876 enterprises, capitalized at \$161,324,529, and employing 50,567 wage-earners whose wages totaled \$26,769,229 in 1909. Production of the principal minerals in 1921 was as follows: cement, 2,518,723 barrels; clay products (value \$67,396,680); coal, 31,942,776 short tons; pig iron, 3,649,835 long tons; natural gas, 47,412,000,000 cubic feet (value \$19,216,000); petroleum, 7,335,000 barrels; salt, 749,349 short tons; sand and gravel, 5,138,276 short tons; stone, 7,229,150 short tons. The total value of the 1921 output was \$223,533,658 as against \$355,844,499 in 1920. In 1922 Ohio produced 26,500,000 tons of coal and 6,762,000 barrels of petroleum.

Climate.—The climate while temperate is variable, and great extremes occur; but neither excessive heat nor cold is of long duration. The maximum temperature is 107.9° and the minimum 34° below zero. The northern part of the State has a longer and colder winter than the southern part; but the winters are not severe in any part of the State. In the northern part, near the lake, sudden changes of temperature occur, especially during the summer season. The mean temperature for July is 73°, for January 26°. The rainfall is evenly distributed and of an amount generally conducive to the growth of farm products. The annual rainfall averages 39.35 inches. The climate is healthful; the winds which are at times a disturbing element as regards temperature, serve to keep the climate of the State as a whole remarkably healthful.

Soil.—The soil of nearly two-thirds of the State is the deposit of the drift or quarternary, and nearly all of such soil is fertile. In the southeastern part the soil is composed of the decomposed sub-rock structure. In the northeast the clay soils are found in many counties and in the west there is a large percentage of limestone; along the rivers are alluvial soils.

Forests and Forest Products.—The western part of the State was once covered with forests, the hardwood variety of timber used in building, was abundant. The ash, elm, beech and varieties of cedar, pine, chestnut, maple, oak and in some parts walnut were found. In the western part the prairie zone begins. The total extent of forests is about 9,300 square miles, which is 23 per cent of the total area. The wood products of Ohio were noted for their good quality, when the raw material was obtained from the forests of the State. There are over 1,000 lumber and timber manufacturing, and the value of the product for a single year is over \$54,144,000. The value of the lumber and planing mill products, including sash, doors and blinds, in a recent year was \$32,428,000, the value of the furniture products is over \$35,224,000, and of paper and wood pulp, over \$55,000,000. The flora and fauna of Ohio belong to the temperate zone, but all large wild

animals have disappeared before the advance of civilization.

Agriculture.—The agricultural statistics of Ohio, taken from the 14th report of the United States Census Bureau, show that in 1920 there were 256,695 farms, totaling 23,515,888 acres, in the State. Improved land in farms totaled 18,542,353 acres; woodland, 3,198,929 acres; other unimproved land, 1,774,606 acres. The percentage of land area in farms was 90.2 and the percentage of farm land improved was 78.9. The value of all farm property was \$3,095,666,336, compared with \$1,902,694,589 in 1909. Land and buildings in 1920 were valued at \$2,661,435,949 (land alone at \$2,015,112,999); implements and machinery at \$146,575,269; live stock at \$287,655,118. The average value per farm, all farm property, was \$12,060; land and buildings, \$10,368; land alone, \$7,850. The average value per acre of land in farms was: All farm property, \$131.64; land alone, \$85.69. There were in the State 31,479 farms of less than 20 acres each; 44,535 of between 20 and 49 acres; 86,337 of between 50 and 99 acres; 69,738 of between 100 and 174 acres; 37,546 of between 175 and 499 acres; 728 of between 500 and 1,000 acres and 105 of 1,000 acres and over. Owners operated 177,986 farms; managers, 3,065 and tenants, 75,644. White farmers numbered, 255,079 of whom 241,075 were native born: colored farmers numbered 1,616. Farms mortgaged numbered 50,784 and the mortgage debt was \$121,120,774. Farm expenditures for labor were, \$46,427,807; for fertilizer \$13,206,018; for feed \$40,378,027. The chief crops, with their acreage, yield and value for the year 1922 were: corn, 3,823,000 acres, 149,097,000 bushels, \$98,404,000; spring wheat, 28,000 acres, 420,000 bushels, \$491,000; winter wheat, 2,516,000 acres, 35,224,000 bushels, \$41,212,000; barley, 73,000 acres, 1,424,000 bushels, \$926,000; clover seed, 206,000 acres, 227,000 bushels, \$2,429,000; oats, 1,472,000 acres, 39,744,000 bushels, \$17,885,000; buckwheat, 25,000 acres, 500,000 bushels, \$400,000; rye, 87,000 acres, 1,235,000 bushels, \$1,025,000; tame hay, 3,374,000 acres, 4,892,000 tons, \$52,834,000; sorghum syrup, 4,000 acres, 248,000 gallons, \$260,000; potatoes, 126,000 acres, 11,214,000 bushels, \$10,093,000; sweet potatoes, 3,000 acres, 360,000 bushels, \$486,000; tobacco, 52,000 acres, 46,800,000 pounds, \$8,892,000; apples, 7,298,000 bushels; peaches, 1,584,000 bushels; and pears, 450,000 bushels.

Stock-raising.—Statistics furnished by the Department of Agriculture of the United States show that on 1 Jan. 1923 there were on the farms in the State 771,000 horses, valued at \$71,703,000; 32,000 mules, valued at \$3,104,000; 1,069,000 milk cows, valued at \$59,864,000; 857,000 other cattle, valued at \$27,167,000; 2,094,000 sheep, valued at \$14,867,000, and 3,091,000 swine, valued at \$37,401,000. In 1922 the clip of wool was over 13,000,000 pounds, while in 1916 it was but 8,947,621 pounds. In 1919 there was produced in home dairies 30,264,265 pounds of butter and in factories and creameries 63,882,101 pounds. The cheese production was 434,042 pounds in the homes and 5,220,545 pound in factories and creameries. The production of eggs in 1919 amounted to 102,377,143 dozen.

Manufactures.—According to the latest reports available (Census of Manufactures, 1919

—Department of Commerce) the value of Ohio's manufactured products was \$5,100,308,728, the average number of wage-earners employed in its manufacturing industries was 730,733, and the value added by manufacture, which is the best measure of the importance of manufacturing industries, amounted to \$2,188,360,857. In 1919 Ohio ranked fourth among the States in value of products, third in the number of wage earners, and third in the value added by manufacture. The value of manufactured products in Ohio in 1919 represented 8.2 per cent of the total for the United States. The corresponding proportions for 1909 and 1904 were 7 per cent and 6.5 per cent respectively.

A summarization of the industries of Ohio shows a wide range of character and high valuations in capital and production. In the manufacture of rubber goods, Akron being the leading point of the industry, which includes rubber tires, clothing, mats, type, springs, tubing, brushes, bands, etc., Ohio held first rank both in 1919 and 1909, the value of products for the industry in the State representing 48.5 per cent of the total value of products for the industry for the United States in 1919 and 42 per cent in 1909. In the manufacture of automobiles, including bodies, parts and accessories, Ohio ranked second among the States in 1919 as in 1914. There was an increase of 37,130 or 144 per cent in the average number of wage-earners employed from 1914 to 1919 while the value of products increased \$293,725,893, or 342.7 per cent, and value added by manufacture \$862,772,000, or 312 per cent during the same period. In electrical machinery, apparatus and supplies, Ohio ranked second in 1919, having advanced from 20th place in 1909. In the manufacture of tin plate and terneplate Ohio ranked second, reporting 8.4 per cent of the total products of the United States in 1919. In the value of paper and wood pulp produced Ohio ranked seventh, having held sixth position in 1904 and 1909, the value of the products being in 1919 \$55,098,000. In the production of butter, cheese and condensed milk the State ranked fifth. The principal industries, ranked by value of products in 1919, were: iron and steel, steel works and rolling mills, \$626,370,000, in the production of which the State stood second; rubber tires, tubes, and rubber goods, \$551,118,000; foundry and machine shop products, \$347,635,000; automobiles, \$287,046,000; iron and steel blast furnaces, \$179,233,000; slaughtering and meat packing, \$170,338,000; electrical machinery, apparatus and supplies, \$156,924,000; cars and general shop construction and repairs by steam railroads, \$96,484,000; automobile bodies and parts, \$92,391,000; flour and grist mill products, \$89,397,000; bread and other bakery products, \$78,819,000; boots and shoes, not including rubber boots and shoes, \$71,355,000; machine tools, \$62,554,000; printing and publishing, newspapers and periodicals, \$58,567,000; men's clothing, \$58,169,000; steel shipbuilding and repair work, \$56,482,000; paper and wood pulp, \$55,098,000; women's clothing, \$48,704,000; coke, not including gas-house coke, \$46,514,000; food preparations, not otherwise specified, \$46,340,000; petroleum refining, \$43,283,000.

The manufacturing importance of the State is due to its ample natural resources as detailed under *Minerals and Mining*, and *Forests*, and

their accessibility by waterways and rail, which led to an early introduction of domestic manufactures along with the chartering of a trading and banking company in 1803. Cleveland and Cincinnati are the chief industrial centres. Cincinnati long held the lead, but has apparently attained its maximum, while Cleveland is still increasing. From 1800 to 1850 Cincinnati was the centre of an extensive hog raising region, and during that period was the most important meat-packing city in the United States; the manufacture of tobacco is also a leading industry of Cincinnati. The manufacture of foundry and machine shop products, including engines, boilers and machinery of many varieties, is carried on extensively in all the leading cities of the State, but chiefly at Cleveland and Cincinnati. Youngstown, in the Mahoning Valley, is the leading city in the State in the iron and steel industry. Mining machinery is made at Columbus and Akron, machine tools at Hamilton. Pottery is produced at Cincinnati, Akron, Zanesville, Roseville and East Liverpool, the last town manufacturing over 49 per cent of the white granite ware and semi-vitreous porcelain of the United States. Toledo is one of the granaries of the country with important flouring and grist mills, and Springfield and Canton lead in the manufacture of agricultural implements.

In 1919 the value of the manufactured products of some of the more important cities was as follows: Akron, \$558,962,067; Canton, \$124,292,924; Cincinnati, \$500,040,996; Cleveland, \$1,091,577,490; Columbus, \$184,021,849; Dayton, \$174,990,607; Springfield, \$67,759,001; Toledo, \$293,520,900; Youngstown, \$241,458,370.

Commerce and Transportation.—The foreign commerce of the State carried on through Cleveland, Cincinnati, Toledo and Sandusky, the four ports of entry of the United States customs districts of the region, is practically unimportant, compared with the enormous domestic commerce over the waterways and the railways of the State. The Ohio River, forming the southern boundary of the State for 436 miles, and its tributary, the Muskingum River, navigable for several miles above Zanesville, have formed for over a century one of the great highways of internal commerce, affording cheap communication with western Pennsylvania and the entire Mississippi valley; notwithstanding the advent and competition of railroads, their waters still bear the larger freight of coal, lumber and the heavier articles of transportation. Two canals originally connected Lake Erie with the Ohio River, one from Cleveland to Portsmouth, and the other from Toledo to Cincinnati; but at the present time there is no connection with the lake and river by either, owing to abandonment and decay. Lake Erie and the Erie Canal afford water communication with the Atlantic seaboard; and the northwest States are reached via the western Great Lakes and the Sault Sainte Marie Canal.

The construction of railroads dates from 1832 and the incorporation of the Mad River and Lake Erie Railroad, now absorbed in the Big Four system. The railway mileage of the State in 1919, including main line, second line, branches and side tracks, was over 9,000 miles. The great lines traversing the State are the Baltimore and Ohio, the Lake Shore and Michigan Southern, the Pennsylvania, the Erie, the

Cleveland, Cincinnati, Chicago and Saint Louis, and the New York, Chicago and Saint Louis. The consolidation of the railroads is proceeding gradually, and nearly all the local lines together with the Lake Shore and Michigan Southern and the Baltimore and Ohio are now controlled by larger corporations. The State is provided also with a network of interurban electric railroads connecting almost every populous centre, and ranking first among the United States in the extent of its mileage.

Banks.—The first bank of the State was a private institution, which was virtually a private company to which the privilege of doing a banking business had been granted. Five banks were established before 1813, all by special act of the legislature. The first government bank in the State was established in Cincinnati in 1817. This "innovation," as it was called; met with great opposition, and various methods were suggested whereby the United States bank might be suppressed or induced to leave the State. From 1817 to 1836 there were 25 banks established. In 1836 an effort was made to establish a second United States bank, but the legislature passed a special act preventing its establishment. A number of private and unauthorized banks were established between 1840 and 1850. The failure of several of those banks caused losses to many people, and led to the passage of prohibitory laws regarding the establishment of unauthorized banks by the legislature of 1845. The law proved ineffective, and a free banking law was passed in 1851. So much had public opinion changed, that in 1863 nearly all the State banks became national banks. In the panic years of 1873, 1884 and 1893 there were many bank failures in the State, nearly all of which were confined to private and State banks. In 1900 the high prices of United States bonds and other reasons caused a reaction in favor of State banks. From 16 Nov. 1900 to 15 Nov. 1902 inclusive, there were established in the State 42 banks, savings and loan associations. During the same period there were established 20 building and loan associations. In 1922 there were in the State 644 State banks (which includes all banking institutions other than private and national banks); 106 private banks and 372 national banks, making in all 1,122 authorized banking institutions. In 1922 there were 787 building and loan associations with assets of \$525,696,242, and 1,152,121 members. Since the year 1908 all the banking institutions of the State, except national banks, have been under the supervision of a State superintendent of banks, with an adequate force of examiners and other expert assistants. The powers vested in the banking department are very extensive and detailed and, so far as examinations are concerned, are regarded as even more effective than those which govern the national institutions. The authority of the department extends not only to all State incorporated banks and savings banks, but to trust and safe deposit companies, not including, however, building and loan associations, which are under the superintendence of another State department. Annual reports, published by the superintendent of banks, show the condition in detail of every concern within the scope of the department.

Finances.—Prior to 1825, Ohio had no debt. The first State debt was contracted that year.

for the construction of canals (see *History*). Later the debt was augmented for other canals, subscriptions toward railroads and roads, and in 1833 the State debt was \$16,880,000, in 6 and 7 per cent bonds. The incomes from canals and a special tax were devoted to the public debt. The State credit remained unimpaired, so that when necessary it was able to borrow further sums. The years 1838–40 brought financial ruin to many enterprises throughout the Union, and made the borrowing of large sums a matter of difficulty. To have discontinued the public works would have caused great loss, so in 1843 the State issued 7 per cent bonds. The canals absorbed the school fund, the sinking fund and the proceeds from sale of public lands, and by 1856 the debt had been reduced nearly \$3,000,000. A further debt of \$2,423,349 was incurred in 1856, after which the whole was gradually decreased.

In 1880 the State debt was \$6,476,805. In 1903 the remaining portion of the funded debt, \$200,000, matured and was paid, together with \$6,000 of interest money. A special university fund was created in 1892. The income of the State is derived from a general tax. The balance in treasury at the beginning of the fiscal year 1921–22 was \$14,326,673.95. Receipts during the year amounted to \$56,929,119.73. Disbursements for the same period to \$51,698,436.12, leaving a balance on hand at the beginning of the fiscal year 1922–23 of \$19,957,357.56. The estimated receipts for 1922–23 were \$43,373,950. The bonded debt of the State in 1922 was \$25,000,000 and the floating debt, \$1,665, making a total State debt of \$25,001,665. The assessed value of real property was \$6,386,334,425; of personal property, \$4,358,323,898.

Education.—The Territory of Ohio received its first grant of land for public education in 1785; the Continental Congress reserved for school purposes the 16th section in every township. Later grants were made by Virginia, the Western Reserve and certain Government Military reservations. No common school system was established until 1825; the law was passed the same day as the law providing for the construction of canals (see *Finances*). In 1827 provision was made for selling school lands. Further legislation was enacted from time to time, that of 1873 provided for the classification of school districts, and making obligatory the use of the English language in teaching all branches to be taught in the schools. The German language had been used in many schools. Prior to the establishment of the common school system, there had been founded a number of schools, some private and others by churches or communities. The Ohio University (q.v.) at Athens was founded in 1804 and the Miami University (q.v.) in Oxford in 1809. The legislature of 1901–02 passed a bill, which became a law 12 March 1902, establishing normal schools, for the training of teachers. This law provides for two schools in connection with the Ohio University at Athens and the Miami University at Oxford. These schools are known as State normal schools, they are to be supported by an income from the "Ohio and Miami University Fund," created with the bill. The income is derived from a direct tax. The legislature at the same session passed bills which classify the different grades of schools and provide for examinations for entrance to

high schools. The Child Labor Law and the Compulsory Education Laws were rewritten and made to harmonize. Children between the ages of 8 and 14 were compelled to attend school the full time and children between the ages of 14 and 16, not engaged in some regular employment, were also required to attend; and if the child over 14 and under 16 could not read and write the English language he had to attend the full time. Heavy penalties are provided for the violation of the compulsory education laws. The centralizing of township schools began in Ohio some years ago, when the matter was optional. The first legislation on the subject, in Ohio, was enacted in 1892. The teachers' institutes, teachers' pensions, the school curriculum, all receive wise and almost constant attention. The principal cities have city training classes for persons who intend to become teachers.

According to the 14th Census of the United States the number of children in Ohio of school age (5 to 20 years) in 1920 was 1,614,777 of whom 1,095,577 were reported as attending school. Corresponding figures for 1910 were 1,405,040 and 881,138 respectively. Illiterates in 1920 numbered 131,006 or 2.8 per cent of the entire population. In 1910 illiterates numbered 124,774 or 3.2 per cent of the entire population that year. School attendance is now compulsory during the full term for children from six to 18 years of age. In 1921 there were in the State 9,788 public elementary schools, employing 26,635 teachers (3,318 men and 23,317 women), and with 876,249 enrolled pupils (447,832 boys and 428,417 girls). In the same year public high schools numbered 639. These gave employment to 7,657 teachers (2,817 men and 4,840 women) while the pupils enrolled numbered 153,881 (71,151 boys and 82,730 girls). The expenditure for education in 1921 amounted to \$60,408,201. Many parish schools are maintained by the Roman Catholics and Lutherans. For higher learning there are a number of colleges and universities which are dealt with under their corporate names.

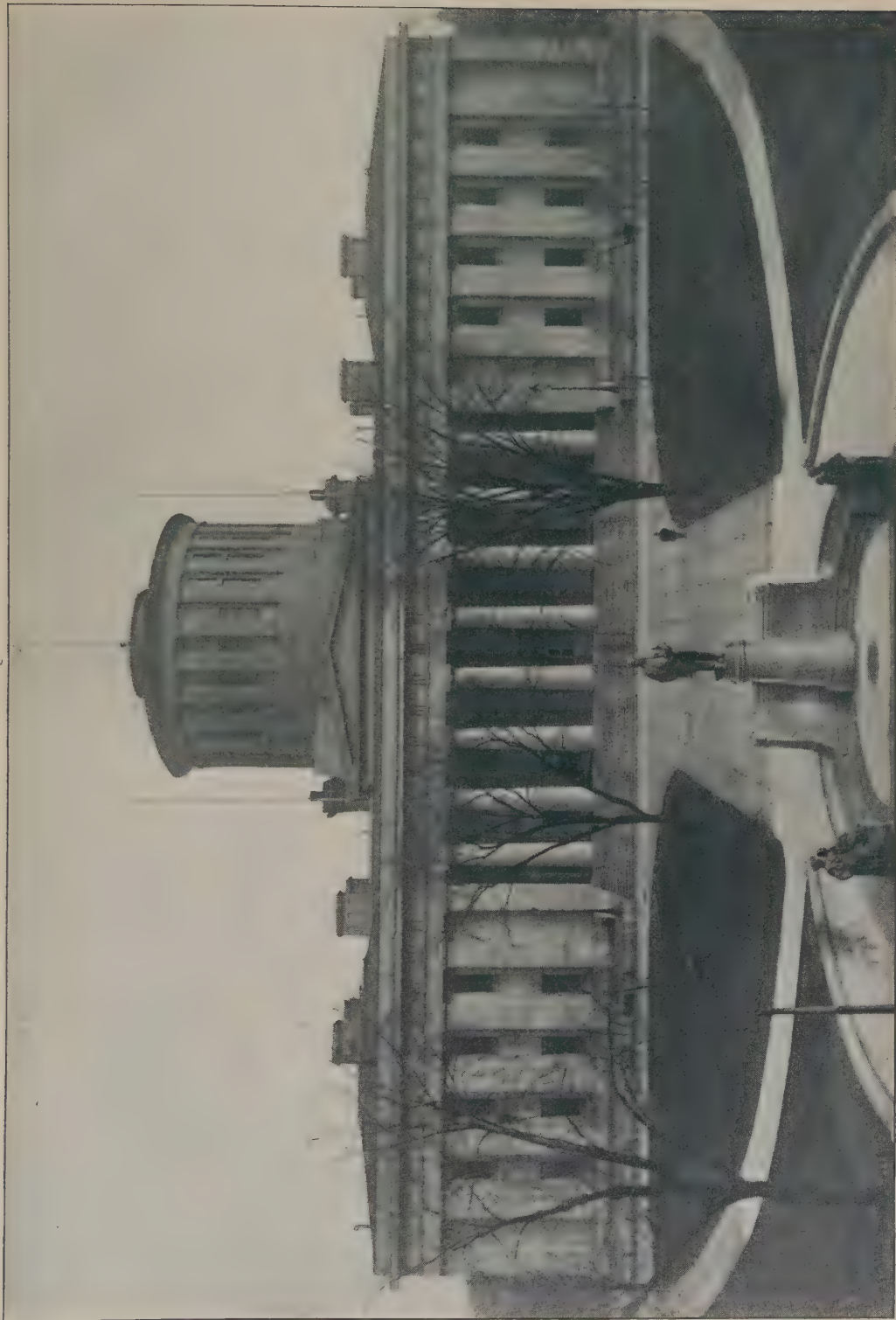
Religion.—The Roman Catholics have, according to the 'Catholic Directory 1921,' 889,423 members. The Methodists claim one-fourth of all the church members of the State. The other Protestant denominations rank as follows: Presbyterians Lutheran, Baptist, Disciples of Christ, Congregationalists and Protestant Episcopalians. The Protestants have large and well organized Sunday schools connected with all their churches. The Roman Catholics have Sunday schools also, but where the parish school has been established, the attendance at the Sunday school is usually limited to those not receiving religious instruction during the week.

Charitable and Penal Institutions.—The State board of charities consists of seven members; six of whom are appointed by the governor; the governor of the State is ex-officio a member and is president of the board. A secretary is appointed by the board. The board has the supervision of all State and municipal institutions, including infirmaries, jails and orphanages, or all institutions for furnishing relief or for correction. The State law further provides that this board shall examine, for criticism or approval, all plans for charitable

or penal institutional buildings, or changes in buildings. There are 17 State institutions, as follows: State hospitals at Athens, Cleveland, Columbus, Dayton, Longview, Toledo; the Ohio Hospital for Epileptics, Institution for Deaf and Dumb; State School for the Blind; Industrial Home for Girls; Industrial School for Boys; homes at Xenia and Sandusky; a State penitentiary and a State reformatory. The municipal institutions are workhouses at Canton, Cincinnati, Cleveland, Columbus, Dayton, Toledo, Xenia and Zanesville, and a House of Refuge at Cincinnati. The county institutions are infirmaries, homes and jails. Outdoor relief is given by infirmary doctors, township clerks and under the direct supervision of the Soldiers' Relief Commission. Changes have been made in the care of epileptics, who are housed in a hospital at Gallipolis. The Juvenile Court, at Cleveland, has shown there are great opportunities for the prevention of the crimes often committed by the young and how they may be reclaimed. The annual State Conference has been productive of much good. Each county has a board of county visitors.

The annual expenses of the State institutions are considerably over \$2,600,000; for the municipal institutions, \$150,000; for the county institutions, \$2,127,000, making for the whole a total considerably over \$5,000,000. A National Soldiers' Home is located at Dayton. It has accommodations for 6,000 persons. The Roman Catholic charitable institutions of the State are 14 orphan asylums, having nearly 2,000 inmates; three industrial schools, 450 inmates; 19 hospitals, over 12,000 patients each year; four homes for the aged, about 500 inmates each year; three homes for the friendless, about 200 inmates each year.

Government.—The State constitution now in force was adopted in 1851 and is the second one under which Ohio has been governed. (See *History*). Provisions for a constitutional convention are arranged for in two ways. "Shall there be a constitutional convention?" is a question submitted to the people at a popular election each 20th year and a majority vote in the affirmative is followed by the proposed convention. A constitutional convention may be called at any time if two-thirds of the members of each branch of the legislature demand it and if a majority of all the legal votes cast at a popular election favor it. Amendments may be added as follows: The amendment may originate in either branch of the legislature; it must be approved by three-fifths of the members of each house and by a majority of the electors voting at a popular election. If there are several amendments, each one must be voted upon separately. The right to vote implies citizenship, residence in the State for one year, in the county, township or voting district such a time as may be determined by the general law for the State. Further limitations take into consideration sex, age and sanity. The right of suffrage may be withdrawn from any person, by the legislature, for certain causes, as bribery, perjury and other crimes. Voters are obliged to register as required by law, in cities of 9,000 population or over. The State sends to Congress 22 members. The government of the State is administered by the legislature, the executive and the judicial departments.



State Capitol at Columbus

OHIO



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Soldiers' and Sailors' Monument, Cleveland

Legislature.—The senate and the house of representatives constitute the legislature. The number of members is based upon the population and is determined by the legislature. Most of the counties have only one member in the lower house, but some of the smaller counties are united with other counties for representation. For senatorial representation many of the counties are united; but some of the large counties are separate senatorial districts. A county may be made a separate senatorial district if it has the population required for a full senatorial ratio and if a full senatorial ratio is left in the county or district from which it asks separation. The regular sessions of the legislature are biennial, beginning on the first Monday of January each odd-numbered year. The members are chosen by popular vote for two years, the day of election being the first Tuesday after the first Monday in November. The salaries of members are fixed by law. Bills may originate in either house; each bill can contain but one subject. The lower house impeaches and the senate tries all impeachment cases; the concurrence of two-thirds of the members of the senate is requisite for a conviction.

Executive.—The governor and his associate officers—lieutenant-governor, secretary of State, State treasurer and attorney-general are elected for two years, at the general State election. The auditor is elected for four years; the board of public works and the school commissioner for three years. The governor appoints the superintendent of insurance, commissioner of railroads and telegraphs, State and law librarians, gas commissioner and supervisor of public printing. He has the power to call extra sessions of the legislature and the usual veto and pardoning powers. In the absence of the governor, for any cause, the lieutenant-governor, president of the senate or speaker of the house are in the line of succession.

Judicial.—The judicial power is vested in the Supreme Court, Circuit Courts, Courts of Common Pleas, Courts of Probate and Justices of the peace. Other courts inferior to the Supreme Court may be established by the general assembly. The general assembly may establish courts of conciliation and limit their duties and powers, but the judgment of such courts is not final except the parties interested agree to abide by such decision. The judges and justices are chosen by popular vote. The judges of the Supreme Court are chosen for a term not less than five years, the judges of the Common Pleas for five years, the justices of the peace for three years.

Local Government.—The legislature provides by law for the organization and powers of cities and incorporated villages and for the election of county and township officials. The terms of office of county officers do not exceed three years.

Laws.—The legal rate of interest is 6 per cent, but 8 per cent may be obtained by contract. Pure-food laws have been passed and are rigidly enforced. Divorces may be obtained for several causes—wilful absence for three years, extreme cruelty, habitual drunkenness, imprisonment in the penitentiary, adultery, divorce procured by either party in another State,

are the chief causes. Restrictions as to time of residence in the State are enforced.

Militia.—The number of men of militia age is about 2,499,963. On 31 May 1923 the State militia had an authorized strength of 11,430 men and an enlisted strength of 7,923 men. These figures include 7,241 division troops and a State staff of 12. During the Civil War, Ohio furnished one-eighth of the Federal troops.

Political Divisions.—There are 88 counties in the State. The Federal census of 1910 gave the population of the nine largest cities as follows: Cleveland, 560,663; Cincinnati, 364,463; Toledo, 168,497; Columbus, 181,548; Dayton, 116,577; Youngstown, 79,066; Akron, 69,067; Springfield, 46,921; Canton, 50,217. Columbus is the capital of the State. The population of the above cities according to the 14th report of the United States Census was on 1 Jan. 1920, as follows: Cleveland, 796,841; Cincinnati, 401,247; Toledo, 243,164; Columbus, 237,031; Dayton, 152,559; Youngstown, 132,358; Akron, 208,435; Springfield, 60,840; Canton, 87,091.

History.—Numerous evidences of prehistoric Ohioan inhabitants are found in the mounds existing in different parts of the State. The study of any one of these mounds, especially of the type of the fort in Adams County, shows the degree of advancement of the people now called the Moundbuilders (q.v.). The first appearance of Ohio in history is when Robert Cavalier de LaSalle left his home at LaChine, near Montreal, Canada, in 1669, on a journey of adventure, before his return he discovered the Ohio River and ascended on its waters near where Louisville now stands. When LaSalle later vested in France the title of the Mississippi Valley by discovery in 1682, the area of what is now known as Ohio became a French possession and remained such until the Treaty of Paris in 1763 when it became territory of Great Britain.

The first English-speaking settlement made in Ohio was established at the mouth of Laramie's Creek, on the Great Miami River in what is now Shelby County. This settlement was made in 1749 and was called Pickawillany. In June, 1752, the French, with their Indian allies, the Chippewas and Ottawas, massacred these white settlers and wiped out the first English settlement in what is now Ohio. In 1748 some English and Virginian gentlemen organized what was known as the "Ohio Land Company," for the purpose of settling the newly-discovered Ohio Valley. Their settlements aroused the intense antagonism and jealousy of the French and the result was an attempt on the part of the French to stop these intrusions into her territory and England to persist in continuing them. In 1753 The Ohio Company complained to Governor Dinwiddie of the interference by the French authorities and the governor sent George Washington, a young man of 23, to endeavor to terminate the friction by peaceable negotiations. He was unsuccessful, however, and the conflict continued until finally peace came from the Treaty of Paris, signed 18 Feb. 1763, by the terms of which the vast territory of which Ohio was a part became the possession of Great Britain. After 10 years of peace the murder of nine kinsmen of the Iroquois chief Logan by a borderer named Greathouse, caused an upris-

ing of the Indians and in 1774 a campaign against them was inaugurated by Governor Dunmore of Virginia, which is known in history as Lord Dunmore's war. It was in this campaign, in the heart of the Indian country along the Scioto River, that the celebrated speech of Logan, the Mingo chief, was delivered.

When the war for independence came on, the Continental Congress, regarding the Northwest Territory as a good heritage to preserve for American supremacy, fortified various points in what is now known as Ohio, the earliest of which was Fort Laurens, the first military stockade erected by American authority in Ohio. This fort was abandoned in 1779. In 1780 and the five years following, Ohio was the theatre of active warfare against the Indians and under the leadership of Col. John Beaman, of Kentucky, the Indians were attacked on the Little Miami River in what is now Greene County, and by Col. George Rogers Clark at other points contiguous. In this period occurred various scenes indicative of the terrible condition of feeling existing between the Indians and whites. There were massacres on both sides characterized by brutality and savagery. The year 1782 opened with a number of atrocious deeds of violence by the Indians. Innocent women and children were murdered in the most horrible manner. The whites were exasperated, and in February of this year Colonel Williamson led an expedition against the Indians. They marched into the Tuscarawas country in eastern central Ohio and massacred in cold blood and with brutal vengeance the Moravian Indians, a peaceable and Christian tribe that had never raised their hands against the whites nor participated in any of the troubles between the Americans and English. Later in May of the same year Col. Wm. Crawford marched 500 men through the Ohio country from where Steubenville now stands to the Wyandot country on the Sandusky River, near where Upper Sandusky is now located. His attack resulted in defeat with a loss of over 100 of his men and the capture of Colonel Crawford himself. Colonel Crawford was burned at the stake by the Delaware Indians in retaliation for the murder of some of their tribe by Colonel Williamson's men.

These Indian campaigns and wars, up to 1782, while they were the outgrowth of adventure upon the part of the Pennsylvanians and Virginians, were sanctioned by the Continental Congress and by the various colonial governments.

When peace came through the Treaty of Paris, which was signed 3 Sept. 1783, all the territory east of the Mississippi River was relinquished to the United States by Great Britain. A part of the acquisition was what was known as the Northwest Territory (q.v.), which added 240,000 square miles to the United States. In October 1787, the Federal government sent 700 troops to the frontier to protect this territory and to emphasize to the Indians that the white man's government had commenced. On 5 October Congress elected officers for the new government. Arthur Saint Clair was named as governor and with him were designated James M. Varnum, Samuel Holden Parsons and John Armstrong as judges and Winthrop Sargent as

secretary of the territory. Mr. Armstrong declined to serve as judge and John Cleve Symmes was named to fill the vacancy. On 9 July 1788, Governor Saint Clair and his associate officers arrived at Fort Harmer where they remained until the 15th when they entered Marietta as the representatives of the National government.

The first settlement in the Northwest Territory was effected under the control and direction of Gen. Rufus Putnam, who had formed "The Ohio Company of Associates" in Boston on 1 March 1786. General Putnam with his little band of emigrants journeyed from Connecticut to the banks of the Ohio in the winter of 1787-88 and on 7 April they landed in the rain at the mouth of the Muskingum River and founded Marietta (q.v.).

Governor Saint Clair, as before stated, inaugurated the reign of law and on 2 September the first court ever held on Ohio territory was opened with formal ceremonies at Marietta. The second settlement in Ohio was made at Columbia, about five miles above Cincinnati. Major Benj. Stites of Pennsylvania purchased 10,000 acres from Judge Symmes near the mouth of the Little Miami. On 18 Nov. 1788, 26 hardy Pennsylvanians located at this point, erected a block house, laid off a little town and called it Columbia. While the major was laying off the town of Columbia, Mathias Denman, with Robert Patterson and Israel Ludlow laid off a town on the high north bank of the Ohio River and opposite the mouth of the Licking River. About 28 Dec. 1788, Denman and his companions, 15 in number, landed at this site and founded the city of Cincinnati (q.v.).

In February 1789, North Bend, near the Indiana line, was settled by Judge Symmes and his associates. For the protection of the three settlements at Cincinnati, Columbia and North Bend, Fort Washington was constructed at Cincinnati, which was then the principal centre of the Miami country. On 2 Jan. 1790, Governor Saint Clair arrived at Fort Washington and issued his proclamation establishing Hamilton County. The county-seat was fixed at Cincinnati. This was the beginning of the great State of Ohio. It absorbed the population of North Bend and Columbia and in 1795 its population were soldiers.

The next settlement in point of time was at Gallipolis. October 1790, 400 French emigrants settled at this place and in memory of their native land called it Gallipolis. They were induced to make settlement here by the picturesque and highly colored representations made to the French people by Joel Barlow who went to France in 1788 to represent the Scioto Company (q.v.), for the purpose of putting its lands upon the market. The settlers were unqualified and unfitted for the hardship of pioneer life, and this fact, in addition to the one that the title to the lands was defective, broke up the settlement. Many of them drifted further west to Detroit and Kaskaskia and some remained and purchased their land from the Ohio Company. Congress, in 1795, sympathetically granted 24,000 acres of land to these defrauded emigrants. This land is in the eastern part of Scioto County on the Ohio River and is known by reason of its history, as the "French Grant."

At Manchester, on the Ohio River, in 1791,

Col. Nathaniel Massie made the first settlement in the Virginia Military District. This composed the territory between the Scioto and Little Miami which had been reserved in the deed of cession by Virginia for bounty land for her soldiers.

In 1796 Colonel Massie, assisted by Duncan McArthur, laid out and founded the town of Chillicothe. The opening to emigration of the far-famed land of the Shawnees attracted many settlers from Virginia and Chillicothe in a short time became an important and populous town.

The settlements referred to thus far were in the southern and central portions of the State and it was not until 1796 that emigration commenced to develop in the northern part. Gen. Moses Cleaveland, as agent for the Connecticut Land Company, with 52 Connecticut settlers, on 4 July 1796, landed at the mouth of Conneaut Creek, in Ashtabula County, for the purpose of settling the Western Reserve. In addition to being settlers, many of them were surveyors. On 26 July 1796, Cleaveland and his associates proceeded to the mouth of the Cuyahoga River and laid out the chief settlement of the Western Reserve. It was named Cleveland, in honor of the leader of the expedition.

The pioneers of the Western Reserve that settled at these points suffered many privations and the country did not grow as rapidly as those further south and in 1798 there were but 130 persons in the whole Reserve.

Ohio now commenced to grow with considerable rapidity and settlements sprung up and developed in every quarter. In 1799 there were in existence and enjoying peace and prosperity the towns of Marietta, Columbia, Cincinnati, North Bend, Gallipolis, Manchester, Hamilton, Dayton, Franklin, Chillicothe, Cleveland, Franklin, Steubenville, Williamsburg and Zanesville. Their prosperity and safety was accomplished through much tribulation and danger, for during the period of their development the territory had passed through its second war with the Indians, to which a retrospect is necessary.

Notwithstanding that on 9 Jan. 1789, at Fort Harmer, Governor Saint Clair made a treaty with the Six Nations and the representatives of the Wyandots, Delawares, Chippewas, Ottawas, Pottawatomies and Sacs, he failed to secure the good-will of the Indians. Marauding parties and forays on the part of the savages continued, to be projected against the whites, evidently instigated by the English. Accordingly, in September 1790, Saint Clair, with a little army, gathered from Pennsylvania, Virginia and Kentucky, amounting to about 1,400, of which 300 were regulars, marched against the Indians. He was overwhelmingly defeated. Owing to a failure to control the militia and lack of general discipline, the battle resulted in a rout. After the defeat of Saint Clair, Gen. Anthony Wayne, one of the most daring officers of the Revolution, was placed in charge of a campaign against the Indians and spent the spring and summer of 1793 at Fort Washington in Cincinnati, drilling and recruiting his men. In October 1793 he left Fort Washington with an army of 3,000 well-equipped soldiers and proceeded to six miles beyond Fort Jefferson, where he erected Fort Greenville, near where Greenville, Darke County, is now situ-

ated. He spent the entire season here and in the spring of 1794, after making many efforts to enter into a treaty of peace, he attacked them on 20 August, defeating them with great slaughter. Nine of the Wyandot chiefs were killed and the Indian question was solved forever in Ohio. This engagement was known as the Battle of Fallen Timbers, on account of the breastworks of fallen trees behind which the Indians were massed. The result of this campaign was a treaty of peace which was known as the Treaty of Greenville, which was signed by the chiefs of the 12 hostile tribes at Fort Greenville, 3 Aug. 1795. By the terms of this treaty the Indians released extensive territory between the Lakes and the Ohio River and the United States gave them \$20,000 in merchandise and \$9,000 annually, to be divided among the several tribes. This was the last Indian warfare in Ohio.

With peace the population of the territory began to increase. In 1790 there were about 3,000 white inhabitants in Ohio; five years later there were 15,000 white persons in the Northwest Territory and by 1798 there were 5,000 free male persons of full age within its boundaries and under the Ordinance of 1787 this entitled the people to a territorial legislature. Accordingly on 29 Oct. 1798, Governor Saint Clair issued his proclamation fixing the day for electing territorial representatives on the third Monday of December following. Thus the Territory of the Northwest passed into its second or legislative grade of government.

During the years preceding this change, barring the Indian troubles, the settlers were progressing satisfactorily. Religion and literature were planted in Ohio. The first church in the territory was erected in 1790 at Columbia and on 9 Nov. 1793, the first newspaper was printed by William Maxwell of Cincinnati, under the name of *The Sentinel of the Northwest Territory*.

The first territorial legislature met at Cincinnati, 4 Feb. 1799. Edward Tiffin of Ross County was elected speaker of the first general assembly of the Northwest Territory, and Henry Vanderburgh president of the council. William Henry Harrison, afterward President of the United States, was elected the first delegate to Congress from the territory. A bitter conflict between the governor and the legislature commenced at this time. Saint Clair was a Federalist and he was opposed by the followers of Mr. Jefferson in the territory. At this time the vast Territory of the Northwest was divided into two districts—the dividing line ran from the mouth of the Kentucky River to Fort Recovery, and northwest to the boundary line between Canada and the United States. West of this line was erected the Territory of Indiana, of which Mr. Harrison was appointed governor, and east of the line was the Territory of the Northwest, of which Chillicothe was designated the seat of government. On 19 Dec. 1799 Governor Saint Clair, exercising the power vested in him by the Ordinance of 1787, dissolved the territorial legislature and fixed the first Monday in November 1800, as the date of its next session.

The second session of the territorial legislature met at Chillicothe on 3 November, and after being in session five weeks adjourned on 9 December. William Henry Harrison having

resigned his position in Congress, William McMillan of Cincinnati was elected to fill the vacancy and Paul Fearing of Marietta to serve the succeeding term. At this time Ohio had a population of 42,000. Transportation and trade were increasing on all hands. On the Ohio River there were packets running regularly for mail and traffic between Cincinnati and Pittsburgh, making the round trip in about four weeks. The first vessel of any size or importance was the brig *Saint Clair*, built at Marietta, of 110 tons burden. It was loaded with provisions, sailing down the Ohio, Mississippi and across the Gulf of Mexico, and finally landed safely in Philadelphia. Transportation by land was by the heavy and cumbersome trading wagons drawn by four and six horses. Cincinnati was a great distributing point for the southern and central part of the territory.

The iron used in the territory came from Pittsburgh and Baltimore, and when from the latter cost \$200 a ton for transportation to the interior of Ohio. The southern and central parts got their supply of salt from the "Ohio Salt Works," located in what is Jackson County of to-day. It sold at the works for two and three dollars a barrel, and after the journey homeward of 100 miles the purchaser sold it to his neighbors for seven dollars a barrel. These were some of the general conditions of the people in what is now Ohio in 1800. There were no vehicles except for burden in the territory. Marietta was the stronghold of Federalism and Chillicothe was the seat of Republicanism, and there were bitter conflicts between the followers of Alexander Hamilton and Thomas Jefferson. Cincinnati was divided almost equally in politics.

The third territorial legislature commenced on 24 Nov. 1801. At this session Cincinnati and Chillicothe were incorporated and the seat of government changed from the latter town to the former.

On 3 April 1802, Congress passed an act enabling the people of Ohio to form a constitution and State government. This was the result of a persistent controversy between the followers of Jefferson and the Federalists. In pursuance to that law of Congress the constitutional convention met at Chillicothe 1 Nov. 1802 and adopted a constitution for the State. It was never submitted to the people. The intense feeling against Saint Clair on account of his vetoes eliminated the veto power from the governor. The convention fixed the capital at Chillicothe until 1808, and named the boundaries of the State. On 19 Feb. 1803, Congress of the United States extended the jurisdiction of the Federal courts over Ohio.

On the second Tuesday of January 1803, the election for governor was held. Edward Tiffin, the candidate of the anti-Federalists, was elected. On Tuesday, 1 March 1803, the first legislature met at the State capitol at Chillicothe. Nathaniel Massie was elected speaker of the senate and Michael Baldwin speaker of the house. Officers provided under the constitution were appointed as follows: Secretary, William Greighton, Jr.; auditor of State, Thomas Gibson; treasurer of State, William McFarland; judges of the Supreme Court, Return J. Meigs, Jr., Samuel Huntington and William Spriggs. At this session Thomas

Worthington and John Smith were elected United States senators from Ohio.

In 1805 Aaron Burr (q.v.), the ex-Vice-President, visited the west and spent considerable time in Ohio, accumulating boats, provisions and accoutrements for the carrying out of his treasonable designs, which were frustrated through the activity of Governor Tiffin. For this act Tiffin received the thanks of the President of the United States. On the ground of being suspected as an accomplice of Burr, John Smith, one of the senators from Ohio to the United States Senate, was charged with treason, and after a complete investigation by the Senate a motion was made to expel him, 9 April 1808, but failed for want of the requisite two-thirds vote. He resigned, however, at the request of the general assembly of Ohio, and Return J. Meigs, Jr., was elected in his stead.

The first seven years of Ohio's estate was a period of marvelous advancement. The population in 1810 was 230,760, an increase of more than 400 per cent over that of 1800. The immigration was healthy and valuable. New counties were erected and out of the wilderness came wealth, so that in 1810 the taxable property of Ohio was valued at \$25,000,000. The natural resources of the State became known and developed. The first blast-furnace was operated in Mahoning County; coal was first mined in 1810 in Summit County.

Education advanced materially (see paragraph on *Education*). By 1810 there were 14 newspapers in Ohio, representing the two contending parties of the day. The populations of the towns throughout Ohio continued to increase. Cincinnati ranked first in importance and in size. Its population had increased to 2,540. On the whole, Ohio was occupying a positive and prominent position in the Union.

The first steamboat to navigate the Ohio River was launched at Pittsburgh and called the *New Orleans*. It descended to Louisville and continued to make trips between that place and Cincinnati. With this event began a new era in the business development of the Ohio, and the value of the Ohio River as a channel of transportation became more apparent than ever to the people of the new State. In 1810 as a result of political feeling in the legislature, the seat of government was transferred from Chillicothe to Zanesville.

On 14 Feb. 1812, the legislature changed the seat of government from Zanesville to Chillicothe, but at the same time provided for the permanent establishment of the capital at Columbus.

In the second war with England, which was finally declared by the United States 18 June 1812, Ohio played an important and patriotic part. She furnished regiments to General Hull at Detroit, and resented his cowardly surrender. Under Gen. William Henry Harrison the soldiers of Ohio were chief in his movements in the northwest in the war against England. Governor Meigs in the meantime calling out, as necessity required, the quota of men assessed upon Ohio. At Fort Meigs, at Fort Stephenson and at other points throughout the State there were conflicts with the British, and at Lake Erie, through Oliver H. Perry, a young sea-captain from Rhode Island, the English supremacy upon the northern lakes and upon the

line of the northwestern boundary was destroyed forever. The battle of Lake Erie was the last engagement of the War of 1812 that occurred within the territorial limits of Ohio. To the expense of this war Ohio contributed over \$300,000. Governor Meigs, on account of his patriotic services to the country, was made post-master-general in President Madison's Cabinet.

The general assembly met for the first time in Columbus on 2 Dec. 1816, and it has assembled there ever since. In this year the State Library was founded by Governor Worthington, and from a few volumes gathered by him it has grown to be a fine collection of more than 100,000 volumes.

The second United States bank, when re-chartered in 1816, opened branches in Ohio at Cincinnati and Chillicothe. This was the occasion for a long and severe contest between the officials of the State of Ohio and the United States government over the right of the former to tax branches of the United States bank. The general assembly passed a law taxing each bank \$50,000 and authorized the State government to collect it by force. After a long litigation it was ended in 1824 by the Supreme Court of the United States declaring the Ohio law taxing banks unconstitutional. The controversy was carried on largely by the advocates of the State banks on one hand and the opponents on the other.

In 1825 the State of Ohio commenced the construction of her canal system. The work was formally commenced 4 July 1825. Governor DeWitt Clinton of New York and Governor Jeremiah Morrow of Ohio initiated the labor of breaking the ground. After 10 years all that energy, men and money could do was directed to the canals. The Federal government aided and encouraged the construction by the donation of 1,100,351 acres of land. This land was sold and the proceeds, about \$2,200,000, were used for the construction of the canals. At the same time of the inauguration of the canal system the public school system was developed. By the association of the friends of internal improvement and popular education both of the great movements were accomplished.

Lafayette visited Ohio in 1825 and was made the formal guest of the State for days, amid the thundering of cannon and the acclamation of a grateful people.

Commencing in 1831 Mormonism flourished several years in Ohio. Joseph Smith with his followers settled in Kirtland, Lake County, in 1832. They built a building here in 1835 which was dedicated on 27 March 1837, in a ceremony witnessed by thousands of people. The Mormon Church grew in numbers, wealth and power for five years in this State; but finally, under the condemnation of public opinion and the enforcement of the law, crumbled away until its leaders and people, in 1838, fled from the State to beyond the Missouri River.

What is known in Ohio history as the "Toledo War," culminated in 1835. It was a dispute between Ohio and Michigan over the boundary line between these two States. There was involved in this controversy a strip of land the whole length of the northern Ohio boundary, five miles in width at the west end and over eight miles at the east end. It was rich agricultural land, but its chief charm was the harbor

where Toledo now stands. Both sides, through their governor and legislative bodies, asserted their respective jurisdictions over the mooted territory. So strong was the determination of each State to secure possession of the strip of territory which each claimed that the militia of both States were called out for a time and conflict was imminent. On 31 March Governor Lucas with his staff and 600 of the militia of Ohio appeared at the debated boundary line. In the meantime Governor Mason, with 1,000 men, arrived at Toledo, and there encamped fully determined to assert the jurisdiction of Michigan. In the meantime, however, two peace commissioners from the President of the United States arrived on the scene. The dispute was finally terminated on 29 Aug. 1835, by the removal of Governor Mason from his position as governor of the Territory of Michigan. Congress, at its next session in June 1836, decided in favor of Ohio. As compensation for the loss of this fertile strip of land Michigan was given the large and fertile peninsula between Lakes Huron, Michigan and Superior. Ohio thus settled her northern boundary and Michigan was given one of the richest beds of mineral ore in the world.

On 4 July 1839, the cornerstone of the present State house was laid in the presence of many citizens. The occasion was made one of public display and demonstration. Ex-Governor Jeremiah Morrow delivered the address and laid the cornerstone.

The census of 1840 found Ohio the third State in point of population, having 1,519,467 inhabitants; being an increase of 63 per cent over the population of 1830. At this time nearly one-third of the population was employed in manufacture and trade. Cities, while increasing in number, were still small in size. Cincinnati had 46,338 inhabitants; while Cleveland was a town of 6,000, and Columbus the same. In this decade the railroad system of Ohio was commenced.

In common with the rest of the country, Ohio was much agitated by the nomination and election to the presidency of Gen. William Henry Harrison in 1840. This was the first impression in a political way that Ohio made upon the country. Up to this time the State had but little influence at Washington. But the nomination of her citizen, General Harrison, at once made Ohio the battlefield of the contest. Great meetings, never equaled up to this time, were frequent in the State. General Harrison's march through Ohio was one triumphal procession of oratory, display and song. At Dayton a political meeting, addressed by General Harrison, numbered 80,000. At Chillicothe he spoke to 50,000 people. Political meetings at this time lasted for several days, just according to the number of orators. The "Log Cabin" campaign resulted not only in the election of Gen. William Henry Harrison to be President of the United States, but also Hon. Thos. Corwin was elected governor of Ohio.

In 1846 Ohio was again called to play an important part in the military affairs of the Union. War with Mexico was declared 13 May 1846, and Ohio sent out four regiments of volunteers and three independent companies. The total number of men furnished was 5,536; more than any other northern State.

In August 1846 the introduction of raw coal

as furnace fuel in lieu of charcoal, for iron-smelting, was an industrial event the effect of which on the wealth and growth of the State cannot be justly estimated. It gave a fresh impetus to iron manufacturing and allayed the painful doubt about its reliability raised by the diminution of the timber supply for the charcoal blast furnaces.

In February 1850, an act calling a second constitutional convention was passed. Nearly 50 years had passed since the forming of the first constitution and in the stupendous development of the State it was generally admitted that the instrument needed change and revision. After a session of 135 days the convention adjourned, and on the third Tuesday of June 1851, the constitution was submitted to the people and it was adopted by a pronounced majority.

The last vestige of what is known as the "black laws," that is laws that discriminated against the negro in Ohio by preventing him being a witness in court if a white man was party to the case, and by preventing his settlement in Ohio without giving bond and by imposing other restrictions, both unjust and unjustifiable, were repealed in 1849. Anti-slavery sentiment was strong in Ohio and the legislature of this period was known as the "anti-slavery legislature." Out of the public discussion of those days grew the Republican party, which held its first State convention in the State of Ohio in Columbus, 13 July 1855. In the election which followed Salmon P. Chase was elected governor, and on 14 Jan. 1856 commenced his gubernatorial term. Governor Chase's administration was signalized by the reorganization of the militia of the State. During this period the State was noted for its "Underground Railroad" (q.v.).

With the approach of the Civil War and in that crisis Ohio met every patriotic demand made upon her. When President Lincoln issued a proclamation, 15 April 1861, calling for 75,000 of the militia of the several States of the United States, the response was immediate from Ohio. Within 24 hours after the President's call 20 companies had proffered their services. Within 36 hours they were on their way to Columbus, where they were organized, 18 April, into the First and Second regiments of Ohio volunteers. The next day they started for Washington city. All this preparation was actively sustained by the legislature. On the day after the call to arms the senate passed a million-dollar appropriation bill for war purposes exclusively. Within three days it passed the house unanimously. The late President Garfield was at that time a member of the Ohio senate and took advanced ground in sustaining the Federal government. In the summer of 1863 the State of Ohio was subjected to the attacks of Gen. John Morgan, a daring Confederate raider, who entered the southern part of the State near Cincinnati and passed through southern Ohio; but after inflicting considerable damage, was eventually captured at Salineville, Ohio, 26 July 1863. Morgan's raid cost the people of Ohio \$897,000.

Ohio more than responded to the call of President Lincoln for troops, so that up to 1 Dec. 1864 she had furnished 346,326 to the service of the United States. Of these 11,237 were killed or mortally wounded and 13,354

died of disease. According to the adjutant-general's report for 1866 the people of Ohio paid for local bounties during the war \$54,000,000, and the military expenses amounted to over \$11,000,000, making the total expenditures chargeable to the Civil War over \$65,000,000.

For the third time, 14 May 1873, a constitutional convention assembled to prepare and present to the citizens of Ohio a new organic instrument of law; but they were satisfied with the constitution of 1851 and they rejected, on 18 Aug. 1874, the proposed constitution by a majority against it of 147,284.

The history of Ohio in these later days has been one of unbroken progress and prosperity. No stirring events have entered into her records save the marvelous developments of her people.

Ohio's part in the war with Spain was characterized by patriotism and promptitude. The President issued two calls for troops, 23 April and 25 May 1898. "So expeditious was the work of getting Ohio's quota ready for service," says Governor Bushnell in his annual message for 1900, "that a comparatively short time elapsed in camp life at the rendezvous. The entire mustering was completed in eight days. Ohio was the first State in the Union to put a volunteer regiment in the field." Under the first call Ohio furnished 428 officers and 8,052 enlisted men; under the second call, 73 officers and 6,801 enlisted men, making a total of 15,354.

In 1903 Ohio celebrated its centennial as a State of the Union at Chillicothe. The occasion was marked by appropriate ceremonies, formal addresses and literary papers on the various phases of Ohio's history and development.

The fourth constitutional convention assembled at Columbus 9 Jan. 1912. After a long session it offered to the people 41 amendments and a special proposition on licensing intoxicating liquors; of these all but eight were adopted, as well as the license proposition. Among the more radical amendments were proposals on the initiative, referendum and recall, which were adopted.

In March 1913 Ohio was visited by general and disastrous floods, the severest occurring in the Miami and Scioto valleys. In the Miami country, 400 people lost their lives and the property damage approximated \$150,000,000. In the Scioto Valley the loss of life reached 145 persons, and the property loss and damage was over \$25,000,000.

Of the Presidents of the United States eight were either born in Ohio or were residents of the State, viz.: William Henry Harrison, Ulysses S. Grant, Rutherford B. Hayes, James A. Garfield, Benjamin Harrison, William McKinley, William H. Taft and Warren G. Harding.

In the growth of population of Ohio she maintained her position as third State in the Union for 50 years, from 1840 to 1890, when she became the fourth in rank, having been outgrown by Illinois; but, notwithstanding, the percentage of increase for as old a State has been marvelous. From 1820 to 1850 the development of population was over 700 per cent, and it was more than doubled from 1850 to 1900. The population during the last four decades was (1890) 3,672,316; (1900) 4,157,545; (1910) 4,767,121; (1920) 5,759,394. In June 1920

Gov. James M. Cox and W. G. Harding were the Ohioan nominees for the Presidency.

GOVERNORS OF THE NORTHWEST TERRITORY.

NAME	Term of service
Arthur St. Clair.....	15 July 1788—14 Dec. 1802
§Charles Willing Byrd.....	14 Dec 1802—3 Mar. 1803

GOVERNORS OF OHIO.

NAME	Term of service
Edward Tiffin.....	3 Mar. 1803—1 Jan. 1807
*Thomas Kirker.....	1 Jan. 1807—12 Dec. 1808
Samuel Huntington.....	12 Dec. 1808—8 Dec. 1810
Return Jonathan Meigs.....	8 Dec. 1810—24 Mar. 1814
*Othniel Looker.....	24 Mar. 1814—8 Dec. 1814
Thomas Worthington.....	8 Dec. 1814—14 Dec. 1818
Ethan Allen Brown.....	14 Dec. 1818—4 Jan. 1822
*Allen Trimble.....	4 Jan. 1822—28 Dec. 1822
Jeremiah Morrow.....	28 Dec. 1822—19 Dec. 1826
Allen Trimble.....	19 Dec. 1826—18 Dec. 1830
Duncan McArthur.....	18 Dec. 1830—7 Dec. 1832
Robert Lucas.....	7 Dec. 1832—13 Dec. 1836
Joseph Vance.....	13 Dec. 1836—13 Dec. 1838
Wilson Shannon.....	13 Dec. 1838—16 Dec. 1840
Thomas Corwin.....	16 Dec. 1840—14 Dec. 1842
Wilson Shannon.....	14 Dec. 1842—15 April 1844
*Thomas Bartley.....	15 April 1844—3 Dec. 1844
Mordecai Bartley.....	3 Dec. 1844—12 Dec. 1846
William Bebb.....	12 Dec. 1846—22 Jan. 1849
Seabury Ford.....	22 Jan. 1849—12 Dec. 1850
Reuben Wood.....	12 Dec. 1850—13 July 1853
*William Medill.....	13 July 1853—14 Jan. 1856
Salmon P. Chase.....	14 Jan. 1856—9 Jan. 1860
William Dennison.....	9 Jan. 1860—13 Jan. 1862
David Tod.....	13 Jan. 1862—11 Jan. 1864
John Brough.....	11 Jan. 1864—29 Aug. 1865
†Charles Anderson.....	29 Aug. 1865—8 Jan. 1866
Jacob D. Cox.....	8 Jan. 1866—13 Jan. 1868
Rutherford B. Hayes.....	13 Jan. 1868—8 Jan. 1872
Edward F. Noyes.....	8 Jan. 1872—12 Jan. 1874
William Allen.....	12 Jan. 1874—10 Jan. 1876
Rutherford B. Hayes.....	10 Jan. 1876—2 Mar. 1877
*Thomas L. Young.....	2 Mar. 1877—14 Jan. 1878
Richard M. Bishop.....	14 Jan. 1878—12 Jan. 1880
Charles Foster.....	12 Jan. 1880—14 Jan. 1884
George Hoadly.....	14 Jan. 1884—11 Jan. 1886
Joseph B. Foraker.....	11 Jan. 1886—13 Jan. 1890
James E. Campbell.....	13 Jan. 1890—11 Jan. 1892
William McKinley.....	11 Jan. 1892—13 Jan. 1896
Asa S. Bushnell.....	13 Jan. 1896—8 Jan. 1900
George K. Nash.....	8 Jan. 1900—11 Jan. 1904
Myron T. Herrick.....	11 Jan. 1904—8 Jan. 1906
John M. Pattison.....	8 Jan. 1906—18 June 1906
†Andrew L. Harris.....	18 June 1906—11 Jan. 1909
Judson Harmon.....	11 Jan. 1909—13 Jan. 1913
James M. Cox.....	13 Jan. 1913—11 Jan. 1915
Frank B. Willis.....	11 Jan. 1915—8 Jan. 1917
James M. Cox.....	8 Jan. 1917—1920
Harry L. Davis.....	Jan. 1921—Jan. 1923
A. V. Donahey.....	Jan. 1923—

§†† Became governor on removal (§), resignation (*), or death (†) of predecessor.

Bibliography.—Black, 'Story of Ohio'; Clarke, 'Founders of Ohio'; Claypole, 'Lake Age in Ohio'; De Nadaillac, 'Prehistoric Americans'; Force, 'Early Notices of Indians of Ohio'; Hinsdale, 'The Old Northwest'; Howe, 'Historical Collections of Ohio'; Howells, 'Recollections of Life in Ohio'; McCabe, 'Historic Towns of Ohio'; Maclean, 'Moundbuilders'; Moorehead, 'Primitive Man in Ohio'; Reid, 'Ohio in the War'; Randall and Ryan, 'History of Ohio'; Short, 'Ohio: a Sketch of Industrial Progress'; Siebert, 'Government of Ohio'; Thompson, 'Bibliography of Ohio'; Ryan, 'Civil War Literature of Ohio'; Venable, 'Footprints of Pioneers in Ohio' and 'Beginnings of Literary Culture in Ohio'; 'Ohio Statistics,' and other State official publications; 'Bulletin of Twelfth Census'; Publications of Ohio Archaeological and Historical Society; Statistical Abstract of United States, 1915.

DANIEL J. RYAN,
Author of 'A History of Ohio'; 'The Civil War Literature of Ohio'; etc.

OHIO, Army of the, in American military history, a division of the Federal army in the Civil War; organized in 1861–62 by General Buell; afterward under the command of General Rosecrans and incorporated with the Army of the Cumberland. A second department of the Ohio was formed and was also in 1865 incorporated in the Army of the Cumberland.

OHIO COMPANY, The, in American history, a western colonial enterprise known as Ohio Company the first and Ohio Company the second. (1) In 1749 George II granted to a party of wealthy Virginians a tract of land containing 500,000 acres, lying mostly to the west of the mountains and south of the Ohio River. Thomas Lee was the projector of this company, but it was later conducted by Lawrence Washington. The conditions of the grant were that 100 families should be established there and a garrison maintained. It was short-lived. (2) On 3 March 1786 at the suggestion and in the house of Rufus Putnam (q.v.) of Rutland, Mass., Putnam, Cutler, Brooks, Sargent and Cushing organized an association of 1,000 shares, each of \$1,000 in Continental certificates, or \$125 in gold. A year was allowed for subscription. Land was to be purchased from Congress, in tracts lying between the Ohio and Lake Erie. On 9 May 1787 Parsons, agent for the company, appeared before Congress and was well received. Congress granted certain lots free of charge and an enormous tract was bought at about eight or nine cents per acre in specie. Colonization was immediately begun, and slavery was prohibited. The company had much influence in shaping the ordinance for the government of the Northwest Territory. See ORDINANCE OF 1787.

OHIO FALLS CANAL. See CANALS.

OHIO NORTHERN UNIVERSITY, Ada, Ohio, a coeducational institution chartered in 1904, but existing under different names from 1871. It was originally the Northwestern Ohio Normal School, but was consolidated with the Northwestern Normal School in 1875. It came under the control of the Methodist Episcopal Church in 1898, and was reorganized, taking its present name in 1904. In 1918 its president was Dr. A. E. Smith. It had 522 students with the United States army and 1,354 attending, the staff numbering 47 members. There are 5,155 living graduates.

OHIO RIVER, one of the largest tributaries of the Mississippi. It is formed by the junction of the Allegheny (q.v.) and Monongahela (q.v.) rivers, at Pittsburgh, in the western part of Pennsylvania. The Allegheny River brings to the Ohio the waters of Chautauqua Lake, and the drainage waters from the southwestern part of the State of New York. The headwaters of the Allegheny in New York are only a few miles from Lake Erie. It is navigable 120 miles from the Ohio. The headwaters of the Monongahela have their rise in the Alleghany Mountains in West Virginia, near the source of the Potomac River. It is navigable for about 60 miles from the Ohio. The Allegheny and Monongahela are large rivers at Pittsburgh, where they blend their waters to make the new stream. Here the Ohio is 1,021 feet above sea-level, and at its confluence with the Mississippi it is 322 feet above the sea. At first the Ohio flows north by

west, the valley broadening out to a flood plain. At Beaver the river turns and flows south by west, then almost south, forming the boundary between Ohio and West Virginia. Changing its course west, northwest, southwest, it forms the boundary between Ohio and Kentucky, then the boundary between Kentucky on the south and Indiana and Illinois on the north. Along its course are a number of large curves, but it has no falls or rapids that obstruct navigation except at Louisville (q.v.), where a coral reef exists; but the rapids formed have been overcome by lateral canals. The descent here is about 22 feet in two miles. The river is now navigable for its whole remaining course, a distance of about 975 miles; but a direct line from Pittsburgh to the mouth of the river is about 614 miles. The area of the Ohio Basin is about 214,000 square miles. The average rate of flow is a little over three miles an hour. The chief tributaries are the Muskingum, Scioto and Miami in Ohio and the Wabash, which is the largest affluent from the north. The largest tributaries from the south are the Tennessee and the Cumberland. Other large streams are the Kanawha, Licking and Kentucky. The largest tributaries of the Ohio have their headwaters in the mountains, and thus they become the depositories of vast quantities of the melted snows and heavy rains of spring which cause floods in the Ohio Valley. Often great damage to property and even loss of life is caused by these floods. The difference between the high and low-water mark some seasons exceeds 60 feet, and in 1887 it was over 70 feet. In the Ohio Valley flood (March-April 1913) damage was done to 206 towns and over 400 persons lost their lives and \$180,000,000 property loss was sustained. There are times in the dry season when the water is so low at Pittsburgh and in places below, even as far as Cincinnati, that navigation is hindered or retarded. The Ohio and its tributaries have 2,300 miles of navigable waters. The coal from Pennsylvania, West Virginia and Ohio, the building stone and the grain and other farm products, the iron, steel, clay and lumber products, make a large amount of freight which is carried over the Ohio and its tributaries. The average annual amount of freight is over 15,000,000 tons. There are a number of large cities on the banks of the Ohio, some of which are Cincinnati, Louisville and Evansville.

The Ohio River has been prominent in the history of the United States. From the first it was recognized as one of the important waterways of the country. The short portages from Lake Erie to the navigable tributaries of the Ohio and the continuous waterway to the Gulf of Mexico make the river an important route for the explorer, missionary and settler. (See UNITED STATES — HISTORY: NORTHWEST TERRITORY; OHIO). Consult Bliss, 'Dr. Saugrain's Relation of his Voyage Down the Ohio River,' (in 'American Antiquarian Society Proceedings,' Worcester 1897); Hulbert, A. B., 'The Ohio River' (New York 1906); King, 'History of Ohio'; Thwaites, R. G., 'On the Storied Ohio' (Chicago 1903).

OHIO STATE ARCHÆOLOGICAL AND HISTORICAL SOCIETY was first organized at Mansfield, Ohio, in 1875 as the Archæological Society of Ohio. Subsequently

it was reorganized at Columbus and incorporated March 1885 as the Ohio State Archæological and Historical Society. Its first president was Hon. Allen G. Thurman. The headquarters are at Columbus. It has a library and very extensive archæological museum in Page Hall, Ohio State University. It is managed by a board of trustees, part of whom are appointed by the governor and part elected by the members of the society at their annual election. The society is supported with appropriations by the general assembly of the State. It publishes an annual volume of biographical, historical and archæological matter pertaining to Ohio. It conducts archæological researches each summer amid the sites and remains of the prehistoric mound builders. Its members, divided into four classes, honorary, life, corresponding and ordinary.

OHIO STATE UNIVERSITY, The, opened at Columbus in 1873. In 1866 an act passed the Ohio legislature providing for the establishment of the Ohio Agricultural and Mechanical College, in accordance with the provisions of the Federal land grant of 1862. But nothing further was done until 1870, when a second law was passed by which the college was established at Columbus. It was reorganized in 1878 and the name changed to the Ohio State University. The present organization includes a graduate school and 11 colleges: (1) the Graduate School administers all the graduate work offered in the university, leading to the following degrees in course: M.A., M.Sc., Ph.D., C.E., M.E., E.E., E.M., Cer.E., Chem.E., and M.Arch.; (2) the college of agriculture offers four-year curricula in agriculture, horticulture, forestry, landscape architecture, applied entomology and home economics, leading to the degree B.Sc.; (3) the college of arts, philosophy and science offers courses in languages, sciences and humanities, leading to the degrees B.A. and B.Sc.; (4) the college of commerce and journalism, offering two-year curricula, based upon two years of college training in accounting, banking and finance, charity organization, insurance, journalism, manufactures, marketing — domestic and foreign, public service, social service and transportation, leading to the degree B.Sc.; (5) the college of dentistry, a four-year curriculum leading to the degree D.D.S.; (6) the college of education, offering four-year curricula in general education, art, home economics, manual training and agricultural education, leading to the degree B.Sc. in Edu.; (7) the college of engineering, offering four-year curricula in architectural, ceramic, chemical, civil, electrical, general, mechanical and mine engineering and architecture, leading to a bachelor degree; (8) the college of homœopathic medicine, offering a four-year curriculum based upon two years of college training and leading to the degree M.D.; (9) the college of law, offering a three-year curriculum, based upon two years of college training and leading to the degrees J.D. and LL.B.; (10) the college of medicine, offering a four-year curriculum based upon two years of college training and leading to the degree M.D.; (11) the college of pharmacy, offering a four-year curriculum, leading to the degree B.Sc. in Pharmacy; (12) the college of veterinary medicine, offering a four-year curriculum, leading to the

degree D.V.M. There are also shorter courses offered in agriculture, horticulture, dairying, poultry husbandry, clayworking, industrial arts and mining. The instruction in agriculture, engineering and science has always been a prominent feature of the university's work; and its laboratories are especially well equipped. A lake laboratory for biological study is maintained at Sandusky. Military drill is a part of the curriculum for men. Women are admitted to all the departments. The governing body is a board of trustees, appointed by the governor with the approval of the State senate for seven years. The campus and farm contain 585 acres, of which 475 are set apart for the work in agriculture and horticulture. The income is derived from the land grant of 1862, from the annual Federal appropriation and from a permanent annual grant from the State, established in 1891 and doubled in 1896. In 1922-23 the students enrolled for the regular session numbered 7,914 and the faculty 658.

OHIO UNIVERSITY, Athens, Ohio, the pioneer higher institution of learning in the "Old Northwest." Ohio University is the oldest higher institution of learning in that part of the United States known as the "Old Northwest." Before Ohio was admitted to Statehood the Territorial legislature, in session at Chillicothe, made provision "that there shall be a university instituted and established in the town of Athens." This action bears date of 9 Jan. 1802. The institution to be "instituted and established" was named the "American Western University." Two years after the passage of the act—Ohio having in the meantime been admitted into the Union—the State legislature re-enacted the provisions of the Territorial Act, with but few changes, by another act dated 18 Feb. 1804. This latter act, which gave the name "Ohio University" to the institution to be established, has ever been regarded as the charter of Ohio University. The institution thus provided for was opened to students in the spring of 1808, when Rev. Jacob Lindley, a Princeton graduate, was placed in charge.

The first graduates, Thomas Ewing and John Hunter, received their diplomas in 1815. The whole number of degree graduates, of baccalaureate rank, in the history of the university is men, 905; women, 314; total, 1,219. The total number of different students enrolled increased from 405 in 1901 to 4,962 in 1916.

A more intelligent statement of an approximate enrolment of different students is as follows:

College of Liberal Arts.....	620
State Normal College.....	1,941
Summer School (total 2,290) counting only those not enrolled elsewhere.....	1,542
Extension Classes (total 1,185) counting only those not enrolled elsewhere.....	859
Total.....	4,962

The university buildings are 15 in number, not including the president's home, the heating plant, the greenhouse and 10 buildings used as dormitory quarters for women students. Conservative valuation of the property of the university is as follows: grounds, \$541,562; buildings, \$976,000; equipments, \$211,100; total, \$1,728,662. The financial support of the university is derived from three sources, namely, the mill-tax, special appropriations and local receipts from incidental fees, rents and interest

on permanent funds forming a part of the irreducible debt of the State of Ohio. Receipts from all these sources in 1916 amounted to \$319,718.02. Salary payments for the fiscal year ended 30 June 1916 amounted to \$166,663, of which amount the sum of \$136,211.34 was for teaching service exclusively. Expenditures for the year made a total of \$300,533.86.

One degree is given in the college of liberal arts—A.B. The degree of B.S. in Education is given those who complete the four-year courses in the State Normal College. To receive either of these degrees the student must have a credit of not less than 120 semester hours based upon at least 15 units of secondary work. Each semester covers a period of 19 weeks and each recitation period represents 55 minutes of actual class-room work. The field of instruction covered is shown by the following classification of colleges and departments: college of liberal arts; the State normal college; the college of music; the department of public speaking; the school of commerce; the department of physics and electrical engineering; the department of mathematics and civil engineering, and the departments of drawing and painting.

In the State Normal College the following courses are offered: 1, course for teachers of rural schools; 2, a two-year course in elementary education; 3, a four-year course in secondary education; 4, a four-year course in supervision for principals and superintendents; 5, a one-year course for college graduates; 6, a two-year course in the kindergarten school; 7, a two-year course in school agriculture; 8, a two-year course in manual training; 9, a two-year course in household arts; 10, a two-year course in public-school music; 11, a three-year course in public-school drawing; 12, a two-year course in physical education. All courses named lead to a diploma; courses 3, 4 and 5 to a diploma with the degree of bachelor of science in education. The library contains over 46,000 volumes. The faculty numbers 88.

OHIO WESLEYAN UNIVERSITY, Delaware, Ohio, was founded under the patronage of the Methodist Episcopal Church in 1841, when the original property was acquired and an academy opened. The charter was granted in 1842. In 1844 the College of Liberal Arts began its work. In 1877 the Ohio Wesleyan Female College, an independent institution, established in Delaware in 1853, was incorporated in the university, its students were admitted to university classes and its graduates to *ad eundem* degrees. Since this time the university has been coeducational. In 1896, the Cleveland College of Physicians and Surgeons, originally established in 1863, became an integral part of the institution and its subsequent graduates were admitted to the degree of doctor of medicine in the university. This school was combined with the medical department of Western Reserve University in June 1910.

The university has maintained, since its foundation, college preparatory classes, now organized as the academy; and maintains, in the conservatory, a school of music and a school of fine arts, both established in 1877. A school of oratory, established in 1894, is now organized as a department of the college. The

school of business, established in 1895 and for several years organized as a part of the academy, was discontinued in June 1912. The graduates of each of these schools, upon the completion of a prescribed course of study, are granted certificates under the seal of the university, but are not thereby admitted to academic degrees. The total value of grounds, buildings and endowments is \$2,400,000 and the annual income from endowments and fees, \$407,523. The library contains 91,013 volumes. The total number of students enrolled for a recent academic year was 1,711, of whom 1,610 were in the college. The college faculty numbered 114 including the faculties of all the schools. The aim of the college is to maintain a genuine curriculum of liberal arts that its graduates may be prepared, under high ideals of scholarship and conduct, for successful professional or technical study elsewhere, or for the discharge of all their obligations as citizens. It confers the degrees of bachelor of arts and bachelor of science. The total number of graduates, including the class of 1922, who have received baccalaureate degrees is about 6,000.

OHM, ðm, Georg Simon, German physicist: b. Erlangen, 16 March 1787; d. Munich, 7 July 1854. He was educated at the University of Erlangen. In 1817 he became a teacher at the gymnasium in Cologne, and in 1826 at Berlin. From 1833 to 1849 he was director of the polytechnic school at Nuremberg, and in 1849 went to Munich as professor of physics at the university. His researches were chiefly concerned with galvanic currents and he formulated the law which is known as Ohm's law; that the current is directly proportional to the electromotive force and inversely proportional to the resistance. This law was first stated in his 'Bestimmung des Gesetzes, nach welchem die Metalle die Kontaktelektrizität leiten' (1826), and was further developed and proved in his 'Die galvanische Kette mathematisch bearbeitet' (1827); in English 'The Galvanic Circuit Mathematically Investigated' (1891). He also wrote 'Beiträge zur Molekularphysik' (1849), and 'Grandzüge der Physik' (1854). His collected writings were published by Lommel in 1892. His name was given to the practical unit of electrical resistance in 1881. Consult Mann, 'Georg Simon Ohm' (Leipzig 1892); Von Lommel, Eugen, 'Scientific Work of Georg Simon Ohm' (Washington 1893, trans. by W. Hallock).

OHM, the practical unit of electrical resistance, adopted in 1881 by the International Congress of Electricians at Paris, the centimeter-gram-second unit formerly in use having proved too minute for convenient reckoning. The ohm, named after the German physicist Ohm (q.v.), equals 1,000,000,000 (10^9) C. G. S. electro-magnetic units of resistance; a michrom is a resistance of one millionth $\frac{1}{10^6}$ of the ohm; and the megohm is a measure 1,000,000 (10^6) times the ohm. The ohm may be independently defined as the electrical resistance to an unvarying current offered by a uniform column of mercury at 0° C., 106.3 centimeters in length and one square millimeter in cross-section.

OHMANN-DUMESNIL, Amant Henry, American dermatologist: b. Dubuque, Iowa, 30 Sept. 1857. He was graduated from the Mis-

souri State University in 1877 and from the Saint Louis Medical College, Washington University, in 1880, and has since made dermatology his specialty. He was professor of dermatology in the College for Medical Practitioners 1881; in the College of Physicians and Surgeons 1882; and in Marion Sims College of Medicine, 1895-97. He was also editor of the *Weekly Medical Review*; editor of the *Saint Louis Medical and Surgical Journal* and *Atlas of Dermatology*, and later editor and proprietor of the *Saint Louis Medical and Surgical Journal* and has published 'Hand Book of Dermatology' (1898); 'History of Syphilis' (3 vols., 1899).

OHM'S LAW, a fundamental principle in the mathematical theory of electricity, discovered in the early part of the 19th century by Dr. Georg Simon Ohm, a professor of physics at Cologne. It was first published in 1826. The law may be stated in the following manner: In any closed electrical circuit of resistance R, the current C, produced by an electromotive force E acting around the circuit, is given by the formula $C = E/R$; C being measured in amperes, E in volts and R in ohms. Some authorities regard this simple equation as a sort of truism, pointing out that the ampere is, by definition, the current generated by one volt in a circuit whose resistance is one ohm. Ohm's law is much more than a truism, however, because it states not only that one volt generates a current of one ampere in a circuit whose resistance is one ohm, but also that P volts, acting in a circuit whose resistance is Q ohms, generate a current of P/Q amperes. Ohm's law was first given for the case in which a constant electromotive force acts in a simple linear circuit, but it may readily be generalized so as to apply to branched circuits and to circuits in which the electromotive force is variable. See ELECTRICITY; RESISTANCE, ELECTRICAL; UNITS OF MEASUREMENT.

OHNET, Georges, French novelist: b. Paris, 1848; d. there, May 1918. He at first became a lawyer, but soon turned to journalism and edited, in the early 70's, *Le Pays* and the *Constitutionnel*. But it was in the melodramatic novel that his literary skill was best displayed. He wrote an enormous quantity of articles, novels and plays, and was writing on the war until a few days before his death. His masterpiece was the novel 'Le Maître de Forges' (1882), known to English readers as 'The Ironmaster.' A dramatized version met with great success. He was a strong admirer of George Sand and modeled his work on her later style, after the force of the Romantic movement had spent itself. Some of Ohnet's novels brought him more profit and notoriety than critical approbation. They form a series bearing the generic title of 'Battles of Life.'

OIL. There exists in nature a great number of substances that are more or less fluid at ordinary temperatures, that are insoluble in water, that take fire on application of flame, and, while not very closely related, are grouped together under the name "Oils." Some are ready formed, as petroleum; others are easily obtained by subjecting the crushed seeds of plants to pressure or by extracting the meal with volatile solvents, as linseed and rapeseed oil; or by the aid of heat and pressure as lard

oil; and others by distillation as oil of peppermint. Some are sparingly soluble in alcohol, others freely so; but all except castor oil are soluble in ether, petroleum of various grades, chloroform and carbon-disulphide and in each other. Because of certain similarities in characteristics they are classified under the three headings of essential oils, fixed oils and petroleum.

Petroleum.—As is indicated by its name, petroleum is obtained from the rocky structure of the earth. (See PETROLEUM). An older classification included the petroleum with the essential oils, because of the readiness with which they are distilled.

Fixed or Fatty Oils.—These are a section of the bodies described under the general heading of "Oils, Fats and Waxes" and are derived from both animal and vegetable sources. They cannot be distilled, as the petroleum, ordinarily, are without decomposition; they leave permanent, translucent grease spots on paper; they are, therefore, called "Fixed Oils." They vary in specific gravity from .875 to .960. Fixed oils are fluid at ordinary temperatures, differing in this respect from the fats which are more or less solid. Both oils and fats are mixtures composed chiefly of olein, stearin and palmitin, but those in which olein predominates are known as oils. Olein is that portion of fixed oils that is fluid at ordinary temperature, while the crystalline portion consists of stearin and palmitin. They differ chemically, but for practical purposes this distinction is sufficiently broad. Considered chemically, the fatty oils and solid fats are neutral glycerides of fatty acids, whereas waxes are esters formed by the union of fatty acids with alcohols not belonging to the glycerol series. When treated with an alkaline solution the fixed oils are saponified with the formation of glycerol. There have been many classifications of the fixed oils based on various characteristics, but the most convenient one for practical purposes appears to Lewkowitch to be that of arranging them according to the magnitude of the iodine value. This principle leads to a natural subdivision into liquid fats (oils) and solid fats (fats), the former being differentiated from the latter by their considerably higher iodine values. This value indicates the percentage of iodine chloride absorbed by a fat or wax, expressed in terms of iodine. The iodine value is obtained by treating the oils in a prescribed manner with iodine chloride, the percentage absorbed being a measure of the proportion of the unsaturated bodies present. The knowledge of this value is of great service in the selection of proper fixed oils, for definite purposes. Those consisting largely of unsaturated bodies, as, for example, linseed and poppy seed, are useful in painting. Naturally thin, they can carry large proportions of pigment giving great covering power. On exposure to air the unsaturated portions become saturated, or "dry" as commonly stated, to a hard surface. For the same reason, linseed oil can not be used for lubrication. On the other hand, olive oil, which has a low iodine number because it contains less unsaturated bodies, can be used for lubrication, but is entirely unsuited for painting purposes. There is a close relationship between the iodine value and the capacity to absorb oxygen so that

arranging the vegetable oils according to the magnitude of this value gives a classification as to drying power.

Cholesterol has long been recognized as one of the crystalline constituents, chemically an alcohol, of fats and fatty oils, of animal origin. Other similar bodies have been isolated and these are all now classified as zoosterols. Vegetable fats and fatty oils are characterized by the presence of corresponding alcohols to which the name phytosterols has been given. Recent researches have served to show the chemical difference between the two series and their derivatives and naturally lead to a second guiding principle in the subdivision of the glycerides. Arranging the fatty or fixed oils and solid fats according to these two principles, we obtain the following subdivisions:

Liquid Fats and Fatty Oils:

- A. Vegetable oils
 - 1. Drying oils
 - 2. Semi-drying oils
 - 3. Non-drying oils
- B. Animal oils
 - 1. Marine animal oils
 - a. Fish oils
 - b. Liver oils
 - c. Blubber oils
 - 2. Terrestrial animal oils

Solid Fats:

- A. Vegetable fats
- B. Animal fats
 - 1. Body fats
 - a. Drying fats
 - b. Semi-drying fats
 - c. Non-drying fats
 - 2. Milk fats,

LIQUID FATS AND FATTY OILS.

A. Vegetable Oils. 1. *Drying Oils.*—The drying oils include linseed, Chinese tung oil, poppy seed oil and several of the less familiar ones which are characterized, when exposed to air, by changing to first, a tacky and eventually a smooth varnish-like surface. Because of this fact linseed oil has long been an important article of consumption as a vehicle both for carrying lead and fine paints for practical house painting and when mixed with pigments, for decorative work. Its source is the seeds of the flax plant. Chinese tung oil, also known as Chinese wood oil, Japanese wood oil and as simply wood oil, was first mentioned in about 1735 as an adulterant of Chinese lacquer. It is obtained from the seeds of *Aleurites cordata*, a tree indigenous to China. The fruit forms a nut, in which three to five seeds having a hard shell and an oleaginous kernel are enclosed; hence in China the oil is frequently termed "nut oil." The seeds are roasted in a flat dish over a naked fire, then broken between stones and the flesh pressed in a crudely-made wooden press. The kernels contain about 53 per cent of oil, but the practical yield is only 40 to 41 per cent. The oil cake, from which the oil has been expressed, is poisonous and is only used as a fertilizer or burned for the production of lamp black. One of the peculiar characteristics of this oil is that it gelatinizes on heating. A portion raised to its fire test and allowed to cool cannot be poured from the containing vessel.

2. *Semi-Drying Oils.*—The semi-drying oils are frequently divided into first, the cottonseed oil group, which includes, beside the one giving the name, maize (corn) oil, sesame, soja bean and several other lesser-known oils;

and second, the rape oil group which also includes the oil derived from the seeds of rampion, black, white and Indian mustard. The oils of this group, in the past, have been used in large quantities for the lubrication of machinery and for illuminating purposes, but are now almost entirely replaced by pure mineral and compounds of mineral and fixed oils, respectively. The highly refined rapeseed oil expressed from seeds grown on their own farms, is prepared by the peoples of European nations for domestic purposes and also for burning in sanctuary lamps.

3. *Non-Drying Oils*.—The non-drying oils are best known through olive, arachis and castor oil. The olive oil obtained from the flesh of barely ripe olives is of better quality than that from fully matured or over-ripe fruit. Fine grades are made from hand-picked fruits from which the kernels have been removed. Exceptionally fine qualities are prepared by peeling hand-picked fruit and pressing lightly after carefully removing the kernels. The pressed pulp is worked over in various ways for the production of the lower grades of edible oils and those for lubrication and soap-making. Castor oil is obtained from the seeds of *Ricinus communis*. The most important sources are East India, Java, the Mediterranean countries, Mexico and the United States. The medicinal oil is produced by expression in the cold. The oil from the presses is received in well-tinned vessels where it is allowed to settle, following which it is refined by heating in tinned pans over water kept at its boiling point to coagulate the albumen. When this is accomplished it is cooled and strained through cotton flannel into cans in which it is brought to market as "cold drawn" oil. The oil cake is afterward heated and pressed for lower grade oils used for mechanical purposes. Castor differs from all other fixed oils in its solubility in alcohol and in its being nearly insoluble in the petroleum. Arachis, peanut oil, is obtained by expression from the ordinary peanut, *Arachis hypogaea*. Under the newer processes it is being converted into a salad oil, water-white in color and entirely free from the odor of peanuts.

B. *Animal Oils*.—The two divisions of the animal oils represent practically also the drying and non-drying classes. As with the vegetable oils there also exist those derived from the animal kingdom that are intermediate in position between the drying and non-drying oils, as indicated by their iodine number. These, however, are the little-known oils and of small commercial value.

1. *Marine Animal Oils*.—a. *Fish Oils*.—The fish oils are obtained from pressing the entire fish—and include the menhaden, herring, sardine, sprat and portions of the salmon that are not usable for food. The catch of the menhaden, for example, which is largely the source of the fish oils expressed in the eastern United States, is in enormous quantities, especially off the coast of New Jersey from about May until November. Some seasons as much as 400,000 tons have been caught and pressed. The United States Fish Commission reported in 1912 a production of 6,651,203 gallons of menhaden oil which, together with the scrap used for fertilizer, amounted in value to \$3,690,155. This

oil is graded under different qualities, the best being that obtained from fresh fish. The oils are clarified by filtering through fullers' earth and then are allowed to rest for some time in tanks, cooled either naturally or artificially, to separate the stearin and impurities from the olein. The more fluid part of the oil is removed by decantation and the stearin, which settles out, is afterward pressed for the removal of a larger percentage of the oil. Both the oil and stearin have a large use in the manufacture of leather.

b. *Liver Oils*.—These are obtained, as indicated by the name, from the livers of the larger fish, the best known being the cod, haddock, skate and dogfish. They contain notable amounts of cholesterol and other unsaponifiable substances. Genuine cod liver oil is obtained from the liver of the *Gadus morrhua*. At certain times every year enormous shoals of cod frequent the coast of the Northern seas, chiefly the coasts of Norway, Scotland, the East coast of the United States and Canada, the coast of Newfoundland and also the West coast of the United States and the coasts of Japan and Siberia. For many years the best medicinal cod was obtained from Lofotes, Norway, at which point the cod appears in February, the fishing season lasting from that month until April. Later in the year they appear at Finmarken, but here they are in an immature condition and hence do not yield as much oil or of as good quality as that obtained from the fish caught off the Lofotes coast. Another difficulty is that the cod frequenting the Finmarken coast are accompanied by other fish, whose livers naturally become mixed with those of the cod and do not add to its value. The main purpose of catching the cod is its value as food and it seems probable that the usefulness of the oil was an accidental discovery. The former practice on shipboard was to place the livers freshly taken from the fish in barrels, where they were allowed to decompose. This ruptured the oil-containing cells and the accumulated oil in the barrels was tapped off and purified for medicinal purposes. Because of contamination, as well as the method of production, its odor and taste were objectionable. In the best equipped establishments at present, the method followed is to place the fresh livers in tin-lined vessels provided with open steam coils, almost immediately after they have been taken from the fish; washed and sorted—all livers showing stains being discarded. Low pressure steam is then blown into the livers and the oil exudes almost immediately. This method is also being followed in Newfoundland, so that the product now being made there is not considered inferior to the Norwegian medicinal oil. The crude medicinal cod liver oil is filtered to free it from liver tissue and bleached by treatment with fullers' earth or by exposure in closed glass vessels by the action of the sunlight. Medicinal oil so prepared deposits stearin at a low temperature and such oil is termed "Congealing Oil." This is rendered "non-congealing" by cooling it down to a temperature below Zero° C and pressing or decanting the stearin free oil. The livers unsuited for the preparation of medicinal oil, either from disease or decomposition due to keeping them too long, are steamed and pressed

for a grade of commercial oil used in finishing leathers. That cod liver oil has a therapeutic value seems to have been definitely proven, but on just what constituent this depends investigators do not agree.

c. Blubber Oils.—Among the blubber oils, the third group of the marine animal oils, are several of varying composition, which are thus described by Lewkowitch: "Seal oil, whale oil, turtle oil and dugong oil consist almost wholly of glycerides; dolphin oil, porpoise oil and brown fish oil contain notable amounts of spermaceti forming as it were intermediate members between true fatty oils and liquid waxes. . . ." "The last three members of this group—dolphin, porpoise and brown fish oil—occupy an exceptional position on account of their containing considerable proportions of glycerides and volatile acids. In this respect turtle and dugong oils form intermediate links between these oils on the one hand and seal and whale oils on the other." The "trying" out of the blubber oils is now mostly done on shore. The blubber is stripped clean from flesh, cut into strips which are thrown into chopping machines and the shredded mass immediately delivered into melting pans and boiled with steam. The first oil off is of the best quality. If desirable to prepare an oil free from stearin, that work is accomplished in the same way as described under cod liver oil.

Sperm is omitted from this classification because while fluid, it is chemically a wax and not an oil. It is unique in many respects. Nearly all the other fixed oils have a specific gravity heavier than .915, while sperm oil has a specific gravity of .880. Its flash test is practically as high as any of the fixed oils, but its viscosity is much lower than any other fixed oil. Notwithstanding these characteristics, sperm oil in the past has been used for lubrication for nearly all kinds of machinery, ranging from ring spindles to steam cylinders. There are two recognized varieties—the sperm obtained from the head cavities and from the blubber of the sperm whale, or cachalot (*Physeter, macrocephalus*) and Arctic sperm oil obtained chiefly from the bottle-nose whale (*Hyperoodon Rostratus*). The oils from the two portions of the body differ considerably in appearance and if rendered on shipboard are kept separate, but when received at the refineries, they are generally mixed in their natural proportions of one-third head oil and two-thirds body oil. This mixture is chilled and pressed for the separation of the spermaceti which remains in the press cloths, the oil, freed from wax passing through. The head or brain oil is clear and limpid when first removed, but after a short time thickens and hardens through the chilling of the spermaceti. The body oil is a light straw color. Sperm whales yield varying amounts from five to 145 barrels of the crude material.

2. Terrestrial Animal Oils.—The liquid fats from terrestrial animals are practically all non-drying. A few of scientific interest, not obtained in commercial quantities, judged by their iodine value alone might be classed with the semi-drying oils. Many of the oils in this section come on the market only after they have been pressed for removal of a portion of the stearin and palmitin with which they are mixed

in the tissues. Lard oil, for example, is obtained from the fats from the visceral cavity of the hog, the best grade being rendered within 24 hours after removal. It is allowed to granulate at a temperature of approximately 55° F., after which it is pressed. The oil obtained is largely used for illuminating purposes, though a portion is required for the "enfleurage" process in obtaining essential oils (see PERFUMES AND PERFUMERY), while the combined stearin and palmitin are mixed with the softer grades of lard to stiffen it for summer trade. The grades rendered from the less desirable fats of the hog in the past have found a ready market for use in cutting threads on metals, but in automatic machine work they are now being superseded by the specially prepared mineral oils.

Other familiar oils from terrestrial animals are neatsfoot and tallow oil. Genuine neatsfoot oil is obtained from the feet of cattle. The hoofs are washed and scraped to remove hair and impurities, are sawed or split to better expose the fatty matter and kept simmering with water in steam-jacketed pans for eight to 10 hours. The oil rises to the surface from which it is frequently skimmed and is transferred to heated tanks in which it is allowed to settle to separate it from water and other suspended matter. On chilling the stearin settles to the bottom of the container; the clear oil is decanted and if the process has been well-carried out, may have a cold test of 20° F. Neatsfoot oil should be pale yellow in color, have a bland taste and a characteristic odor. The demand for this oil in the leather industries has brought out inferior grades, adulterations and substitutes. Some of the latter, however, are quite as valuable in finishing leather as genuine neatsfoot. The products obtained from the rough fats taken from cattle come to the market both as oils and fats and because of their importance in both conditions, will be taken as the types for the connecting links between the oils and the fats. The methods of separating the fats are of sufficient interest to warrant describing them in detail. In the large slaughter houses the fat is immediately removed from around the kidneys and bowels of the slain animal; is carefully freed from all inferior fatty matter and taken at once to the oleomargarine factory where it is sorted, washed thoroughly with warm water and placed in cool rooms to dry and harden. It is "rendered" by heating in tin-lined jacketed kettles to a temperature of 109° F., the liquefied portion rising to the top of the kettle from which it is decanted. The liquid is cooled in shallow tin-lined trays at such a temperature that the stearin will crystallize or "granulate." When finally solidified the cake is cut into small pieces, each one wrapped in a press cloth of canvas and a quantity of these submitted to pressure in an hydraulic press. The oleo oil oozes through the canvas but the oleo stearin remains inside. The oleo oil is the chief ingredient of oleomargarine (q.v.) and the oleo stearin is used in the preparation of "lard substitutes" and other food products.

The fat taken from all other portions of the carcass are usually rendered together. The simple process calls for a steam jacketed lead-lined kettle supplied with open steam coils, having a close fitting cover to which a pipe is

attached for conveying the odorous vapors to a stack and facilities for charging and discharging. The rough fat is cut up, put into the tank, hot water run in, steam turned on and continued until all the fat obtainable by heat alone has risen to the surface. The melted fat is removed, a small percentage of dilute sulphuric acid added and steam again turned on. The acid breaks down the animal tissues and releases oil from the cells which heat alone could not. In smaller places these two grades are mixed in melted condition, purified by settling over hot water, run into molds allowed to cool and solidify and sold as cake tallow. The sweetness and purity of the product depends quite as much on the stock used as on the care taken in rendering and purifying. In the larger institutions the rendered fat is allowed to cool at granulating temperature, after which it is placed in canvas bags and submitted to pressure. The oil pressed through the canvas is mostly olein and is the tallow oil of commerce. The portion remaining inside the bags has a higher melting point than the tallow because consisting chiefly of stearin and palmitin, and is marketed as tallow stearin.

Essential Oils.—The greater proportion of the essential oils are found in nature ready formed. The characteristic odors of plants are due in most cases to the presence of one or more of these bodies. Not all now being produced, however, are of vegetable origin, large quantities being made synthetically in laboratories to the identical chemical structure of the natural oil. The essential oils differ from the fixed or fatty oils in that they are volatile, leaving at most only a trace of residue, hence they do not produce a permanent grease spot on paper. They are usually of very complex composition, and different specimens from the same botanical source often exhibit considerable variations in the proportions of their constituents. The following by Mr. Ernest J. Parry, taken from the last edition of Allen's 'Analysis,' gives important information as to their composition: "The only satisfactory classification of Essential oils is according to their botanical origin. The alternative method, adopted by many French chemists, is to classify them according to their chemical relationships. But this at once raises a serious difficulty. Many oils owe their chief characteristics to at least two different substances. For example, citronella oil contains a large amount of both geraniol and of citronella. If we adopt a chemical classification, are we to place this oil with otto of roses, which contains a very large amount of geraniol, or with a lemon-grass oil, which consists chiefly of the aldehyde citral. Both German and French chemists prefer a botanical classification, and this will be found to have considerable advantages over a chemical one. The greater part of the Essential oils will be found to owe their principal characteristics to one or more of the following groups of compounds: (1) Terpenes, hydrocarbons of the formula $C_{10}H_{16}$: in many of these cases 90 per cent of terpenes are present, but they are seldom the most useful portion of the oil, which frequently depends entirely for its value on the remaining constituents, e.g., lemon oil, orange oil; (2) Sesquiterpenes, hydrocarbons

of the formula $C_{15}H_{24}$: cedar-wood oil and patchouli oil are type of this class; (3) Open chain alcohols and their corresponding aldehydes: such are the so-called Indian grass oils (citronella, lemon-grass and Indian geranium oils); (4) Aromatic alcohols of the camphor series and their corresponding ketones, such as peppermint, thuja and pennyroyal oils; (5) Aromatic alcohols of the benzene series and their corresponding aldehydes and ketones, such as bitter-almond oil, caraway oil and cinnamon oil; (6) Sesquiterpene alcohols, such as sandalwood oil. (7) Phenols and their derivatives, such as clove and aniseed oils. (8) Esters of any of the above-mentioned alcohols, such as lavender and bergamot oil, wintergreen oil. (9) Sulphur compounds, such as garlic oil. There are a few oils which do not come under any of these heads, but they are not very numerous."

The essential oils of plants are usually liquid at ordinary temperatures, but many of them deposit solid bodies called stearoptenes by cooling, e.g., camphor and the paraffin hydrocarbons of rose oil.

Manufacture of Essential Oils.—They are obtained by the following methods: (A) By pressure, as the oils of lemon, laurel and bergamot. (B) By distillation with water, or by passing a current of steam through the matter to be extracted. It has been found that the steam distillation of some essential oils is not the best method of manufacture, because certain bodies may be changed chemically by this operation and impart an odor not present in the plant itself. (C) By fermentation and distillation, as the essential oils of mustard and bitter almonds. After all the fixed oil has been extracted from the mustard seed meal, water is added. In its presence, a fermentation is started which results in the formation of essential oil which is then recovered by distillation with water. (D) By solution in a fixed oil devoid of odor, such as olive oil or lard—the "enfleurage" process. The "enfleurage" process, for this reason, is considerably better in that the essential oils are not exposed to heat. A layer of fat or oil is spread on a plate of glass, the fresh flowers are sprinkled on it and after the fat has absorbed the odor they are replaced by more flowers, and this process repeated until the fat is saturated. The fat is then removed and is washed with alcohol which extracts the odorous substances that have been absorbed from the flowers. (E) With volatile solvents. There are objections to the use of volatile solvents such as petroleum ether, carbon-tetrachlorid, chloroform and others, because they also dissolve resinous bodies that are detrimental to the true odors of the plants. (F) By synthesis. Industrial chemists have made considerable progress in duplicating odors synthetically. Not only are natural odors produced but other chemicals having delightful odors not yet discovered in nature have been made, and are now available for the use of the manufacturer of perfumes. The synthetic materials of to-day are successfully utilized in goods of the highest grade and many odor and flavor effects would be impossible without them. Because of the large number of chemical bodies found in ylang-ylang, an essential oil obtained from the flowers of a tree (*Canarium odora-*

turn), and that has long been a valuable product from the Philippines, a full description of it in an article by Mr. Alois von Isakovics in Rogers and Aubert's 'Industrial Chemistry' will be quoted:

"The distilled oil is a very complex body which differs considerably from year to year and according to the method of production; in fact, ylang and cananga, a cheaper oil, are derived from the same tree. The best ylang ylang oil consists of the first portion of the steam distillate. It contains a larger proportion of esters and is a fine example of a complex natural product. It contains benzyl alcohol, benzyl acetate, benzyl benzoate, benzyl salicylate, methyl anthranilate, methyl benzoate, methyl salicylate, geraniol, geraniol acetate, linalool, linalyl acetate, eugenol, iso-eugenol, methyl eugenol and methyl iso-eugenol. This list, while long, is by no means complete, as a number of allied bodies, especially other esters, are also present. Even all these together will not give the right odor, until the characteristic constituent is added which converts the product into ylang ylang. This body is the methyl ether of para-cresol, which is enormously powerful, and therefore must be used with great care. Traces of para-cresol and of guaiacol ethers are also present in the oil."

FLORUS R. BAXTER,

Chief Chemist of the Vacuum Oil Company.

OIL-BEETLE. See BLISTER-BEETLE.

OIL-BIRD or **GUACHARO.** See GUACHARO.

OIL CAKE. See FLAXSEED.

OIL CITY, Pa., city in Venango County, at the junction of Oil Creek and the Allegheny River, and on the Pennsylvania, the Lake Shore and Michigan Southern and the Erie railways, about 130 miles north by east of Pittsburgh. It was settled about 1825, but was only a small place, with but few local manufacturing, until the oil wells of the vicinity were developed in 1860. It was incorporated as a borough in 1863 and chartered as a city in 1874. A terrible catastrophe occurred on 5 June 1892, when burning oil came down Oil Creek from Titusville, a distance of 18 miles, and swept over the city. More than 100 persons were killed and property to the amount of about \$1,000,000 was destroyed. The city is in the midst of the celebrated oil fields of Pennsylvania and many of its industries are connected with the marketing of petroleum. Some of the prominent buildings are the Oil Exchange, the Standard Oil Company office buildings, the city hospital, church and school buildings and several building blocks. The educational institutions are the public and parish schools and the Carnegie Free Library. The government is vested in a mayor, who holds office for four years, and a council of four members, elected every two years. The school board, assessors, treasurer and comptroller are elected by the people. The city owns and operates the waterworks. Pop. (1920) 21,274.

OIL CLOTH. See FLOOR-CLOTH.

OIL ENGINE. See INTERNAL COMBUSTION ENGINE.

OIL-FISH, the colloquial name of several fishes of the blenny family (*Comephorus baikalensis*) notable for yielding oil, as the men-

haden (q.v.) of the eastern United States. Specifically, the Russian golomynka (q.v.). The specific oil-fish which has supplied the term now current in the United States for several oil-yielding fish, is found only in Lake Baikal (q.v.). It is without scales, is about a foot long and is very soft and full of oil.

OIL FUEL. See OIL; PETROLEUM.

OIL GAS. See OIL.

OIL OF MUSTARD, a volatile, pungent, colorless and irritating oil formed in mustard by fermentation when it is wet. It is chemically known as allyl isothiocyanate C^3H^5NCS . The seeds of the black mustard contain a bland fixed oil from which volatile oil is produced by the action of a soluble ferment upon the potassium salt of myronic acid in the presence of water. Oil of mustard blisters the skin. Pure oil boils at $151^{\circ} C$. The term "mustard oils" is commonly applied to organic isothiocyanates in general.

OIL PAINTING, a method of painting in which the pigments used are ground in linseed oil, made from the seed of the flax plant, or in poppy oil; in many respects the most valuable of the various processes at the command of the artist who works in color. Apparently unknown to the ancients, and but little used by the earlier painters of the Renaissance in Italy, it has gradually come into wider use in succeeding schools of art, and at the present day has very largely superseded the older methods of tempera, encaustic and fresco, even for monumental mural paintings. In the important art of scene painting the use of distemper still prevails, for various reasons of practical convenience. The technical disadvantages under which the artist painter labors are probably reduced to a minimum by the use of oil colors, but they are by no means entirely removed. The oil itself is a yellow vehicle, and has a tendency to cause the colors both to yellow and darken with age; the pigments—even with all the science of modern chemistry applied to their fabrication—are frequently unreliable, being affected by time, by exposure to the atmosphere, smoke, gas, etc., by being mixed with each other, or even by contact with the steel of the palette knife, and, many of them, having a tendency to become useless by drying in their tubes. Paintings executed in this medium, liable to deterioration through all these causes, are also frequently injured by unskilful or careless technical methods—cracking when the glazing or over-painting has been applied before the first painting was thoroughly dry, or because of the use of a medium, a varnish or a dryer, which does not dry nearly simultaneously with the pigments. Many of the paintings of the modern French school, executed in the highest period of the contemporary art, and by the recognized masters of the school, have cracked within twenty-five years of their execution. The use of bitumen—a great temptation to many painters because of its luminous, warm, dark tones—very frequently causes the painting to crack, as notably in the works of Munkacsy (q.v.). To prevent the yellowing of the oil vehicle it is usually thinned with turpentine, or is replaced in the painter's palette cups by a mixture of Siccative de Harlem and turpentine, or turpentine alone, or refined kerosene, or even by some of

the retouching varnishes. The use of an absorbent ground to paint upon also lessens this danger (while diminishing very considerably the lustre and beauty of the colors); Puvis de Chavannes (q.v.) used the common oil colors on a canvas prepared with plaster. Want of sunlight also causes oil paintings to yellow, and they can be partially restored by exposure to that light. Zinc white is much the safest white to use with oil. Oil painting cannot be used directly on a plaster wall because of the combination of the caustic lime with the oil, thereby forming a soap which destroys the durable qualities of the pigments and causes them to redden or yellow. The modern mural painters adopt the safer method of painting their pictures on canvas, which is then fastened to the wall with white lead. This method has the advantage of dispensing very largely with the disagreeable necessity of working on scaffoldings, frequently at a great height from the ground, as the old painters did. In general, heavy impasto, or the application of much color by many repaintings and scumbling or glazing of thin color over another underneath, are more apt to lead to deterioration of the painting than the use of nearly pure colors applied sparingly and with but little thinning medium. The slow but gradual destruction of many of the world's masterpieces in this manner is a heavy loss; the paintings in the great Louvre galleries in Paris, left uncleaned, darken very perceptibly in the course of 20 years.

The invention of oil painting was ascribed in Vasari's time to the Flemish painter Jan van Eyck (q.v.) (died 1440), but something, at least, of the art had been known much earlier. In a technical work, the 'Book of Art' by Cennino Cennini, one of the later followers of Giotto (1276-1336), the mixing of pigments with boiled linseed oil is mentioned, though not with reference to artistic works. The brothers Van Eyck (Hubert and Jan) seem to be entitled to the honor of having first availed themselves of the great advantages possessed by the oil pigments with their slow drying qualities, which permitted the mingling of the colors on their palattes and their canvases. They are said to have mastered the properties of color from Pliny's 'Historia Naturalis.' In the old tempera painting, the colors were laid on and dried, practically, one at a time. In the first half of the 15th century the painters of northern Italy heard of the new method of the Van Eycks, and experimented with it; Antonello da Messina (q.v.), a Sicilian painter (1430-79), saw in the possession of Alphonso, king of Naples, a painting by Jan van Eyck, and was so much impressed by it that he journeyed to Bruges to study the new art, and brought it back to his compatriots in 1465. It was practised in Tuscany earlier than in Venice, and with different methods in Florence and Venice, but its adoption was gradual. It is related that Sebastiano del Piombo lost the friendship of Michelangelo (q.v.) by endeavoring to induce him to adopt this method for his 'Last Judgment' in the Sistine Chapel; and the almost complete destruction of Leonardo da Vinci's (q.v.) 'Last Supper' (1498) is attributed to the use of oil on the plaster wall, while the fresco (*buon fresco*) of the 'Crucifixion' by Donato Montorfano, painted in 1495,

is still in good condition, though exposed to the same unfavorable conditions. Some of the Italian painters, including Perugino (q.v.), Pollaiuolo (q.v.), and Andrea Verrocchio (q.v.) employed a mixed method, partly oil and partly a species of tempera, in their easel pictures. A few of the moderns, as Gustave Moreau (q.v.), have combined this method with water-color, or other processes. It is remarkable that the very earliest oil paintings, those by the Van Eycks and their Flemish contemporaries, are among the most perfectly preserved of any that have come down to us. Several attempts to discover a satisfactory substitute for oil have been made in modern times, as, the water-glass (stereochromy) invented by the German chemist Von Fuchs, and practised by Kaulbach and his school and by the English painter MacIse, used for mural paintings; the mixture of copal, wax, resin and oil by Lord Leighton and some of his compatriots in mural work, and, the latest, the "solid oil colors" of Jean François Raffaelli, the Parisian painter, for easel pictures. For the preference displayed by modern artists for this medium there are several reasons — general convenience and ease of handling, and certain properties in the oil medium which seem to enable the painter better to represent — or, at least, suggest — the material aspects of Nature and of both animate and inanimate objects, real or imaginary. The materials and processes of tempera, fresco (q.v.), water-color (q.v.), and pastel (q.v.), all possess various disadvantages, both material and artistic, for general use. See MURAL PAINTING; PAINTING, TECHNIQUE OF.

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WILLIAM WALTON,
Author of 'Chefs d'Oeuvre; Exposition Universelle 1889.'

OIL-PALM. See PALM-OIL.

OIL RIVERS, rivers of the Niger Delta, chief among which are Benin, Brass, New Calabar, Bonny, Opobo, Kwo-Ibo and Old Calabar, in the Niger Coast Protectorate, formerly known as the Oil Rivers Protectorate. The rivers are named from the oil palm district through which they flow and are navigable to steamers of light draught.

OIL SHALE. In various parts of the world there are shales containing organic matter in greater or less proportion and which on heating in suitable retorts yield crude petroleum. Such shales have been utilized to some

extent in this way and the original kerosene or "coal oil" was obtained many years ago by distilling coaly shales. Vast deposits of oil shales occur in the United States, notably in a wide area in northeastern Utah and northwestern Colorado, which some time will be used as a source of gasoline, kerosene and other petroleum derivatives. Much of the shale will yield a barrel of distillate or crude oil to a ton of shale. The highly carbonaceous shale Torbanite of Scotland and certain shales in New South Wales yield twice this amount. According to Baskerville there were 55 shale oil companies in the United States in 1860 and although the output was small there was great promise of increase when the discovery of petroleum paralyzed the industry.

For many years shales have been worked extensively for oil in the West and Midlothian districts in Scotland. In 1915 six companies were engaged in the industry. The beds are mostly from one to eight feet thick, and while the material varies considerably in composition the shales yield from 20 to 40 gallons of oil and 30 to 60 pounds of ammonia sulphate to the ton. The shale is quarried or mined like coal, crushed and distilled in huge retorts, when it gives off crude oil, ammonia and fuel gas. The crude oil can be worked up into many products. Very little oil is contained in the shale, most of the organic material being bituminized vegetable matter which the heat converts into oil and the other products. Ordinary oil shale consists of about 60 per cent of ash or 10 times as much as ordinary coal. Its specific gravity averages 1.6 or much higher than coal, and the richer shales are lighter than the lean material. Ordinarily the shale yielding the most oil yields less ammonia, but the ratio of products depends somewhat upon conditions of distillation. Good shale is distinguished from common more or less carbonaceous shale by its brown streak, toughness and not crumbling on exposure to the weather. It consists of thin layers, but the layers are not readily separable and it is somewhat flexible as well as tough. When cut with a sharp knife the edges of the layers curl up as they are severed.

The amount of shale mined annually in Scotland averages nearly 3,000,000 tons, which produce about 65,000,000 gallons of crude oil, or more than 20 gallons to the ton. This oil yields about 3,000,000 gallons of naphtha, 18,000,000 gallons of burning oils, 40,000 gallons of lubricating oils, 25,000 tons of paraffin and 50,000 tons of ammonia salts. The cost of mining and distillation is stated to average about \$1.85 a ton, or nine cents a gallon, for the crude oil. The gas given off is sufficient to furnish the heat for the distilling process. It has been estimated that a plant with capacity of 700 to 800 tons daily would cost about \$500,000 in Scotland.

The oil distilled from shale at Broxburn yielded the following products on redistillation:

Naphtha.....	sp. gr. .740	1.36 per cent.
Kerosene.....	.810	31.60 "
".....	.840	4.86 "
Lubricating oil.....	.865	10.30 "
".....	.885	10.08 "
Paraffin.....		10.52 "
		68.72 "
Loss in refining.....		31.28 "

Large deposits of oil shales occur in New Brunswick. Working tests of these shales made in Scotland showed yields of from 37 to 45 barrels of oil and 58 to 100 pounds of ammonium sulphate to the ton. Oil shale from Castillon, Spain, is reported to yield 13½ gallons of crude oil to the ton, and shales from Asia Minor 30 to 40 gallons. Extensive deposits are reported in Brazil, New Zealand and South Africa.

In the Uinta Basin in northeastern Utah and northwestern Colorado there are extensive deposits of oil shale in the Green River formation of early Tertiary age. The shale is in several beds, some of them four to 10 feet thick, and so extensively exposed that vast amounts are easily mined. The richer shale is black or brownish. It has been estimated (by Winchester) that in the Utah part of the basin there is enough shale to produce 42,800,000,000 barrels of crude oil and 500,000,000 tons of ammonium sulphate. In Colorado there is sufficient shale in beds three feet or more thick and richer than the Scottish shale which will yield about 20,000,000,000 barrels of crude oil and 300,000,000 tons of ammonium sulphate. These deposits have the great advantage of being at or near the surface so that they can be worked very cheaply. Many field tests made by distilling the Utah and Colorado shales gave yields that varied greatly, but more than half the samples yielded from 25 to 30 gallons of crude oil and more than five pounds of ammonium sulphate. The specific gravity varied from .859 to .933 with an average of .897. Fractionation of the distillate gave gasoline (to 150° C.) seven to 12 per cent; kerosene (150-300° C.), 28.5 to 49 per cent; paraffin, 1.63 to 9.21 per cent, and asphalt, 0.47 to 4.10 per cent; with some sulphur and nitrogen.

A large area of the Uinta oil shale district has been set aside as an oil reserve for the Navy Department.

More than a dozen large companies have been organized to win oil from these shales and are now making experiments to determine the most efficient and economical way of doing so. Aerial tramways are being built to bring the shale from mines to be opened high on the sides of the mountains down to retorts or distillation plants to be built in the valleys near water and near lines of transportation.

Chemists are finding that a great many useful things can be made from the oil shales—such as dyes, explosives, paints, fertilizers and substitutes for rubber, as well as gasoline, kerosene, paraffin and flotation oil—but the industry is not yet far enough advanced to enable anyone to tell which of these products or how many of them can be manufactured at a profit. The industry must eventually succeed, but its success may depend largely on the profits derived from the sale of the by-products.

Oil shales appear to owe their peculiar properties to partly bituminized vegetable debris originally deposited with the fine silt of the shale. Most of the oil is developed by the destructive distillation, although a small amount of petroleum exists in the rock and may be extracted by ether, carbon bisulphide and other solvents. Thin sections made by the late C. A. Davis revealed an admixture of a number of more or less decomposed plant fragments, algae, fungi, spores, pollen and bacteria in a

jelly-like mass intermixed with very fine particles of silt.

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OIL SHARK, SOUP-FIN SHARK, a shark (*Galeorhinus zyopterus*) of the southern Pacific Coast, allied to the topes, grayish, and often six feet in length. Its liver yields a large quantity of valuable oil, and its fins are highly prized by the Chinese as a material for soup; hence its popular name. From the fins, when dried, a fine white gelatin is obtained. The oil shark is generally caught during July and August when it enters quiet bays, river mouths and protected places along shore to deposit its young.

OIL-STONE, a slab of fine-grained abrasive stone, used for imparting a keen edge to tools. It is so called because oil is used for lubricating its rubbing surface. The most extensively used oil-stones in the United States come from Arkansas and Indiana. Formerly there were large importations of oil-stones from Germany. The Kansas stones, which are of white siliceous rock of a very fine texture, are known as Washita or Arkansas stones, while the Indiana stones, which are also very fine grained, are marked under the names of Hindostan or Orange stones. Oil-stones are also made artificially, and of these one of the best is made from powdered corborundum.

OIL WELLS. See PETROLEUM.

OILED ROADBEDS. See OIL; PETROLEUM.

OISE, wāz, (1) a river of France, which rises near Selogne on the frontier, in the forest of Thierache, among the Ardennes, Hainaut, Belgium, flows southwest across the departments of Aisne-et-Oise, and joins the Seine about six miles below Pontoise in the department of Seine-et-Oise. (2) A northern department of France named after the river. The greater part of the surface, which is generally more or less level, is in normal times extensively cultivated. The department of the Oise

lies on both sides of the river of the same name, north of the departments of Seine-et-Oise and Seine-et-Marne. Before the devastations of the European War it produced extensively cereals, beets, sugar, potatoes, fine grapes and other fruits and cattle. It is also a well-developed industrial region, manufacturing iron, paper, chemicals, pottery and textiles. Area, 2,272 square miles; pop. about 423,000. Capital, Beauvais.

OJÉDA, ō-hā'dā, Alonzo de, Spanish cavalier and explorer: b. Cuenca, about 1468; d. Santo Domingo, 1515. He sailed with Columbus on his second voyage in 1493 and thereafter identified himself intimately with the exploration and occupation of the New World. In 1495 he performed a feat of great boldness in the capture of the cacique Caonabo. In 1499, with Juan de la Cosa, former pilot of Columbus, and accompanied also by Amerigo Vespucci, he explored the northern coast of South America from a point probably on the north of the present Brazil westward to the Gulf of Venezuela. On a charge of trespassing, during a second voyage in 1502, upon territory belonging to Portugal, he was arraigned, after his return, and punished by censure and fine. After being imprisoned for debt in Spain, he sailed for the third time for South America in 1505 and explored to the Gulf of Darien. In November 1509, with over 300 men, he made an abortive attempt to capture Nueva Andalusia, between the Gulf of Darien and the Gulf of Venezuela, of which territory he had been appointed governor. Ojéda next established a colony at San Sebastian, but ran short of provisions and, sailing for Hispaniola in quest of reinforcements and supplies, was shipwrecked on the coast of Cuba, and died in poverty and wretchedness at Santo Domingo.

OJÉDA, Emilio de, Spanish diplomat. After holding several minor diplomatic posts he became first secretary of the Spanish embassy at London in 1880, was chargé d'affaires in Bolivia and in 1883 Minister Resident in Montevideo, in 1884 at Lima and at Athens in 1888. In 1890 he was made Minister Plenipotentiary to Peru, to Morocco in 1894 and secretary of the Spanish commission to arrange a treaty of peace with the United States in 1898. He succeeded the Duke de Arcos as Minister to the United States in June 1902.

OJETTI, ō-yāt'tē, Ugo, Italian author: b. 1871. He attained a considerable reputation as an art critic and lecturer, was an extensive contributor to *Corriere della Sera*, Milan, and in 1915 became editor-in-chief of the committee in charge of publishing a series of works bearing on Italy's part in the war, 'Problemi italiani.' Author of 'Senza Dis' (1894); 'Il Vecchio' (1898); 'L'America vittoriosa,' travels (1899); 'L'ailet,' comedy (1908); 'I capricci del conte Ottavio' (2 vols., 1908-09); 'Ritratti d'artisti italiani' (1911); 'L'Amore e suo figlio,' novel (1913); 'L'Italia e la civiltà tedesca' (1915); 'I monumenti italiani e la guerra' (1917), etc.

OJIBWAY, the largest and most important of the Algonquin tribes. See CHIPPEWA.

OJIER, ō'yē-ā, THE DANE, Frankish Duke of Autchar, romantic hero of Charlemagne's court and legendary hero of the Danes. Ac-

cording to the old chronicles he safeguarded the journey of Gerberga, widow of Charlemagne's brother Caroloman, and her children to the court of the king of Lombardy in 771 or 772 and after various military exploits entered the cloister of Saint Faro at Meaux, where he died. Other versions place him as the son of Geoffrey, King of Denmark, and make him hostage for his father at the court of Charlemagne, where he gained high favor with the emperor through his military prowess. His son being slain by Charlemagne's son, Charlot, Ojier killed the queen's nephew and the emperor's life was saved from his fury only through the prompt action of the knights, who, however, permitted him to escape to his Normandy stronghold, Castelfort. Here he withstood a seven years' siege but was eventually captured and imprisoned at Rheims. He obtained his release through the necessity for securing a champion to meet the giant Saracen chief, Bréhus, whose forces were overrunning France. He defeated the giant, married an English princess and, again in high favor with Charlemagne, was rewarded with the fiefs of Brabant and Hainaut. A later version adds a touch of magic in which he is under the protection of the fairies. Morgan la Fay, I's principal fairy guardian, rescues him at various critical times, and he is supposed to have dwelt 200 years, in her castle of Avalon. There are Italian and German versions of the hero's exploits, and in Danish legend he became Holger Danske a great champion of the Danes and who is supposed to sleep in a mountain ready to waken and come to the defense of Denmark in time of need. Consult Barrois, J. B., 'La Chevalerie Ojier de Danemarche' (2 vols., 1842); Pio, L., 'Sagnet om Holger Danske' (1870).

OJINAGA, ō'hē-nā'gā, or **VILLA DE OJINAGA** (formerly **PRESIDIO DEL NORTE**), Mexico, town in Chihuahua, at the confluence of the Rio Grande and the Rio Conchas, nearly opposite but slightly below Presidio, Texas. It has an important export and import trade with the United States. It was the scene of military activities in 1912 and in 1914 in the Mexican revolution.

O.K., a term signifying all right, correct, the origin of which is generally ascribed to Andrew Jackson, seventh President of the United States. The story originated with Seba Smith (Major Downing), the humorist, that Jackson used O. K. to endorse official papers as correct, or as Smith put it, "Orl Korrekt," and the term became a by-word in the Presidential campaign of 1832, being used by Jackson's opponents as an illustration of his illiteracy. According to Parton Jackson endorsed legal documents with O. R. (order recorded); and this may have occasioned the jest about "O. K." The term has also been ascribed to an Indian chief, "Old Keokuk," who was accustomed to sign documents with the initials O. K. It is now commonly used to signify worth, merit or excellence. The term O. K. has also been ascribed to Josh Billings, John Jacob Astor and several other characters; but it is probable that it is older than any of these and that it had its origin in Aux Cayes from which the best tobacco and rum were imported in Colonial days. The port was frequently

written O. K., the literal pronunciation or sound of the name itself.

OKA, ō'ka ("gold fish"), Canada, a Catholic mission settlement of Iroquois and Algonquin Indians, on the Lake of Two Mountains, near Montreal. It was settled by some 900 Iroquois Catholic converts from Sault au Recollet, in 1720, who were shortly afterward joined by Algonquins from the Isle aux Tourtes. The Mohawk and Algonquin languages are spoken by the respective bodies, who inhabit different sections of the village. A branch settlement exists at Watha (Gilson), Ontario, since 1881. The total number at Gilson and Oka is about 600.

OKA, ō-kā', two rivers of European and Asiatic Russia. (1) Oka, in Europe, rises in the government of Orel, flows north till near the town of Kaluga, then east past that town, east-northeast across Riazan and the east of Vladimir, and after a course of about 600 miles, navigable from Orel, joins the Volga at Nizhni-Novgorod after a course of nearly about 1,000 miles of country, for the most part fertile and populous. The Oka is navigable for ordinary river steamers for 850 miles and for smaller boats for 900 miles. Consequently there is much traffic on it. (2) Oka, Asiatic Russia, rises in the mountains between China and the government of Irkutsk, flows north-northeast for 400 miles, and joins the Angara at Bratsk.

OKAPI, the native African name of a large animal (*Ocapia johnstoni*) of the giraffe family which inhabits the forests of the upper Kongo Valley. It had been vaguely known previously, but the first specimen and description given to science were obtained by Sir Harry Johnston in 1899, in the Semliki forest, near the Uganda border. The animal has many of the features of a giraffe, such as drooping hindquarters, a short tufted tail and a skull of similar shape, with vestiges of three horn pedicels or cores, but, of course, no external horns. The neck is short, thick and maneless. The head is long and narrow, the ears large, the eyes far from ears, and the lips prolonged and mobile, suited to grasping the leaves of trees, upon which they are said by the negroes to feed. The size is that of a medium antelope, about four and a half feet tall at the withers. The colors are remarkable. The head, neck and body generally, as described by Johnston, range in color from warm purplish red to sepia and jet-black; but the cheeks are yellowish-white; the legs are cream-white on their lower part and above broken into rings or stripes of alternate black and white extending on the hams up to the root of the tail. A single stuffed and mounted skin is deposited in the British Museum.

These animals seem uncommon, and dwell in almost inaccessible forests, where they are said to go about alone or in pairs. It is probable that they may be the lingering survivors of a species now nearly extinct which formerly ranged far more widely, especially to the northward, since Egyptologists at once recognized this animal as the prototype of the figure of the ancient Egyptian deity Set, whose curious head has heretofore eluded identification. For the discovery of the okapi, consult 'Transactions' and 'Proceedings' of the London Zoological Society (1901, 1902); and for its identification

with the figure of Set, consult 'Scientific American Supplement' (28 March 1903), and the writings of Wiedemann; Johnston, Sir H. H., 'Okapi' (Smithsonian Institute Report, 1901, published Washington, 1902).

OKAYAMA, ō-kā-yā-mā, Japan, a town and capital of a prefecture of the same name in the province of Bizen, on the island of Hondo, near the shore of the Inland Sea separating it from Shikoku, 89 miles to the west of Kobé.

OKEECHOBEE, ō-kē-chō'bē ('Big Water'), a lake in Florida, in the southern part of the State. It is about 40 miles long and 28 miles wide; depth from a few inches to 13 feet. It is on the northern border of the Everglades (q.v.), and it seems to be changing slowly, as no doubt the Everglades have changed. Vegetation is increasing within the lake and the marshy shores are encroaching upon the lake boundaries. Caloosahatchee River, by means of canals, has been made an outlet, but considerable of the water spreads over the Everglades. The canals mentioned have reduced the area of the lake and drained portions of the Everglades so as to make them suitable for raising certain crops. Okeechobee is the largest lake in the Southern States.

O'KEEFFE, ō-kēf', John, Irish actor and dramatist: b. Dublin, 24 June 1747; d. Southampton, England, 4 Feb. 1833. He was an actor in Henry Mossop's stock company for 12 years, but his sight began to fail when he was 23 and he turned to the writing of comedies, comic opera and farces. His farce 'Tony Lumpkin in Town' (1773) was produced in Dublin, and it later enjoyed a considerable success at the Haymarket Theatre in London (1778). Despite failing vision he became a prolific writer of plays and verse, most of which was dictated to a secretary; but the approaching blindness, which overtook him in 1797, had no dampening effect upon the gaiety and humor of his work. Many of the songs from his operas remained popular for years and some, like 'I am a Friar of Orders Gray' and 'Amo Amas I Love a Lassie,' are still sung. He wrote some 68 plays, of which about 50 were produced and many were highly successful. Hazlitt terming him "The English Molière." He was in straightened circumstances for a time after becoming totally blind, but a benefit at Covent Garden, under the patronage of the Prince of Wales, netted him a considerable sum in 1800, and he was granted an annuity of 20 guineas from Covent Garden Theatre. In 1820 he was granted a pension from the privy purse amounting to 100 guineas annually. Of his many plays, 'Wild Oats' (1791) and 'The Castle of Andalusia' (1782) alone have survived to be given modern stage presentation. Among the most successful besides these were 'The Agreeable Surprise' (1781); 'Peeking Tom of Coventry' (1784); 'The Highland Reel' (1778); 'Tony Lumpkin's Rambles' (1792); 'The Eleventh of June' (1798). An edition of his plays was produced (4 vols., 1798) but did not include many of his greatest successes as the copyrights had previously been sold. He was also author of 'Recollections' (1826), later edited by Stoddard, R. H., in 'Personal Reminiscences by

O'Keefe, Kelly and Taylor' (New York 1875); and two volumes of verse, 'Oatlands, or the Transfer of the Laurel' (1795); 'A Father's Legacy to His Daughter' (1834).

OKEFINOKE (ō-kē-fi-nō'kē) **SWAMP** ('trembling earth') in the southeastern part of Georgia, occupies nearly all of Charlton County, and parts of Ware and Clinch Counties, extending into Baker County, Florida. The area is about 660 square miles. In the eastern part is a lake containing several small floating islands, the marshy shores of which show the same formation as Okeechobee (q.v.) Lake in Florida. In some parts of the swamp, which is from 40 to 70 miles from the coast, are large trees and a dense low vegetation. In places where the sandy soil rises above the surface of the swamp water there are pine forests, in some places open, in others very dense. In the thicker forests are black gum, cypress and other swamp trees. These are interspersed with open grassy spaces locally known as "prairies" and little lakes. Alligators and moccasins inhabit this swamp in large numbers.

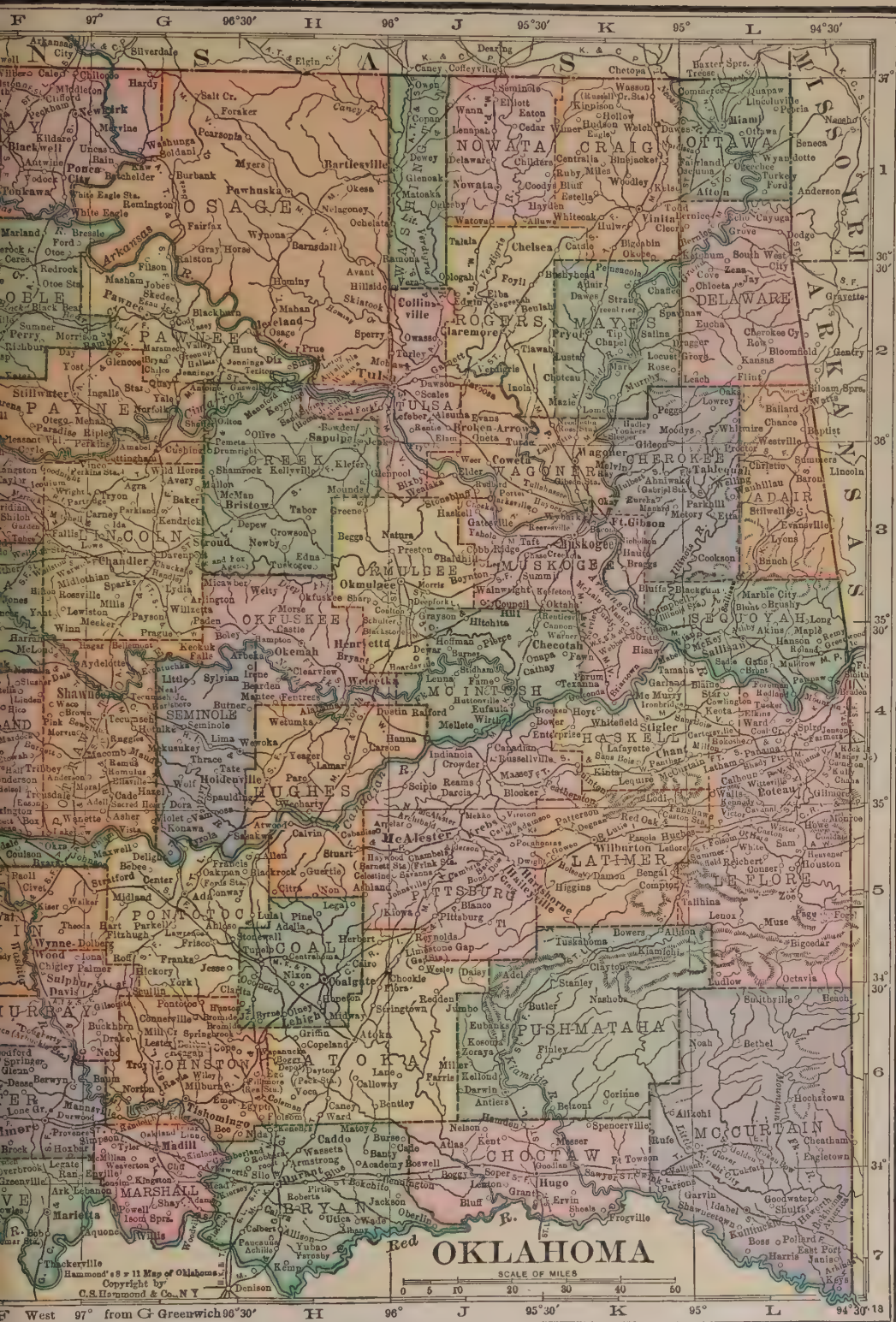
OKEGHEM, ō'kē-gēm, or **OKEHEM**, **OKENGHAM**, **OCKEGHEM**, **OCKENHEIM**, Joannes, Flemish composer: b. probably at Termonde, East Flanders, early in the 15th century; d. Tours, probably 1513. He was a singer at the Antwerp Cathedral and is supposed to have received his education there. He entered the service of the King of France in 1452 and became head of the chapel of Charles VII. He remained in the service of the royal house through the reigns of Louis XI and Charles VIII but retired to Tours on the accession of Louis XII in 1498. He was regarded as the head of the second and greatest Netherlandish school of music, was credited with the invention of canonic and contrapuntal art, and with that of counterpoint and canon. Among his pupils were Josquin Després, De la Rue and others through whom his art was carried into the foremost musical circles of the world. Most of his compositions are thought to have been destroyed during military invasions but enough remain to evidence the great progress made during the 40 years of his leadership. There remain six masses, an Ave, six motets, a number of songs and other compositions.

O'KELLY, Charles, Irish historian: b. Screen Castle, Galway, 1621; d. 1695. He was educated at the Irish College in Saint Omer, France, and upon the outbreak of the Civil War in England in 1642, took his stand with the king, but in consequence of the outcome of the war in Cromwell's favor was forced to leave the country and, with about 2,000 compatriots and followers, continued to render service to the royal house under Charles II in France and Spain, subsequently serving as colonel of cavalry. Upon returning to England after the Restoration, O'Kelly attended the Dublin Parliament of James II in 1689 as a representative of Roscommon. In 1691 he was entrusted with the defense of the island of Bofin against the Orange troops, but was compelled to capitulate and after the Treaty of Limerick retired to private life. He is perhaps better known as the author of the history of the Revolution, 'Macariae' (1692), of which three editions have appeared: (1) that of the Camden Society in

OKLAHOMA

Achille, (H7).....	500	Calera, (H7).....	575	Douglas, (E2).....	195	Harrah, (F4).....	365
Ada, (G5).....	8,012	Calhoun, (L4).....	350	Douthat, (L1).....	900	Hartshorne, (J5)...	3,480
Adair, (K2).....	369	Calvin, (H5).....	700	Dover, (E3).....	375	Haskell, (J3).....	2,196
Addington, (E6)...	368	Camargo, (B2).....	320	Dow, (J5).....	500	Hastings, (D6).....	629
Afton, (L1).....	1,518	Cameron, (L4).....	203	Drummond, (E2)...	292	Haworth, (L7).....	400
Agra, (G3).....	272	Caney, (H6).....	432	Drumwright, (G3)...	6,460	Hazel, (G4).....	125
Albion, (K5).....	301	Canton, (C2).....	582	Duncan, (D6).....	3,463	Headrick, (B5)...	280
Alderson, (J5).....	855	Canute, (B4).....	410	Durant, (H6).....	7,340	Healdton, (E6)...	2,157
Alex, (E5).....	478	Capron, (C1).....	184	Durwood, (F6).....	230	Heavener, (L5)...	1,850
Alfalfa, (C4).....	125	Cardin, (L1).....	2,640	Dustin, (H4).....	713	Helena, (D1).....	615
Aline, (C2).....	358	Carmen, (D1).....	792	Eagle City, (C3)...	160	Hennessey, (E2)...	1,310
Allen, (H5).....	1,377	Carnegie, (C4)...	1,150	Earlsboro, (G4)...	317	Henryetta, (H4)...	5,889
Alluwe, (K1).....	125	Carney, (G3).....	367	East Duke, (A5)...	502	Hess, (B6).....	200
Altus, (B5).....	4,522	Carter, (B4).....	381	Edmond, (E3).....	2,452	Hester, (A5).....	80
Alva, (C1).....	3,913	Cashion, (E3)...	296	Eldorado, (A6)...	967	Hickory, (G5)...	359
Amber, (E3).....	310	Castle, (H3).....	381	Elgin, (D5).....	181	Hill, (L4).....	200
Ames, (D2).....	278	Catoosa, (J2).....	363	Elk City, (B4)...	2,814	Hillsdale, (E1)...	209
Amorita, (D1).....	196	Cement, (D5).....	1,098	Elmore City, (F5)...	337	Hinton, (D4).....	744
Anadarko, (D4)...	3,116	Centrahoma, (H5)	600	El Reno, (D3).....	7,737	Hitchcock, (D3)...	281
Antlers, (J6).....	1,842	Centralia, (K1)...	300	Enid, (E2).....	16,576	Hitchita, (J4)...	264
Apache, (D5).....	919	Cestos, (B2).....	250	Enterprise, (K4)...	507	Hobart, (B4).....	2,936
Arapaho, (C3)...	326	Chandler, (G3)...	2,226	Erick, (A4).....	971	Hochatown, (L6)...	200
Arcadia, (F3).....	310	Chant, (K4).....	279	Erin Springs, (E5)	210	Hockerville, (L1)...	520
Armore, (F6).....	14,181	Chattanooga, (C6)	507	Eufaula, (J4).....	2,286	Hoffman, (J4)...	365
Arnett, (A2).....	404	Checotah, (K4)...	2,390	Fairfax, (G1).....	1,342	Holdenville, (H4)...	2,932
Asher, (G5).....	370	Chelsea, (J1).....	1,692	Fairland, (L1)...	818	Hollis, (A5).....	1,683
Ashland, (H5)...	175	Cherokee, (D1)...	2,017	Fairmont, (E2)...	166	Hollister, (C6)...	240
Atoka, (H6).....	2,038	Cheyenne, (A3)...	400	Fairview, (C2)...	1,751	Homestead, (D2)...	300
Atwood, (H5).....	250	Chickasha, (E4)...	10,179	Fallis, (F3).....	239	Hominy, (H2)...	2,875
Avant, (H2).....	1,071	Choctaw, (F4)...	199	Fargo, (A2).....	258	Hooker, (B7).....	946
Avard, (C1).....	147	Choteau, (K2)...	541	Faxon, (C6).....	163	Howe, (L5).....	711
Avery, (G3).....	240	Claremore, (J2)...	3,435	Fitzhugh, (G5)...	175	Hoyt, (K7).....	200
Aylesworth, (G7)...	125	Clarita, (G6).....	232	Fletcher, (D5)...	482	Hugo, (K7).....	6,368
Banner, (F5).....	266	Clarksville, (J3)...	388	Foraker, (G1)...	394	Hulbert, (K3)...	300
Barnsdall, (H2)...	2,099	Cleo Springs, (D2)	377	Foran, (C7).....	582	Hulen, (D6).....	150
Bartlesville, (H1)...	14,417	Cleveland, (H2)...	2,717	Fort Cobb, (D4)...	546	Hunter, (E1).....	443
Beaver, (C7).....	926	Clinton, (C4)...	2,596	Fort Gibson, (K3)	1,353	Hydro, (C3).....	686
Bebee, (G5).....	200	Cloud Chief, (C4)...	175	Fort Sill, (D5)...	1,200	Idabel, (L7).....	3,067
Beggs, (H3).....	2,327	Coalgate, (H6)...	3,009	Fort Towson, (K6)	965	Indianola, (C5)...	195
Bennington, (J7)...	951	Coalton, (J3).....	280	Foss, (B4).....	348	Indianola, (J4)...	415
Bernice, (L1).....	198	Colbert, (H7).....	490	Foyil, (J2).....	109	Ingersoll, (D1)...	218
Berwyn, (F6).....	435	Coleman, (H6)...	200	Francis, (G5)...	911	Inola, (J2).....	498
Bessie, (B4).....	363	Collinsville, (J2)	3,801	Franklin, (F4)...	150	Isabella, (D2)...	120
Bethany, (E3).....	485	Colony, (C4).....	225	Frederick, (C6)...	3,822	Jefferson, (E1)...	322
Bigcabin, (K1)...	500	Comanche, (E6)...	1,427	Frisco, (G5).....	220	Jenks, (H3).....	1,508
Billings, (F1).....	846	Commerce, (L1)...	2,555	Gage, (A2).....	804	Jennings, (H2)...	910
Binger, (D4).....	482	Cooperton, (C5)...	105	Gans, (L4).....	295	Jet, (D1).....	370
Bison, (E2).....	375	Copan, (J1).....	430	Garber, (E2).....	1,446	Jones, (F3).....	214
Bixby, (J3).....	1,249	Cordell, (C4)...	1,855	Garvin, (L7)...	292	Junction City, (D6)	120
Blackburn, (G2)...	257	Cornish, (E6).....	261	Gate, (A1).....	309	Kanama, (K4)...	200
Blackwell, (F1)...	7,174	Council Hill, (J3)...	206	Geary, (D3).....	1,167	Kansas, (L2)...	154
Blair, (B5).....	437	Covington, (E2)...	1,283	Geronimo, (D6)...	161	Kaw, (G1).....	627
Blanchard, (E4)...	842	Coweta, (J3).....	1,318	Gerty, (H5).....	251	Kellyville, (H3)...	480
Blocker, (J4).....	131	Cowlington, (L4)...	344	Glencoe, (C2)...	354	Kemp, (H7).....	396
Bluejacket, (K1)...	442	Coyle, (F3).....	408	Glenpool, (J3)...	428	Kendrick, (G3)...	255
Boise City, (A7)...	210	Crescent, (E3)...	878	Goltry, (D1)...	287	Kenefic, (H6)...	413
Bokchito, (H7)...	627	Cross, (F1).....	372	Goodwell, (B7)...	290	Keokuk Falls, (G4)	250
Bokoshe, (L4)...	869	Crowder, (J4)...	581	Gore, (K3).....	329	Keota, (L4).....	494
Boley, (G4).....	1,154	Cumberland, (G6)	200	Gotebo, (C4)...	737	Ketchum, (K1)...	280
Boswell, (J6).....	1,212	Cushing, (G3)...	6,326	Gould, (A5).....	228	Keystone, (H2)...	300
Boynton, (J3).....	1,204	Custer, (C3).....	671	Gracemont, (D4)...	266	Kiefer, (H3)...	1,663
Braggs, (K3).....	430	Cyril, (D5).....	386	Grainola, (G1)...	320	Kildare, (F1)...	146
Braman, (F1).....	396	Dacoma, (C1)...	265	Grandfield, (C6)...	1,990	Kingfisher, (E3)...	2,447
Breckinridge, (E2)	132	Dale, (F4).....	250	Granite, (B5)...	395	Kingston, (G6)...	767
Bridgeport, (D3)...	294	Davenport, (G3)...	440	Grant, (J7).....	312	Kinta, (K4).....	393
Brinkman, (B4)...	239	Davidson, (B6)...	461	Grayson, (J3)...	400	Kiowa, (J5).....	1,287
Bristow, (H3)...	3,460	Davis, (F5).....	1,609	Greenfield, (D3)...	325	Konawa, (G5)...	896
Britton, (E3).....	1,070	Dawson, (J2)...	300	Grove, (L1).....	869	Krebs, (J5).....	2,078
Broken Arrow, (J2)	2,086	Deer Creek, (E1)	218	Guertie, (H5)...	305	Kremlin, (E1)...	169
Broken Bow, (L6)...	1,983	Delaware, (J1)...	804	Guthrie, (F7)...	11,757	Kusa, (J4).....	1,069
Bromide, (G6).....	523	Depew, (H3).....	800	Guymon, (B7)...	1,507	Lahoma, (D2)...	262
Buffalo, (A1).....	479	Devol, (C6).....	1,936	Haileyville, (J5)...	2,067	Lakemp, (B7)...	400
Burlington, (D1)...	169	Dewar, (J4).....	1,558	Hallett, (G2)...	279	Lamar, (H4).....	38
Butler, (B3).....	332	Dewey, (J1).....	2,302	Hammon, (B3)...	440	Lambert, (C1)...	130
Byars, (F5).....	627	Dill, (B4).....	345	Hanna, (J4).....	460	Lamont, (E1)...	586
Byron, (D1).....	249	Dilworth, (F1)...	395	Hanson, (L4)...	230	Langston, (F3)...	259
Cache, (C5).....	382	Dougherty, (F6)...	405	Hardy, (G1).....	78	Laverne, (A1)...	476
Caddo, (H6).....	1,421						





OKLAHOMA - Cont'd.

Lawton, (D5).....	8,930	New Marshall, (E2)	434	Ringwood, (D2) ..	225	Texanna, (K4)....	180
Lebanon, (G7)....	200	New Wilson, (F6)...	900	Ripley, (G2).....	406	Texhoma, (B7) ...	687
Leedy, (B3).....	468	Ninnekah, (D5)...	230	Rocky, (C4).....	322	Texola, (A4).....	298
Leflore, (K5).....	300	Noble, (F4).....	497	Rolf, (G5).....	1,138	Thackerville, (F7)	210
Lehigh, (H6).....	1,898	Norman, (F4).....	5,004	Roland, (L4).....	271	Thomas, (C3)....	1,223
Lenapah, (J1)....	434	North Enid, (E2)...	95	Roll, (A3).....	125	Tipton, (B6).....	727
Leon, (F7).....	216	North Miami, (L1)	483	Romulus, (G4)...	200	Tishomingo, (G6)	1,871
Lexington, (F4)...	950	Nowata, (J1).....	4,435	Roosevelt, (C5)...	362	Tonkawa, (F1)...	1,448
Lima, (G5).....	146	Oakland, (G6).....	420	Rosedale, (F5)...	260	Tribbey, (F4)....	350
Lincolnton, (L1)	300	Oakwood, (C3)...	224	Rosston, (A1)...	181	Trousdale, (F4)...	125
Lindsay, (E5)....	1,543	Oberlin, (J7).....	200	Rush Springs, (E5)	768	Tryon, (G3).....	225
Lockridge, (E3)...	210	Ochelata, (H1)....	419	Ryan, (E6).....	1,379	Tullahassee, (J3)	189
Loco, (E6).....	350	Oil City, (F6)....	220	St. Louis, (L1)...	900	Tulsa, (H2).....	72,075
Locustgrove, (K2)	587	Oilton, (G2).....	2,231	Salina, (K2).....	411	Tupelo, (H5)....	387
Lone Grove, (F6)	286	Okarche, (E3)....	449	Sallisaw, (L4)...	2,255	Tushka, (H6)....	248
Lone Wolf, (B5)...	657	O'Keene, (D2)....	1,084	Saltfork, (E1)...	200	Tussy, (E6).....	130
Long, (L3).....	170	Okemah, (H4)....	2,162	Sand Springs, (H2)	4,076	Tuttle, (E4).....	590
Longdale, (D2)...	308	OKLAHOMA CITY:		Sapulpa, (H2)....	11,634	Tyrone, (B3)....	225
Lookeba, (C4)....	240	(E4).....	91,295	Sasakwa, (H5)...	355	Union, (E4)....	220
Loveland, (D6)...	191	Okmulgee, (H3)...	17,430	Sayre, (A4).....	1,703	Valliant, (K6)...	809
Lovell, (E2).....	220	Oktaha, (K3).....	335	Scipio, (J4).....	300	Vannoss, (G5)...	490
Lucien, (F2).....	375	Olive, (H2).....	200	Schulter, (J4)...	200	Vera, (J2).....	209
Lugert, (B5).....	190	Olustee, (B5)....	665	Scullin, (G5)....	62	Verden, (D4)....	496
Luther, (F3).....	601	Omaha, (D3)....	200	Seiling, (C2)....	323	Vian, (L4).....	1,176
McAlester, (J5)...	12,095	Oologah, (J7)....	277	Seminole, (G4)...	854	Vin, (B2).....	425
McCurtain, (K4)...	1,052	Optima, (B2)....	190	Sentinel, (B4)...	723	Vinco, (G3)....	120
McCloud, (F4)...	1,661	Orlando, (F2)...	161	Seward, (F3)....	118	Vinita, (K1)....	5,010
McMann, (E6)....	200	Orr, (E6).....	254	Shamrock, (G3)...	1,409	Vinson, (A5)...	230
McMillan, (G6)...	150	Osage, (H2).....	757	Shattuck, (A2)...	1,365	Wade, (H7)....	190
Macomb, (G4)....	281	Owasso, (J2)....	379	Shawnee, (G4)	15,348	Wagoner, (K3)...	3,436
Madill, (G6)....	2,717	Paden, (G4)....	600	Short, (L3).....	200	Wainwright, (J3)	254
Manchester, (E1)	237	Panama, (H4)...	568	Silo, (H6).....	152	Wakita, (E1)....	338
Mangum, (B5)....	3,405	Paoli, (F5).....	363	Skedee, (G2)....	268	Walters, (D6)...	3,032
Manitou, (B6)...	335	Parkhill, (L3)...	180	Skiatook, (H2)...	1,653	Wanette, (G5)...	783
Mannford, (H2)...	550	Pauls Valley, (F5)	3,694	Snyder, (C5)....	1,197	Wann, (J1).....	404
Mannsville, (G6)...	639	Pawhuska, (H1)...	6,414	Sobol, (K6).....	450	Wapanucka, (H6)	1,038
Maple, (L4).....	150	Pawnee, (G2)....	2,418	Soper, (J6).....	538	Warwick, (F3)...	180
Maramec, (G2)...	287	Peggs, (K2).....	157	So. Coffeyville, (J1)	179	Warner, (K4)....	318
Marble City, (L3)	344	Peoria, (L1)....	166	Sparks, (G3)....	472	Washington, (E4)	336
Marietta, (F7)...	1,977	Perkins, (F3)....	608	Spaulding, (G4)...	200	Washunga, (G1)...	140
Markham, (G2)...	220	Perry, (F3).....	3,154	Spencer, (F4)....	240	Watonga, (D3)...	1,678
Marlow, (E5)....	2,276	Pershing, (H1)...	891	Sperry, (J2)....	487	Watova, (J1)....	220
Marshall, (E2)...	375	Phillips, (H6)...	972	Spiro, (L4).....	1,162	Watts, (L2)....	396
Martha, (B5)....	225	Picher, (L1)....	9,676	Springer, (F6)...	300	Waukomis, (E2)...	463
Maud, (G4).....	637	Piedmont, (E3)...	213	Stanley, (K5)....	200	Waurika, (E6)...	3,204
May, (A1).....	324	Pittsburg, (J5)...	892	Stanton, (E6)...	200	Wayne, (F5)....	429
Maysville, (F5)...	627	Pleasant Valley, (F2)	250	Sterling, (D5)...	265	Waynoka, (C1)...	1,500
Mead, (G7).....	250	Pocasset, (E4)...	400	Sterrett, (H7)...	703	Weatherford, (C3)	1,929
Medford, (E1)...	1,050	Ponca City, (F1)...	7,051	Stidham, (J4)...	62	Webbers Falls, (K4)	480
Meeker, (G3)....	513	Pondcreek, (E1)...	965	Stigler, (K4)....	1,797	Welch, (K1).....	696
Meno, (D2).....	92	Pontotoc, (G6)...	300	Stillwater, (F2)...	4,701	Wleetka, (H4)...	1,588
Meridian, (F3)...	201	Porter, (J3).....	597	Stillwell, (L3)...	1,155	Wellston, (F3)...	650
Merrick, (F3)....	150	Porum, (K4)....	533	Stonebluff, (J3)...	280	Welly, (H3)....	200
Miami, (L1)....	6,802	Poteau, (L4)....	2,679	Stonewall, (H5)...	622	West Tulsa, (J2)...	300
Midway, (H6)....	200	Prague, (G4)....	1,127	Strang, (K2)....	520	Westville, (L2)...	956
Midburn, (G6)...	496	Preston, (J3)....	400	Stratford, (G5)...	964	Wetumka, (H4)...	1,422
Mill Creek, (G6)...	620	Prue, (H2).....	164	Stringtown, (J6)	360	Wetoka, (H4)...	1,520
Millerton, (K7)...	200	Pryor, (K2).....	1,767	Strong City, (A3)	350	Wheatland, (E4)...	150
Milton, (L4)....	200	Purcell, (F5)....	2,938	Stroud, (G3)....	1,361	Whitefield, (K4)	250
Minco, (E4).....	606	Purdy, (E5)....	250	Stuart, (H5)....	300	Wilburton, (K5)...	2,226
Monroe, (L5)....	180	Putnam, (C3)....	230	Sugden, (E6)....	218	Wild Cat, (J4)...	298
Moore, (E4).....	254	Quapaw, (L1)...	1,394	Sulphur, (F5)...	3,667	Williams, (L4)...	320
Mooreland, (B2)...	592	Quinlan, (B2)...	310	Sumner, (F2)....	65	Willis, (G7)....	130
Morris, (J3)....	1,926	Quinton, (K4)....	1,557	Supply, (A1)....	231	Willow, (B4)....	286
Morrison, (F2)...	353	Ralston, (G1)....	703	Swink, (K7)....	169	Wilson, (F6)....	2,286
Mounds, (H3)....	1,078	Ramona, (J1)....	793	Taft, (J3).....	553	Wirt, (E6).....	900
Mountain Park, (C5)	334	Randlett, (D6)...	323	Tahlequah, (L3)	2,271	Wister, (L5)....	586
Mountainview, (C4)	917	Rankin, (A3)....	125	Talala, (J1)....	197	Witcher, (F3)...	275
Muldrow, (L4)....	693	Ravia, (G6).....	513	Talihina, (L5)...	690	Woodville, (G7)...	443
Mulhall, (F2)....	385	Redbird, (J3)....	336	Taloga, (C2)....	365	Woodward, (A2)...	3,849
Muskogee, (K3)...	30,277	Red Fork, (H2)...	844	Tanahqua, (K4)...	501	Wright City, (L6)	520
Mustang, (E4)....	170	Red Oak, (K5)....	593	Tangier, (A2)....	275	Wyandotte, (L1)...	274
Mutual, (B2)....	169	Redrock, (F2)...	329	Tar River, (L1)...	900	Wybark, (K3)....	200
Nardin, (F1)....	200	Red, (A5).....	190	Tatums, (F6)....	250	Wynnewood, (F5)	2,200
Nash, (L1).....	439	Renfrow, (E1)...	132	Tecumseh, (G4)...	1,429	Wynona, (H1)...	2,749
Navina, (E3)....	126	Rentiesville, (K4)	255	Temple, (D6)....	906	Yale, (G2).....	2,601
Nelagoney, (H1)...	450	Rhea, (B3).....	150	Terlton, (H2)....	410	Yeager, (H4)....	286
Newkirk, (F1)....	2,533	Ringling, (E6)...	1,039	Terral, (E7)....	506	Yukon, (E4)....	1,016

1842; (2) the annotated edition of 1850, prepared for the Irish Archaeological Society by J. C. O'Callaghan; and (3) that which appeared in 1894 as 'The Jacobite War in Ireland.'

O'KELLY, James, American Methodist Episcopal minister: b. Ireland, about 1757; d. in North Carolina, 1826. Emigrating to the United States in 1778 he became a Methodist preacher, traveling from place to place. When the Methodist Episcopal Church in the United States was organized (1784) he was one of the elders ordained, and later he held the position of presiding elder in the district of South Virginia. He was soon afterward found in opposition to his denomination regarding the life-tenure and powers of the bishops, and the General Conference of 1792 was followed by his withdrawal, which led to the first secession from that ecclesiastical body, several churches and ministers joining with O'Kelly to form the Republican Methodist Church. His determined fight against the Episcopacy, though it failed to dislodge the innovation of the bishopric, gave the practical ends for which he contended to the lower ranks of the Methodist ministry. By 1795 the defections from the Methodist Episcopal Church caused by O'Kelly's agitation reached almost 6,500. His Republican Methodist Church changed its name to "Christian Church" (q.v.). Consult Buckley, 'History of Methodism in the United States' (New York 1898).

OKEN, ǝ'kēn, or OKENFUSS, Lorenz, German naturalist: b. Bohlshach, Württemberg, 1 Aug. 1779; d. Zürich, 11 Aug. 1851. He studied natural history and medicine at the University of Würzburg. In 1802 he published 'Grundriss der Natur-Philosophie,' in which he reduced to a system the materials Fichte and Schelling had previously undertaken to arrange; in this he maintained that animal classes are simply a representation of the organs of sense and divided the animal kingdom accordingly into five classes. In 'Die Zeugung' (1805) he advanced the doctrine that all organic beings originate from and consist of vesicles or cells. He was professor of medicine at Jena in 1807 and of natural science in 1812; but he was forced to resign because of his attitude toward the government, 1819. In 1828 he became professor of science in the University of Munich and in 1833 he went to the University of Zürich where he remained until his death. His inaugural discourse at the University of Jena 'Ueber die Bedeutung der Schädelknochen' or 'On the Signification of the Bones of the Skull,' which was published later, became popular. In 1808 he announced the propositions that organism is a combination of the activities of the universe, within a single individual body and that world and organism are one in kind; that light is only a polar tension of the ether evoked by a central body in antagonism with the planets and heat only the motion of this ether. His 'Lehrbuch der Natur-Philosophie' appeared in 1809-11. In 1816 he began the publication of his periodical, the *Isis*, devoted principally to natural science. In 1821 he originated the annual general meetings of German naturalists in different cities, the first of which was held at Leipzig in 1822. The British and American associations for the advancement of science have been since then instituted more or less after the German model.

His other published works include 'Lehrbuch der Naturgeschichte' (1813-27), and 'Allgemeine Naturgeschichte' (1833-42).

OKINAGAN, ǝ'kē-nā'gan, North American Indian tribe of the Salishan family, formerly occupying the territory to the west of Okanogan River, Wash., from Old Fort Okanogan to the Canadian border and in British Columbia, the country around Okanogan Lake. Subsequently they drove the Athapaskan tribe from the Similkameen Valley and occupied that territory. There are reservations in which 527 of them lived at Colville, Wash., in 1906, and 824 lived at the Kamloops-Okanagan agency, British Columbia in that year.

OKLAHOMA (Choctaw Indian, land of the red men), one of the southwest central states of the United States. It was admitted to the Union in 1907 by joining Indian Territory and Oklahoma Territory. It was the 46th State admitted to the Union. It contains an area of 70,057 square miles and lies between 33° and 35° and 37° N. and long. 94° and 29° and 103° W. It is bounded on the north by Kansas and Colorado, on the east by Missouri and Arkansas and on the west by Texas and New Mexico and on the south by Texas. The Red River forming the whole of its southern boundary.

Physiography.—Oklahoma lies entirely in the Mississippi River Basin. Its drainage finds its way through the Arkansas and Red rivers and their tributaries. While the surface of the State as a whole is a plain, this plain is broken in different sections by hilly lands and small mountains. The Ozark Mountains are in the northeastern part of the State and the Ouachita in the southeastern part and the Arbuckle and the Wichita mountains in the southern portion. In the southern part of the State some of the mountain peaks rise 1,500 feet above their base. The surface of Oklahoma slopes from the northwest to the southeast. The altitude ranges from about 4,500 feet in the extreme northwest corner near the Colorado border to a little less than 400 in the southeastern corner where the Oklahoma-Arkansas line meets the Red River.

Climate.—The climate of Oklahoma is temperate. The extreme seasonal changes range from a little below zero in the winter to a little over 100° in the summer. The temperature decreases 1° for about 65 feet of elevation, so the northern and western parts of the State are cooler than the southern and eastern parts. The average temperature for 10 years for January was 37.87°, while the average temperature for August for the same period was 81.55°.

Population.—According to the Federal census of 1920 the population of Oklahoma is 2,028,283. Of these about 57,337 are Indians and about 149,408 negroes. About 2.0 per cent of the population is foreign born, over 7,000 or 17.6 per cent of the foreign population having come from Germany. About 40 per cent of the native population was born in the State. Every State in the Union is numerously represented, but Texas, Missouri, Kansas and Arkansas predominate. In 1910 there were only eight cities with populations of over 8,000. This number has been greatly increased by the discovery and development of new oil fields. Oklahoma City in

had a population of 91,295, Tulsa, 79,952, Muskogee, 30,277, Ardmore, 14,181, McAlester, 12,095, Shawnee, 15,348, Guthrie, 11,757, Enid, 16,576, Bartlesville, 14,417, Okmulgee, 17,430.

Mineral Resources.—Oklahoma is one of the richest States in the Union in mineral resources. The mineral resources of the State include oil, gas, coal, lead and zinc ore, asphalt, shale, clay, glass sand, sand and gravel, sandstone, limestone, marble, granite, gabbro, Portland cement rock, gypsum, salt, iron ore, manganese ore, tripoli, volcanic ash, copper ore and mineral waters. Of the above-mentioned resources the following are being developed and marketed in their original form or as manufactured products: oil, gas, coal, lead and zinc ores, pyrites, manganese ore, asphalt, gypsum, granite, sand and gravel, limestone as building stone, crushed rock and lime, sandstone. Portland cement, clay products, tripoli and mineral waters.

Oil and Gas.—Oil and gas is by far the most important industry being developed in Oklahoma at the present time. During the past few years Oklahoma has ranked first in both production and value of petroleum among the producing States of the Union. There are at present over 100 oil and gas fields in Oklahoma. The total production of petroleum in Oklahoma

first coal mined in Oklahoma on a commercial scale was in old Indian Territory in 1872. In 1890 Oklahoma produced 869,230 short tons and in 1907 had increased to 3,642,658 tons and remained near these figures until 1920, when 4,849,288 tons were produced. Coal was mined in 12 counties in 1919. In 1922 production amounted to 2,800,000 short tons, as compared with 3,362,623 short tons in 1921.

Lead and Zinc.—In Oklahoma, in 1919, according to the 14th Federal census, the mineral industry, second in importance, ranked by value of products, was the mining of lead and zinc ores in Ottawa County. This industry reported products valued at \$18,979,726 or 6.7 per cent of the total value of the products of the State. It also employed 15.5 per cent of the total number of wage-earners. One hundred and eleven enterprises were in operation that year when, in the production of lead and zinc, Oklahoma outranked all other States. In 1920 the lead produced totaled 65,394 short tons valued at \$10,463,040; in 1921 production of lead amounted to 41,552 short tons, valued at \$3,739,680. Zinc produced in 1920 totaled 219,727 short tons valued at \$35,595,774. In 1921 production dropped to 121,372 short tons valued at \$12,137,200.

TABLE SHOWING PRODUCTION AND VALUE OF PETROLEUM, ZINC AND LEAD AND COAL, 1915-21.

PRODUCTS	1915		1920		1921	
	Amount	Value	Amount	Value	Amount	Value
		Dollars		Dollars		Dollars
Petroleum (barrels).....	123,000,000	70,500,000	106,206,000	356,439,000	114,634,000	183,185,000
Lead (short tons).....	*		65,394	10,463,040	41,552	3,739,680
Coal.....	2,990,450	5,980,900	4,849,288	23,294,000	3,362,623	15,546,000
Natural gas (M. cu. ft.)..			154,467,200	25,805,000	124,058,000	23,429,000
Zinc (short tons).....			219,727	35,595,774	121,372	12,137,200

* Lead and zinc together, valued at \$4,236,632 in 1915.

from 1891 to and including 1922 was estimated at 1,428,000,000 barrels. In 1922 146,631,000 barrels, valued at \$251,300,000 were produced. Oklahoma ranks second among the States in the marketed production of natural gas. The marketed production in 1921 was estimated at 124,000,000,000 cubic feet as compared to 123,517,358,000 cubic feet in 1916, valued at \$19,216,000 and \$11,980,000, respectively.

Coal.—The coal field of Oklahoma lies in the eastern and northeastern parts of the State and includes about 12,000 square miles. The

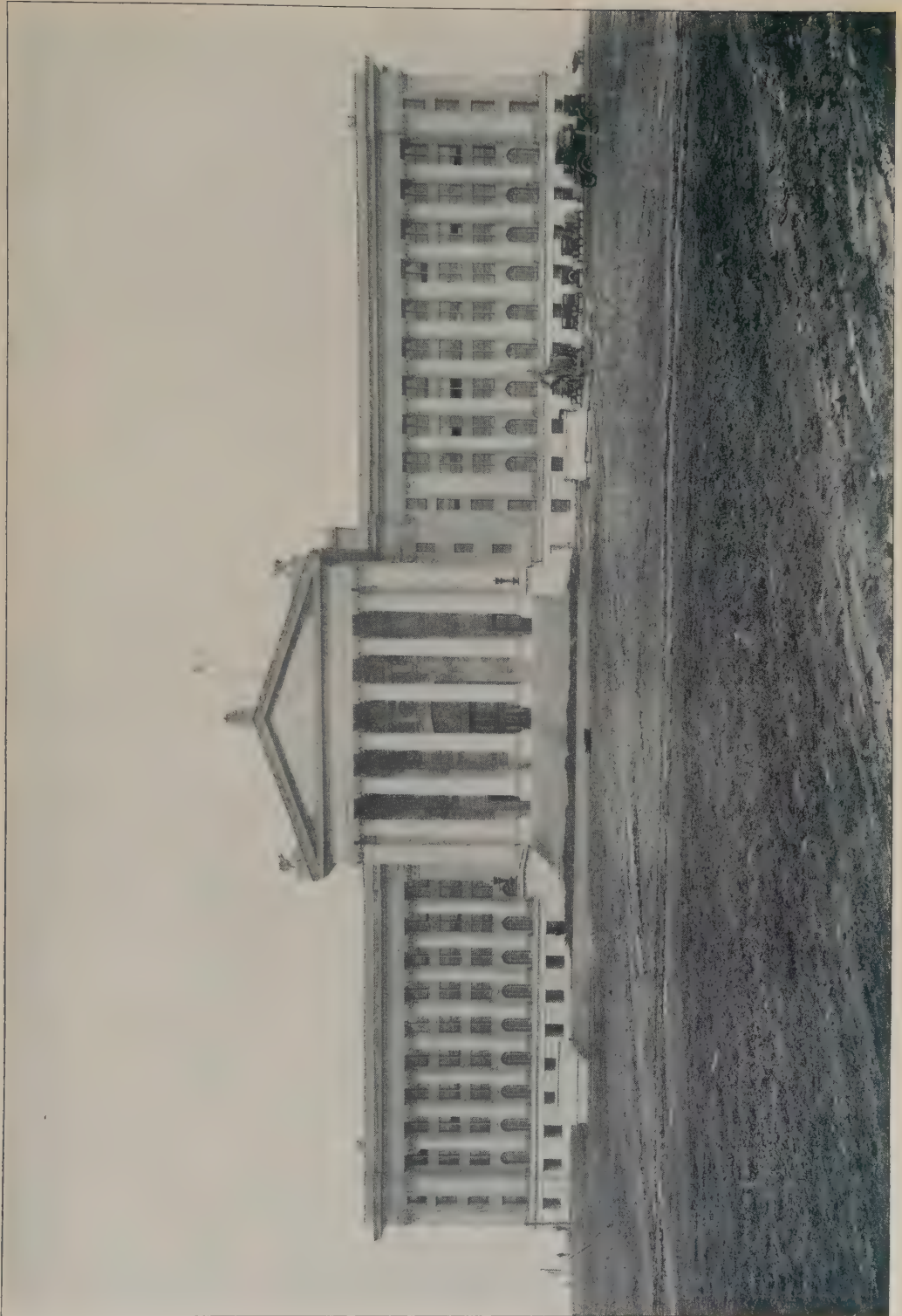
Agriculture.—The land area of Oklahoma is 44,424,960 acres. Lands in farms in 1920 totaled 31,951,934 acres; improved land in farms, 18,125,321 acres; woodland in farms, 4,206,171 acres; other unimproved land in farms, 9,620,442 acres. Farms in the State numbered 191,988—93,217 operated by owners and 97,836 operated by tenants. Farm lands were valued at \$1,171,459,364 in 1920; all farm property at \$1,660,423,544.

The following table gives the acreage, production and value of the leading crops for 1922.

ACREAGE, PRODUCTION AND VALUE OF THE LEADING CROPS FOR 1922.

CROP	Acreage	Yield	Value	Value per acre
Corn.....	3,200,000	57,600,000 bu.	\$40,320,000	\$12 60
Wheat.....	3,300,000	31,350,000 bu.	30,723,000	9 31
Barley.....	129,000	2,193,000 bu.	1,206,000	9 35
Oats.....	1,500,000	30,000,000 bu.	13,500,000	9 00
Rye.....	31,000	310,000 bu.	248,000	8 00
Broom corn.....	180,000	18,000 tons	3,834,000	21 30
Timothy hay.....	965,000	1,448,000 tons	18,100,000	18 75
Wild hay.....	495,000	446,000 tons	3,345,000	6 75
Sorghum syrup.....	17,000	1,122,000 gals.	808,000	47 52
Potatoes.....	40,000	2,720,000 bu.	3,346,000	83 64
Sweet potatoes.....	27,000	2,052,000 bu.	2,421,000	89 68
Cotton.....	2,951,000	635,000 bales	73,025,000	23 69

OKLAHOMA



State Capitol at Oklahoma City

Livestock.—The following table will give the number and value of the livestock of the State for 1917 and 1923 as compiled from the report of the United States Department of Agriculture:

NUMBER AND VALUE OF THE LIVESTOCK OF THE STATE FOR 1917 AND 1923.

	1917		1923	
	Number	Value	Number	Value
Horses.....	702,908	\$59,747,000	715,000	\$28,600,000
Mules.....	269,125	27,451,000	337,000	19,546,000
Milch cows.....	512,847	29,745,000	566,000	19,244,000
Other cattle.....	1,234,264	46,902,000	1,364,000	22,915,000
Sheep and goats.....	81,026	405,000	87,000	505,000
Swine.....	940,837	9,480,000	1,401,000	12,329,000
Total.....	3,741,007	\$173,730,000	4,470,000	\$103,139,000

Dairy Progress in Oklahoma.*—"The dairy industry became more firmly established in Oklahoma in 1918 than perhaps ever before. The farmers in general purchased more milk cows, and correspondence from farmers and breeders showed an increased interest in better cows, in the building of silos, and in growing more feed on their own farms, as well as better methods of feeding cattle. The high prices which farmers received for butter fat in that war year was a great stimulus to more dairying even though prices of feed which had to be purchased were high. Several new breeders of purebred dairy cattle were added to the previous list of breeders and these new breeders manifested great interest in dairying. The southeastern section of Oklahoma has perhaps the best natural facilities for more dairying. A number of new co-operative and local creameries were established during 1918 and are being successfully operated. One of these creameries operated a cheese factory and demonstrated that cheese can be successfully manufactured under factory conditions at least during the cooler portion of the year." Butter produced in 1919 totaled 33,021,095 pounds; cheese, 11,116 pounds; milk sold, 118,127,327 gallons.

Honey Bees.—The Fourteenth Census of the United States reported 46,743 hives of bees in Oklahoma in 1919. Honey produced that year totaled 357,677 pounds valued at \$103,728. Wax produced was 2,916 pounds valued at \$1,139.

Banks.—The great impetus given to industrial development by the opening up of oil and

case of bank failure. The State banks guarantee law is considered a success. It makes it necessary to have very stringent State banking laws. The condition of the various banks on 30 June 1922 is shown herewith.

Transportation.—The railroad mileage in 1919, not including sidings and spurs, was 6,536.96 miles. The principal systems are as follows: Saint Louis and San Francisco, 1,498 miles; Chicago, Rock Island and Pacific, 1,326 miles; Atcheson, Topeka and Santa Fe, 1,080 miles; Missouri, Kansas and Texas, 703 miles; Missouri, Oklahoma and Gulf, 315 miles; Midland Valley, 245 miles; Missouri Pacific, 161 miles; Fort Smith and Western, 196 miles; Kansas City, Mexico and Northern, 186 miles; Wichita Falls and Northwestern, 328 miles; Kansas City Southern, 142 miles. There are about 14 other short lines in and about the oil fields. There are 2,334 miles of oil pipe lines valued at \$43,270,696.

Industrial Commission.—The constitution of Oklahoma has a strict provision on employers' liability to employees. This provision has been vitalized by appropriate legislation, which provides for an industrial commission to settle questions arising. The report of this commission shows that for the year ending 1 Sept. 1918 there were 19,918 accidents in 33 industrial plants and the compensation paid to the injured for the year amounted to \$663,764.12.

Military.—Oklahoma had a well organized militia at the beginning of the Great War of 1914-18. It comprised about 1,500 enlisted men and 75 officers. It included a regiment of infantry, two troops of cavalry, a company of engineers with a signal corps and sanitary field hospital detachment. The Oklahoma National Guard was called to the Mexican border in 1916 at the time of the Mexican raids across the border. Oklahoma furnished 85,000 men for the War with Germany, many of them for over-sea service. The State was a centre of military activity during the War. Camp Doniphan with a training capacity of about 35,000 men was located at Fort Sill. In 1923 the State militia had an authorized strength of 6,406 men. On 31 May the enlisted strength was 4,151 officers and men.

Manufactures.—In 1914 the value of the products of manufacturing industries of Oklahoma amounted to \$102,005,693 and the total average number of wage-earners employed was 17,443. The State ranked 34th in value of products in 1914 against a rank of 40th in 1909, while in average number of wage-earners it ranked 39th in both 1914 and 1909.

	National	State
Number.....	449	486
Capital.....	\$29,010,000	\$9,800,000
Surplus.....	9,379,000	2,089,000
Deposits.....	310,133,000	74,571,000
Loans.....	209,629,000	68,947,000
Total assets.....	377,105,000	101,360,000

mineral fields of Oklahoma has stimulated the banking industry. State banks are required by law to provide a fund to pay depositors in

* Report of the professor of dairying, Oklahoma, A. & M. College.

In 1919 Oklahoma ranked 30th in value of manufactured products; 38th in the number of wage-earners employed and 37th in the value added by manufacture. In 1919 there were 2,445 manufacturing establishments in the State, a decline of 2.9 per cent from the 1914 figures. However capitalization had increased to \$277,034,318 while the average number of wage-earners employed was 29,503. The value of manufactured products that year was \$401,362,869, and the value added by manufacture, \$88,757,040. From second place in 1914, petroleum refining rose to first place in 1919, exchanging places with the flour-milling industry. Among the States, Oklahoma, in 1919, ranked fifth in the petroleum-refining industry. It ranked eighth in 1914. The total production of refined oils in 1919, including gasoline and naphthas, illuminating oils and lubricating oils, was 33,200,145 barrels of 50 gallons as compared with 8,610,533 barrels in 1914 and 792,682 barrels in 1909. The following table shows the principal industries of the State, ranked by value of products, in 1919:

INDUSTRY	Number	Wage earners	Value of product
All industries.....	2,445	29,503	\$401,363,000
Petroleum, refining.....	66	4,612	\$150,673,000
Flour and grist mill products.....	227	958	49,844,000
Smelting and refining, zinc.....	11	2,272	19,518,000
Cottonseed oil and cake.....	51	930	18,907,000
Foundry and machine shop products.....	114	1,717	13,510,000
Bread and other bakery products.....	288	993	8,129,000
Butter.....	20	301	7,718,000
Printing and publishing newspapers.....	410	1,415	7,705,000
Cars and general shop construction and repairs by steam railroads.....	12	2,687	6,149,000
Lumber and timber products.....	145	1,947	4,904,000
Glass.....	16	1,692	4,751,000
Ice, manufactured.....	115	831	3,574,000
Lumber, planing mill products, not including planing mills connected with saw mills.....	56	546	3,150,000
Printing and publishing, book and job.....	97	505	2,507,000
Coffee roasting and grinding.....	7	168	2,402,000
Confectionery, ice cream.....	45	187	2,246,000
Automobile repairing.....	129	455	2,108,000
Brick and burnt clay ballast.....	22	628	1,679,000
Confectionery.....	28	194	1,345,000
Mineral and carbonated waters.....	79	156	1,292,000
Explosives.....	9	76	1,063,000
Saddlery and harness.....	36	92	1,042,000
Copper, tin and sheet-iron work.....	75	187	984,000
Mattresses and spring beds.....	13	99	700,000
Brooms.....	32	110	696,000
Marble and stone work.....	48	117	688,000
Oil, mineral and composite.....	3	42	681,000
Paving materials.....	13	295	579,000
Shirts.....	4	69	573,000
All other industries.....	274	5,222	82,246,000

Education.—The public school system of Oklahoma is well organized and maintains a high standard of proficiency. All teachers in the public schools must have a high school or normal training and those in high schools must have a college education. The constitution in providing for a public school system expressly declared that separate schools must be provided for white and colored children. This separation

of races also applies to institutions of higher learning whether supported by the State or not. There are 754,117 children of school age in Oklahoma with an enrolment of 559,282. There are 15,389 teachers employed in the public schools. There are 384 schools in Oklahoma doing high school work, with an enrolment of 44,223 and 1,791 teachers.

The University of Oklahoma (q.v.) located at Norman was established by an act of the first Territorial legislature in 1890 and its doors were opened to students in September 1892.

The Agricultural and Mechanical College, located at Stillwater, has a fine plant, with an 80-acre campus and 1,000-acre farm, about 113 instructors and an enrolment of 3,100 students. There are five secondary agricultural colleges in Oklahoma.

Other State educational institutions are six State Normal schools, located at Edmond, Alva, Tahlequah, Durant, Ada and Weatherford, and one Teachers' College.

The State supports a State College for Women at Chickasha, which is growing in strength and equipment, having had appropriated for its support by the 1919 legislature over \$400,000 for the next biennium.

There is a State school for the colored people at Langston which combines in its organization normal, agricultural and college training. The school of mines is at Wilburton and in February 1919 another school of mines was established at Miami in the zinc region. There are State preparatory schools at Claremore and at Tonkawa.

Charities and Correction.—The charitable institutions supported by the State consists of an orphan home at Pryor, a school for the blind at Fort Gibson, a school for the feeble-minded at Enid, a school for the deaf at Sulphur, a reform school for boys at Pauls Valley and an institution for the deaf, blind and orphans for the colored race. Oklahoma supports about 21 educational institutions, not including the charitable institutions. There are denominational colleges as follows: Kingfisher College (Congregational) at Kingfisher, Phillips University (Christian) at Enid, Kendell College (Presbyterian) at Tulsa, the Methodist University at Guthrie, the Baptist College at Shawnee and the Catholic University at Shawnee. The penitentiary of the State is located at McAlisterville and a branch prison at Granite. There are three insane asylums, located at Vanita, Norman and Fort Supply.

Public Lands.—Sections 16 and 36 were set aside for the benefit of public schools. Section 13 in each township of Oklahoma Territory except the original five counties was reserved for institutions of higher learning and the proceeds of it divided between Oklahoma University, Agricultural and Mechanical College and the normal schools. Likewise section 33 in Oklahoma Territory was reserved for public buildings, the proceeds of which go to the construction of buildings of educational institutions, asylums, penitentiaries and the State capitol. The enabling act also reserved from homestead entry and donated to the educational institutions over 1,000,000 acres of land. This latter with section 13 constitutes a land endowment for the educational institutions from which a great part of the revenue

OKLAHOMA



Fields of Kafir corn, Western Oklahoma

necessary to run the schools is derived. The greater part of the lands have been sold and the proceeds invested by lending to farmers on farm lands at 5 per cent. The lands which are not sold are leased and the proceeds used for the purposes specified in the grant.

Government.—The constitution of Oklahoma was formulated in 1906 by a convention and adopted in 1907 by popular vote. The general framework of the State government is like that provided for in other States, consisting of a single executive, bicameral legislature and a system of courts consisting of a Supreme Court, District Courts and County Courts. The constitution provided for the election of all State officers who were to be nominated by a primary election in each party. The constitution provided for the exercise of the initiative and referendum but not for the recall. The constitution also provided that cities of over 2,000 population could form their own charters and under this provision many of the larger cities have adopted the commission or managerial form of government.

Suffrage.—The constitution provided for manhood suffrage which was afterward limited by statute by an educational test and the Grandfather clause. The Grandfather clause was declared unconstitutional by the United States Supreme Court in 1915, the educational test remaining but applied to all alike. At a recent election the constitution has been amended allowing women to vote in all elections.

History.—The first European to visit Oklahoma was Coronado who marched across it in 1541 while searching for the Land of Quivira. During the latter part of the 17th and the first part of the 18th centuries French trappers and traders from the lower Mississippi visited much of the eastern portion of the present State of Oklahoma and gave names to many streams and mountains in that region. All of Oklahoma except the "Panhandle" was a part of the Louisiana Purchase. From 1817 to 1840 was the period during which the great Southern tribes of Indians, the Cherokees, Choctaws, Chickasaws, Creeks and Seminoles, were removed here from Georgia, Alabama, Florida and Mississippi and in which Oklahoma was divided among them and set apart as an Indian Territory. These Indians held slaves and when the Civil War broke out all of these tribes joined the Southern Confederacy. When the war closed they were compelled by the treaties of 1866 to cede to the United States much of their western lands, upon which they had established no settlements, as a home for friendly Indians of other tribes. The Creeks ceded the western half of their lands for which the United States paid them 30 cents an acre. The Seminoles were compelled to cede all of their lands at a price of 15 cents an acre and to accept as a new home a much smaller tract carved out of the lands ceded by the Creeks. The Chickasaws and Choctaws also gave up the western part of their country which had been previously leased to the United States and was known as the "Leased District." For this they received \$300,000. The Cherokees did not absolutely surrender any of their lands but agreed to allow the United States to locate friendly Indians upon that part of their western lands known as the "Outlet"; the title to remain with

the Cherokees until such Indians had been so located. Tribes of Western Indians were accordingly removed to this region and given reservations. Among them were the Cheyenne and Arapaho, Kiowa and Comanche, Sac and Fox, Pawnee, Iowa, Kickapoo, Shawnee, Potawatomi, Wichita, Ponca Sioux, Otoe and Missouri and some others. A large tract near the centre of the present State remained unoccupied. White people were forbidden to settle there but colonization schemes were developed by Capt. David L. Payne and others. President Hayes issued proclamations in 1879 and 1880 forbidding settlement but it was found necessary to use troops to remove the "boomers," as the would-be settlers were called. One of the chief difficulties in the way of the "boomers" were the "cattle-kings," who under leases from Indian tribes or in some cases without any authority whatever were grazing large herds within the limits of Oklahoma. In 1885 Congress authorized the President to negotiate with the Creeks and the Seminoles for the purpose of opening these vacant lands to settlement. This was accomplished in 1889. On 23 March of that year President Harrison under the authority of an Act of Congress approved 2 March issued a proclamation declaring these unoccupied lands would be open to settlement under the homestead laws of the United States at noon 22 April. Troops along the border kept the home-seekers in order until that time when the great crowd that had gathered dashed across the line in a mad race for the best lands and town lots. The entire region was settled almost within a day. Towns were laid out, farms opened up and the population increased at an extraordinary rate. There was no government until May 1890 when an Organic Act was passed by Congress (2 March 1890) creating the Territory of Oklahoma. By this act the "Panhandle" which had been a veritable "No Man's Land" was made a part of Oklahoma and provisions were made for other additions as fast as the various Indian reservations were opened to settlement. The Organic Act provided for a governor, a secretary and a Supreme Court appointed by the President and for a bicameral legislature elected by the people. The first governor was George W. Steele and the first legislature met at Guthrie on 27 August. Other Indian lands were opened to settlement in 1891, 1892, 1893, 1901 and 1906 while Greer County, a tract claimed by Texas, was awarded to the United States by the Supreme Court in 1895 and immediately attached to Oklahoma. The agitation for statehood began in 1891. There was much discussion as to whether Oklahoma and Indian Territory should be joined to make one State or admitted separately as two States. A bill admitting Oklahoma passed the House of the 57th Congress but failed in the Senate. Indian Territory made but little effort to secure separate statehood until 1905. In July of that year delegates from the Five Nations met at Muskogee in what is known as the Sequoyah Convention. This body formed a State constitution for the state of "Sequoyah" but Congress refused to recognize its work so the convention came to nothing except that the leaders in this movement were later prominent in the convention that made the Oklahoma constitu-

tion. After much debate the Joint Statehood Bill, or Enabling Act, was at last passed by Congress and approved 16 June 1906. It provided that Oklahoma and Indian Territory should be admitted as one State, provided such union were approved by both Territories. The union being approved the 112 delegates provided for by the Enabling Act met at Guthrie 20 Nov. 1906 and proceeded to draft a State constitution. Some of the radical features of this instrument caused the convention several times to come into conflict with President Roosevelt. Ninety-nine of the delegates were Democrats and bitter clashes came over the attempts to introduce a "Jim Crow" clause. William H. Taft in a speech delivered at Oklahoma City 24 Aug. 1907 criticized the constitution very severely and strongly advised its rejection. It was adopted, however, at a special election held 17 Sept. 1907 by a vote of 180,333 to 73,059 for rejection. Prohibition which was submitted as a separate provision was accepted by a vote of 130,361 to 112,258. At the same election State and county officers were chosen. The Republicans had nominated the Territorial governor, Frank Frantz, as their candidate for State governor. The Democrats had nominated Charles N. Haskell. Haskell was elected and of the five Representatives in Congress four Democrats and one Republican were elected. Saturday, 16 Nov. 1907, President Roosevelt proclaimed Oklahoma the 46th State of the Union. On that day Governor Haskell and the other State and county officials assumed office. The legislature was Democratic and Robert L. Owen and Thomas P. Gore were chosen as United States senators. In the Presidential election of 1908 Bryan received 122,406 votes, Taft 116,558 and Debs 21,729. Gore was re-elected to the Senate in 1909. At the primary election of 1910 the so-called "grandfather clause" amendment to the constitution was adopted. This was declared unconstitutional by the Supreme Court of the State and later by the United States Supreme Court in 1915. The Enabling Act had made Guthrie the capital until 1913 but at an election held in 1910 it was voted to remove it to Oklahoma City. This gave rise to litigation in the courts and the Supreme Court of the United States decided that the part of the Enabling Act fixing the location of the capitol at Guthrie was unconstitutional. In November 1910 the Democrats elected their candidate, Lee Cruce, who received 120,218 votes as compared with 99,527 for the Republican candidate, Joseph W. McNeal. The Republicans, however, elected an additional representative in Congress, giving them two, while the Democrats had three. The census of 1910 gave Oklahoma 1,657,155 in population. This entitled the State to eight representatives in Congress so three more, all Democrats, were elected at large in 1912. In the Presidential election of 1912 Wilson received 119,156 votes, Taft 90,786 and Debs 42,262. Owen was returned to the Senate, as a Democratic legislature was elected. In November 1914 the Democrats elected Robert L. Williams as governor by a vote of 100,597 as compared with 95,904 for the Republican candidate, John Fields. Gore was again elected to the Senate. In 1916 Wilson received 148,115 votes and Hughes 98,299. In 1918 the Demo-

crats nominated and elected as governor J. B. A. Robertson, who received 104,132 votes. The Republican candidate, H. V. McKeever, received 82,865. Owen was again returned to the Senate. Oklahoma has eight Representatives in Congress. The governors of Oklahoma have been as follows:

TERRITORIAL.

George W. Steele.....	Republican.....	1890-91
Robert Martin (acting).....	".....	1891-92
Abraham J. Seay.....	Republican.....	1892-93
William C. Renfrow.....	Democrat.....	1893-97
Cassius M. Barnes.....	Republican.....	1897-1901
William M. Jenkins.....	".....	1901
Thompson B. Ferguson.....	".....	1901-06
Frank Frantz.....	".....	1906-07

STATE.

Charles N. Haskell.....	Democrat.....	1907-11
Lee Cruce.....	".....	1911-15
Robert L. Williams.....	".....	1915-19
J. B. A. Robertson.....	".....	1919-23
J. C. Walton.....	".....	1923-

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J. S. BUCHANAN,

Dean of the College of Arts and Sciences, University of Oklahoma.

OKLAHOMA, University of. A State coeducational institution for higher education, established at Norman, Okla., by the First Territorial legislature in 1890. It was opened to students in September 1892. It is supported by biennial appropriations of the State legislature and also from an income on public lands that were set aside when the various Indian reservations were opened to settlement. Section 13 in each township in the greater part of old Oklahoma Territory was set aside for institutions of higher learning and the proceeds from leasing the lands or sale is divided between the university, the Agricultural and Mechanical College and the normal schools. The Statehood Bill gave to the university about 250,000 acres of additional land in 1906. This with one-third of section 13 makes a large land endowment which is supplemented by direct appropriations. The legislature of 1919 appropriated \$1,800,000 for the next two years.

The university comprises the following colleges and schools: Graduate School, College of Arts and Sciences, with schools of education, journalism, public and private business, social service, home economics, fine arts, law, medicine, pharmacy, engineering.

There is a campus of 120 acres with seven large fire-proof buildings valued at over \$1,000,000. There is a faculty of 208 instructors and an enrolment of 3,408 students. Tuition is free to residents of Oklahoma. In 1922-23 the institution's property was valued at \$2,413,312.14, and its income was \$949,252. The library contains 45,000 volumes.

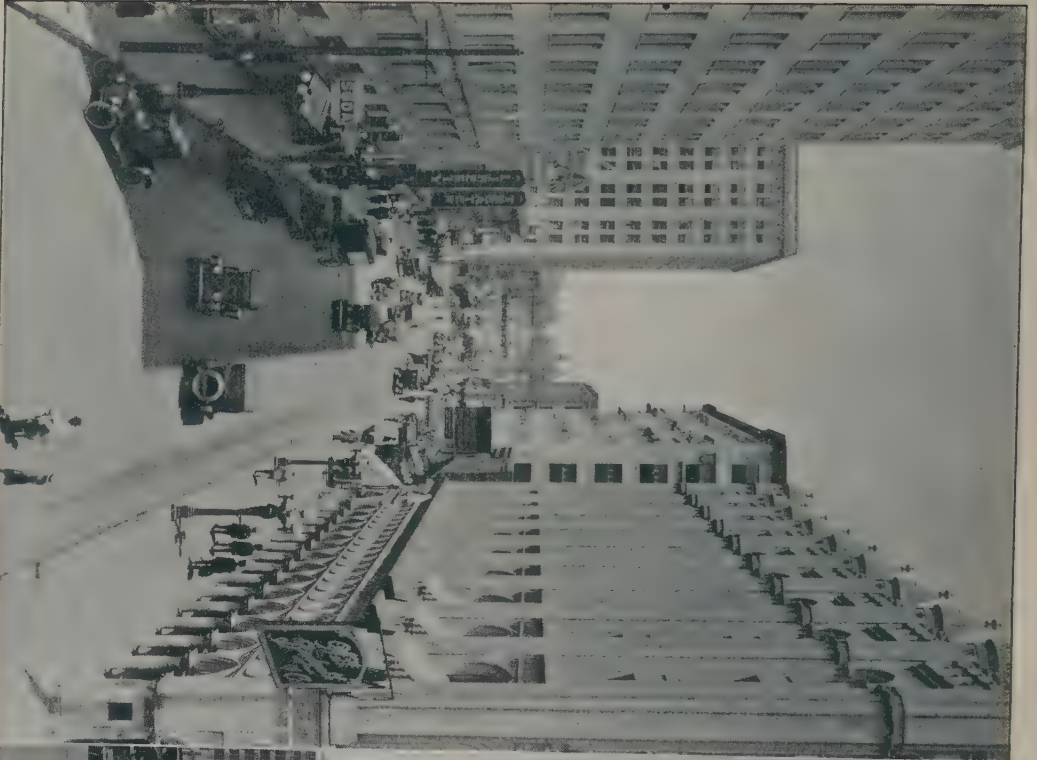
OKLAHOMA CITY, OKLAHOMA



Reservoir Dam for Water Works

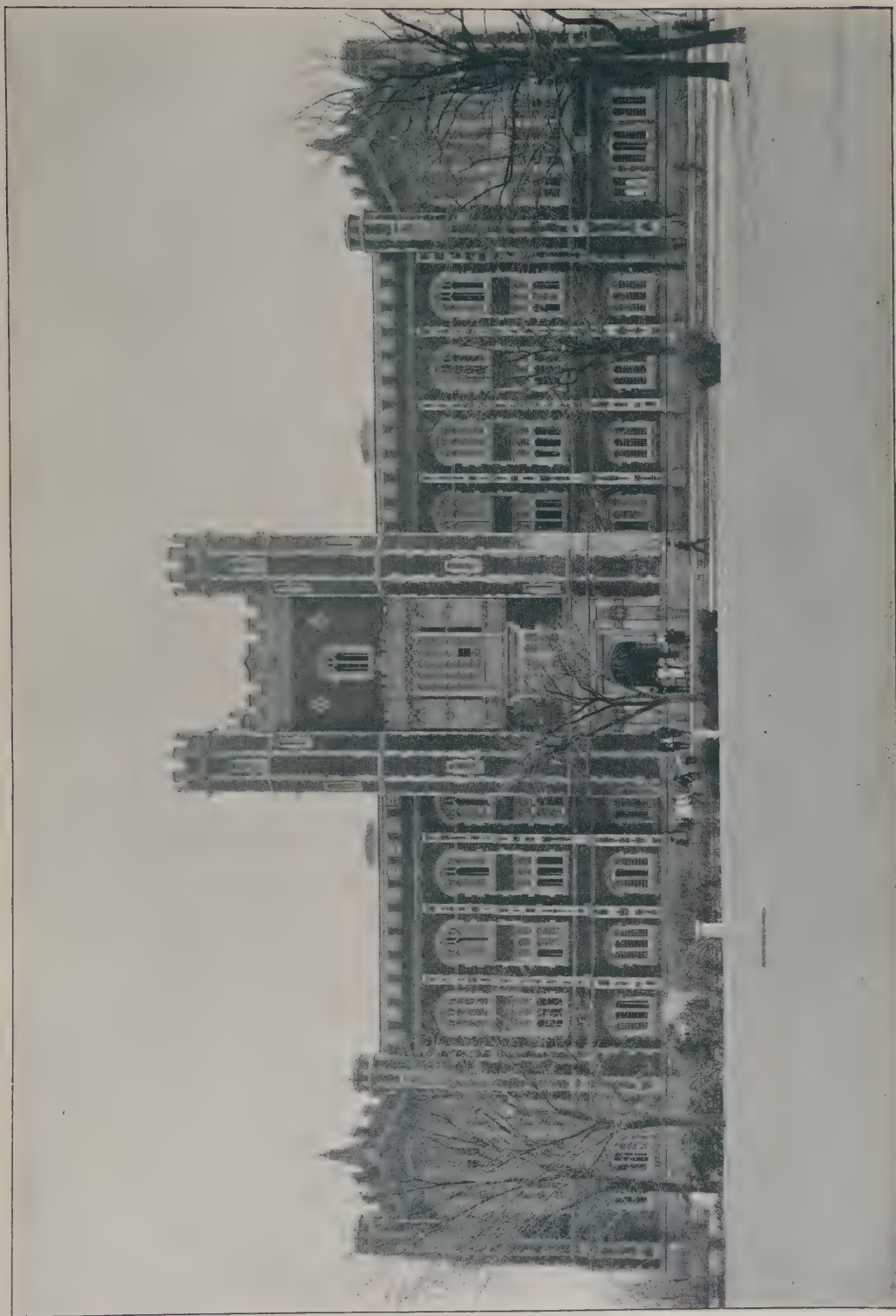
OKLAHOMA CITY, OKLAHOMA

1 Robinson Street looking north from Grand Avenue



2 Downtown scene looking north from Grand Avenue





ADMINISTRATION HALL, UNIVERSITY OF OKLAHOMA, NORMAN, OKLA.

OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE, a coeducational State and Federal institution founded at Stillwater, Okla., in 1891. It offers courses in agriculture, mechanic arts, military science, domestic science and teaching, with corresponding instruction in mathematics, physics, English, philosophy, history and other subjects and awards the degrees B.S. and M.S. There is a secondary school to which pupils from the eighth grade are admitted and which prepares for the college course. The college owns a 1,000-acre farm, has an 80-acre campus, substantial brick buildings and adequate equipment. Its income is derived from State and Federal funds and from its allotment of public lands. Tuition is free. In 1922-23 the president was James B. Eskridge, Ph.D.; the number of instructors was 113 and students, 3,100. The library is an excellent one. The value of the buildings and equipment is about \$2,133,779 and the annual income is about \$741,850.

OKLAHOMA CITY, the capital of the State of Oklahoma. It is also the county-seat of Oklahoma County and is situated on the north branch of the Canadian River and on the Atchinson, Topeka and Santa Fe, the Chicago, Rock Island and Pacific, the Saint Louis and San Francisco, the Missouri, Kansas and Texas, and the Fort Smith and Western railroads. It is the commercial and industrial centre of a productive agricultural and stock-raising region. It has a large number of wholesale houses. The chief manufacturing establishments are cotton mills, flour mills, box and cracker factories, patent medicine factories, iron works, soap factories, wood work shops, packing-houses, oil refineries and cottonseed-oil mills. It has an extensive trade as it is the distributing centre for a large region; and the grain, cotton and livestock of the surrounding country is mostly shipped from Oklahoma City to Eastern and Southern markets. The city is the seat of the Oklahoma City College, and Saint Mary's Academy. It has public and parish schools and a Carnegie free public library. There are a number of church buildings, the State University and Saint Anthony's hospitals. The city has a number of banks, with a large combined capital. Oklahoma City was settled 22 April 1889 by 3,000 men who came on railroad trains and horseback from the Territory line, after noon of said date, when by proclamation the country was declared open to settlement. It was incorporated July 1890 and chartered as a city April 1891. The government is vested in a mayor and four commissioners elected for a four year term. The city owns and operates the waterworks. The population is nearly all American-born white people, about 2 per cent are negroes and 3 per cent Indians. Pop. (1920) 91,259.

OKLAHWA ("crooked water"), a river in central Florida which rises in the central part of the State, flows almost due north for about 80 miles, turns abruptly and flows east into the Saint John about 20 miles south of Palatka. It is about 200 miles long. It is narrow and crooked but is navigable for launches and steamers for nearly its whole length.

OKMULGEE, òk-mŭl'gē, Okla., town and county-seat of Okmulgee County, 44 miles

southwest of Muskogee, on a fork of the Canadian River and on the Saint Louis and San Francisco Railroad. Its courthouse is a stone building formerly the capitol of the Creek Indian government. There are good schools, a hospital and the commission form of municipal government. There are roller-mills, cotton and cottonseed-oil industries and glass manufactures. The surrounding district is rich in coal, oil and gas. Pop. (1920) 17,430.

OKOLONA, ò'kō-lō'nā, Miss., town and county-seat of Chickasaw County, 68 miles south of Corinth, on the Mobile and Ohio Railroad. It is the seat of the Okolona High School and college and owns a modern lighting plant and waterworks. The district raises cotton, corn and stock and there is a considerable lumber industry. Pop. (1920) 3,852.

OKOTSK, ò-kōtsk', Sea of, an extensive inlet of the north Pacific Ocean, indenting the eastern coast of Russian Siberia. It is bounded on the north by Siberia, is separated from the ocean on the east by the Kamchatka Peninsula and is partially enclosed by the Kuril and Urup islands on the east and southeast and by the island of Saghalin on the southwest. It is connected with the Sea of Japan by the La Pérouse Strait between Saghalin and Yezo islands and also by the long passage between Saghalin and the mainland which broadens out into the Gulf of Tartary. The sea is about 1,000 miles in length and 600 miles wide, is nearly rectangular in shape and its northern shore nearly follows the 60th parallel N. The coasts are steep, good harbors are few and these are generally icebound from November to April. The open sea is often fogbound and subject to heavy storms and consequently is little frequented.

OKRA, a plant (*Hibiscus esculentus*) of the mallow family, native of Africa, commonly grown for its long pods. These are used as a vegetable, especially, because of their mucilaginous texture, to give body to soups, stews and catsups. The plant is a tall, rough annual with flowers similar to those of the cotton plant. It is extensively grown in the southern United States and to a less extent northward.

OKU, ò'kū, **Yasukata**, COUNT, Japanese soldier: b. province of Chikuzen, Fukuoka Prefecture, 3 Nov. 1846. He entered the army in 1871 and was a major in the Imperial forces during the Satsuma Rebellion in 1877. He attained rank as lieutenant-general in 1894 and in the war with China commanded the Fifth Army Division. For services at the battle of Newchwang he was created baron. He received the rank of full general in 1903 and in the Russo-Japanese War, 1904-05, he commanded the Second Army. He rendered distinguished service at Nanshan, Telissu, Kaiping and Newchwang, Ta-shih-chao, Liaoyang, Shaho and Mukden. He was awarded the First Class Order of the Golden Kite and the Grand Cordon of the Rising Sun; was appointed chief of the general staff and member of the Supreme Military Council, succeeding General Viscount Kodama in 1906; and in 1907 he was created count.

OKUBO, ò'kū-bō, **Toshimitsu**, Japanese reformer and statesman: b. in the province of Satsuma 1830; d. Tokio, 14 May 1878. He

displayed from childhood evidences of great ability. He was special adviser of the Prince of Satsuma, who was the great exponent of the restoration of the Mikado to supreme power. His political sagacity was amazing. From the first he penetrated the designs of Russia in the Far East and for this reason, after his return from Europe in 1872, he opposed the war with Korea, knowing that temporary success, before Japan was modernized, would simply be playing into Russia's hands. It was Okubo's manifesto in 1868 that brought the Mikado from palace seclusion behind the screen of mystery into public life, and removed the capital to Tokio. From 1870 until his death he was the most powerful minister in the Imperial cabinet, and the personification of energy and progress. As special envoy to China in 1874 he settled the Formosa episode. The suppression of the Satsuma Rebellion in 1877 settled Okubo's policy as the permanent one for Japan. He was assassinated 14 May 1878 by six of his own clansmen but received posthumous honors from the emperor. Consult his life by Maurice Courant (Paris 1904).

OKUMA, ōk'oo-mā, **Shigenobu**, Japanese statesman: b. at Saga, in the province of Hizen, 1837; d. Tokio, 10 Jan. 1922. He became an advocate of advanced reforms, the abolition of the feudal system, the restoration of the emperor to power and a new system of education; and his persistent and courageous advocacy was influential in bringing about the revolution of 1867-68. After the reorganization of the Japanese government he was appointed to a position in the Foreign Office, and in 1872 was made Minister of Finance, in which position he brought the national finances into order and established a national currency. In 1881 he withdrew from office and organized the Progressive party, which urged that a constitutional government be immediately organized, and that the ministry be subordinated to the Parliament, of which he was the recognized leader during his political career. After the Japanese parliament was established, he became Minister of Foreign Affairs, but his liberal attitude toward the revision of the treaties with foreign countries aroused so much popular opposition that he retired from office. In 1896 he was for a short time in the cabinet, and in 1898 organized a cabinet of which he was Premier; but he resigned within a few months and retired from public life. After his withdrawal from office in 1881, he founded the Semmon-Galko, a school for the study of law, literature and political economy. In 1907 he resigned leadership of the Progressive party. He advocated higher education of women.

OLAF, ō'lāf, **Saint**, king and patron saint of Norway: b. 995; d. Sticklestad, Norway, 1030. He was a great-grandson of Harald Haarfager, a son of Harald, chief of the district of Gränland. He early made himself famous by his military expeditions to England, successfully assisting King Ethelred against the incursions of the Danes. After the death of Eric and the expulsion of his son, Olaf caused himself to be proclaimed king. He began his reign by introducing a special court of law called the Hirdskra, and restored the ancient boundaries of Norway and Sweden, but above

all he was a zealous supporter of Christianity and may indeed be called the real converter of Norway. The severity which he employed for this purpose afterward exposed him to a formidable retaliation at the hands of his own subjects. Having engaged in war with Canute the Great, king of England, he allied himself with King James of Sweden, but was so completely defeated in battle that he fled to Sweden and Russia. In 1028 he was induced by a dream to return to Norway, where he found the people so alienated from him that he could only bring 3,000 men into the field to oppose the forces of the mighty Canute. The armies met at Sticklestad near Drontheim, in 1030, and Olaf lost both the battle and his life. His body was buried in the cathedral of Drontheim, and he has since 1164 been honored as the patron saint of Norway. His feast day is 29 July. Many legends respecting him are current throughout the North, and his name has been given to an order of knighthood founded by King Oscar I in 1841 as a reward for services to king and country, art and science. Consult Longfellow's poem, 'The Saga of King Olaf' (1863).

ÖLAND, ē'länd, an island in the Baltic Sea, owned by Sweden and lying off the southeastern extremity of that country, separated from the mainland by Kalmar Sound, a strip of water from five to 15 miles broad. The island is 85 miles in length and 10 miles in breadth at its widest point. The area is 519 square miles. There is a ridge of limestone along the west side and much of the island is sandy and barren. There are, however, some well-wooded hillsides and the narrow coast land is productive. There are several small streams and a lake, Horusjö, about three miles long. Barley and sandstone are the principal exports, and fishing and navigation constitute the chief occupations of the inhabitants. The principal town and capitol is Borgholm, a watering resort on the west side of the island, and here are ruins of a castle dating the 13th century, later remodeled into a palace, and now one of the most famous ruins in Sweden. In Scandinavian history Öland appears frequently as a battleground between Denmark and her northern neighbors. It was at one time self-administered but in 1824 was united with the Län of Kalmar.

OLATHE, ō-lā'thē, city, county-seat of Johnson County, Kan., on the Atchison, Topeka and Santa Fe, the Saint Louis and San Francisco, the Missouri, and the Kansas City, Clinton and Springfield railways, about 22 miles southwest of Kansas. It is in an agricultural and stock-raising region. The chief manufactures are flour, furniture, shoes, brick and agricultural implements. The State institution for the deaf and dumb and a Carnegie library are located here. The city owns and operates the waterworks. Pop. (1920) 3,268.

OLBERS, ōl'bērs, **Heinrich Wilhelm Matthäus**, German astronomer: b. Arbergen, near Bremen, 11 Oct. 1758; d. Bremen, 2 March 1840. He studied medicine at Göttingen in 1777-80 and at the same time pursued Kaestner's course in mathematics. He engaged in the practice of medicine at Bremen in 1781, practising continuously until 1823, and devoting the nights to his astronomical investigations. In 1779 he devised a method for determining the orbit of a comet

which is still in use by astronomers and known as "Olbers's Method." It was described by Baron von Lach 'Ueber die leichteste und bequemste methode dië Bahn eines Cometen zu Berechnen' (Weimar 1797). He was especially interested in comets and in the minor planets. He rediscovered Uranus, supposed to be a comet, in 1781; confirmed the identification of Ceres in 1802; discovered Pallas later in that year and Vesta in 1807. He discovered many comets, most of them, however, being first detected at Paris; but that of 1815 bears his name as the original discoverer. His hypothesis of the origin of comets was later disproved; but his observations, notes and calculations remain of high value. Besides the publications by Baron von Zach, his papers were published in the 'Jahrbuch of Bode' (1782-1829); and of Encke (1832). His collection of books relating to comets is in the Pulkowa Library. Consult Schilling, C., 'Wilhelm Albers, sein Leben und seine Werke' (3 vols., 1894-1900).

OLCOTT, òl'kòt, Eben Erskine, American mining engineer: b. New York, 11 March 1854. He was educated at the College of the City of New York and at Columbia University. He engaged in practice as a mining and metallurgical engineer in the Western States, Mexico and South America and later became president of the Hudson River Day Line and the Mary Powell Steamboat Company. He is interested in railway transportation in the Catskills, is a director in several New York banks and in 1901-02 he was president of the American Institute of Mining Engineers. He inaugurated the movement for the Hudson-Fulton celebration in New York in 1909 in honor of the Hudson ter-centenary and the Fulton centennial.

OLCOTT, Henry Steel, American theosophist: b. Orange, N. J., 2 Aug. 1832; d. Adyar, India, 17 Feb. 1907. He was educated in the University of the City of New York and in 1858-60 was agricultural editor of the New York Tribune. In 1863-66 he was special commissioner in the United States War and Navy departments and was admitted to the bar in 1866. He was one of the founders in 1875 of the New York Theosophical Society, and was its president. He edited the *Theosophist* (1879-1907) and in recognition of his services to Hindu philosophy received the unique honor of the sacred thread of the Brahman caste. In 1878 he was appointed by President Hayes to report on the trade of the United States and India. He and Mrs. Annie Besant (q.v.) founded the Central Hindu College at Benares, and with her he lectured throughout India and Ceylon. In his later years he lived at Adyar, in the province of Madras, India. He published 'Sorgho and Umphree' (1857); 'People from the Other World' (1875); 'The Buddhist Catechism' (1882); 'Theosophy, Religion and Occult Science' (1885); 'Posthumous Humanity' (1887); and 'Old Diary Leaves' (1895-1903).

OLD AGE, Diseases of. The human body reaches its complete development about the 30th year. About this time the lungs attain their maximum respiratory capacity, the heart reaches its maximal normal growth and the brain is heaviest. Growth in stature ceases between the 20th and 25th year but this is due to the downward pressure upon the spinal

column when the body is in the erect position, the unequal thicknesses of the discs between the vertebrae forcing the spinal column into curves. In every other direction skeletal growth continues until about the 30th year and about this time the individual requires the largest hat, shoes and gloves and he has the largest chest measurement. At this time the body is in its most perfect physical condition.

Causes of Old Age.—Aging begins soon after the period of development has been completed. Diminution in respiratory capacity has been demonstrated between the 35th and 40th year, the average weight of the brain is less at 40 than it is at 30 and the normal blood pressure begins to rise about the 40th year. This rise in blood pressure indicates that the arteries are beginning to lose their elasticity and the heart must send the blood through the arteries with greater force to maintain the circulation. The greater demands made upon the heart are met by an increase in the thickness of the walls whereby the propulsive force of the heart is increased. The organs and their functions continue however to maintain their harmonious relations with allied organs and functions, and a state of stable metabolism, in which the waste of tissue is counterbalanced by the repair, continues to exist for about 30 years. This is the period of maturity. Toward the end of this period objective and subjective manifestations of aging appear but not until the end does functional impairment become marked. Fast living and the neglect of the physiological needs of the body, as excessive work and insufficient sleep, improper food, unhygienic surroundings, etc., will hasten the period of maturity and shorten it, and the person will look old, feel old and his tissues will present the senile changes in the fifth or sixth decade of life.

The popular conception of old age is based upon the years of life and the objective manifestations, the appearance. There is, however, not one of the many objective manifestations of old age that is distinctively senile. Gray hair and baldness, wrinkles, tanned, dry skin, thin, shrunken features, falling out of the teeth, dull expression, general body waste, mental decay, and other objective features of old age may appear in earlier life, either as the result of disease or due to physiological causes or unknown causes.

The individual conception of old age is based upon the subjective manifestations, the feelings; but so repugnant is the idea of aging to most persons that when the manifestations appear they will be ascribed to any other possible cause than aging. Shortness of breath due to diminished respiratory capacity will be called asthma; the aches and pains in the joints due to hardening of the ligaments and cartilages and senile changes in the joints themselves will be ascribed to rheumatism; malaria will be held responsible for the more rapid fatigue and the tendency to fall asleep during the day. Impaired vision, diminished virility, forgetfulness, vertigo, even prostatic troubles which are purely senile, will be ascribed to accidental disease and not to advancing age.

The scientific conception of old age is based entirely upon the condition of the organs and tissues. As there is no regularity in time, ex-

tent or order in which the organs and tissues undergo the senile changes a person may be physically aged before he is old in years while another of advanced age may show few of the senile changes. Precocious senility, too early aging, is becoming more prevalent, especially in busy commercial centres where excessive activity, mental strain, unnatural sensory impressions as loud noises, artificial light, peculiar flavors employed in cooking, the exceedingly rapid and fine vibrations of the present day motor vehicles, cause rapid degeneration of the organs and tissues that have been excessively employed. Insufficient sleep and incomplete elimination of waste contribute to the rapid degeneration by preventing complete repair. This explains the frequency of cardiac, renal and cerebral diseases in the sixth decade of life, these diseases causing the most deaths during this period.

Senile Changes.—The earliest demonstrable senile change occurs in the respiratory capacity of the lungs. Hypertrophy of the heart may appear earlier but this is pathological and is almost always due to violent athletics during the period of development. The diminished respiratory capacity is caused primarily by the deposit of dust in the air vesicles and lung tissue. Fine dust in the inspired air is deposited in the lungs from birth but the increase in the size of the air vesicles during the period of growth overcomes the diminution of the aerating surface that is being covered by dust. The deposit of dust continuing after the limit of growth has been reached, the aerating surface is continually being encroached upon and the amount of inspired and expired air constantly diminishes. At the age of 30 the average amount of carbonic dioxide is about 1,340 cubic inches an hour. This is reduced to about 1,000 cubic inches at the age of 60 and it may fall to 700 cubic inches or less at the age of 85. The dust not alone covers the interior of the air cells, but fine particles work through the walls of the cells and remain embedded in the lung tissue, producing *Pneumokoniosis*. As a result of this deposit the lungs which are pink in infancy become dark and marbled or mottled, the color depending upon the amount and character of the dust deposit. In comparatively dust-free localities the lungs of aged persons are dark gray; in agricultural districts they are dark greenish or bluish; in smoky or sooty sections they are gray-black or brown-black. Two other factors aid in diminishing the respiratory capacity of the lungs. Owing to the senile changes in bone and cartilage the chest walls become rigid and prevent the complete expansion of the lungs; and owing to impaired nutrition due to impaired blood and defective circulation when the blood vessels degenerate, the walls of the air cells waste producing *Senile Emphysema*. Violent respiratory efforts as in coughing will have the same result, the walls breaking instead of wasting away slowly. The air cells coalesce and where there were many small cells, each containing aerating walls, there will be a few large cells with the aerating partitions removed. Senile emphysema causes no distress during quiet breathing but slight exertion will cause dyspnoea and an effort to take deep breath will bring on a spasmodic cough. Violent exertion as in running will cause rapid

and extensive emphysema which will seriously interfere with the respiration.

The immediate result of diminished respiratory capacity is impaired oxygenation of the blood. Less air being inhaled less oxygen is available for interchange with the carbonic dioxide which is to be eliminated. The blood retaining part of the impurities which should have been removed in the lungs, its carrying capacity of nutrition to the tissues and of waste from the tissues is impaired. This is one of the ultimate causes for the senile degeneration of the tissues. Incomplete aëration is at first partly overcome by more rapid respiration, the respiratory rate at the age of 30 being 16 per minute, rising to 18 per minute at the age of 50, and it may rise to 20 per minute later. This rapid respiration causes fatigue and waste of the muscles of respiration and the respiratory rate is automatically lowered and the periods of rest between inspiration and expiration are lengthened. This prevents too rapid muscle waste but the impairment of the blood proceeds more rapidly. Several other factors contribute to the impairment of the blood. A number of causes combine to weaken the propulsive power of the intestines and retard the passage and expulsion of the fecal mass and thus constipation is produced. The fecal mass remaining too long in the intestines, it decomposes and the decomposition products are absorbed and carried in the blood. (See *AUTOINTOXICATION*). Leucomaines, tissue waste products, are likewise retained and owing to degeneration of the kidneys part of the urea which should be eliminated by the kidneys is retained in the blood. The entire quantity of blood in the body is diminished, and there is usually a larger proportion of calcium salts than in earlier life. In consequence of these changes in the blood, it becomes denser and more viscid and it passes through the capillaries and other fine tubes with greater difficulty. The tissues receiving an insufficient and perverted blood supply are improperly nourished and they degenerate.

We have traced here one of the many factors responsible for the production of the senile changes. This factor becomes operative with the first breath that the new-born child takes and it continues with increasing force throughout life. The production of pneumokoniosis has been advanced as the basic cause of aging but the extent of the pneumokoniosis bears no relation to the extent of the senile changes and persons have been found who exhibited marked senile changes at a comparatively early age in a fairly dust-free atmosphere. Several auto-intoxication theories have been advanced, the one advanced by Metchnikoff being the best known. There is the same objection to these that there is to all theories confining the basic cause to a single factor. They all fail when put to the test of universal application. The only theories of aging that have not been absolutely disproven are those that place the basic cause of aging in some characteristic of the cell. Better appliances than those at present at our command, especially more powerful microscopes, and a better understanding of the chemical and perhaps physical processes that are engaged in the production and maintenance of life, will probably reveal the intrinsic factor in the cell that causes it and the tissue

which it forms to undergo the changes that we call aging.

In tracing the causes of aging with a view to minimizing them, more importance has been attributed to the condition of the blood vessels than to the condition of the blood itself. (See ARTERIOSCLEROSIS). The arteries degenerate early, the usual form of degeneration being a hardening of the vessel. In many cases the earliest change is *Atheroma*, a fatty degeneration in which the vessel is softer than normal but the elasticity of the vessel is diminished as in arteriosclerosis and the heart must exert increased propulsive force to send the blood through the body. There is consequently both in hardening and in softening of the vessels increased blood pressure. (The terms Arteriosclerosis and Atheroma are often used interchangeably although they refer to different conditions of the vessels).

Senile degeneration of the vessels is due to three causes acting either independently or together. The impurities in the blood cause localized irritation and inflammation of the lining membrane of the vessel, producing an inflammatory degeneration. Owing to the insufficient and perverted blood supply the waste of muscular fibres in the arterial walls is not completely repaired but is replaced by a growth of fibrous tissue which requires a smaller blood supply. This nutritional degeneration is the ordinary form of senile degeneration of the tissues. A mechanical degeneration results from the continual contraction and expansion of the muscular fibres (nearly 100,000 times a day), these fibres when insufficiently nourished losing their tone and elasticity. The three factors are active in varying degrees in every senile case.

Fibrosis, the increase in fibrous tissue, replacing the waste in other tissue, is a distinctively senile phenomenon. The new growth does not always fill the space of the waste tissue and the manner of its growth sometimes produces most pernicious results. In the spleen the fibrous tissue forms bands which compress the spleen substance causing it to waste and in crossing blood vessels the bands may compress a vessel, occluding it and depriving of nutrition the part which it is to supply. In the bladder the fibrous tissue forms bands across the interior of the walls and the weakened walls bulge out between the bands and form pockets. Urine collects in these pockets and may remain for days, decomposing and producing *cystitis*. In the solid organs like the kidneys, liver, lungs, brain and glandular organs, the fibrous tissue growth compresses the organ and interferes with its functions. The only notable exception to this is the prostate gland which is frequently enlarged in old age. The heart is usually enlarged but this is not a senile change and the fibrosis does not diminish its size to an appreciable degree. The true senile degeneration called *Brown Atrophy*, in which the heart is smaller, denser and shows extensive fibrosis, is very rare.

Fibrosis occurs early in degeneration of the arteries. Late in life calcium deposits occur and in very rare cases there is complete calcification of the vessel and the so-called pipe-stem artery is produced. In the inflammatory degeneration the lining membrane becomes thickened and in small vessels this thickening may completely ob-

literate the lumen of the vessel. Where this happens the part beyond the occlusion is deprived of nutrition and unless a fresh blood supply is rapidly obtained through collateral circulation *senile gangrene* follows. There are few diseases due directly to the degenerated arteries, the pernicious effects of arteriosclerosis being mostly the secondary effects produced in organs and tissues that receive an insufficient blood supply. Directly due to arteriosclerosis are *Angina Pectoris* or neuralgia of the heart which is ascribed to degeneration of the coronary artery; *abdominal crises*, neuralgic attacks in the abdomen ascribed to arteriosclerosis of the abdominal aorta; *Charcot's claudication*, a painful cramp of the legs with sudden lameness, ascribed to arteriosclerosis of the femoral artery. *Cerebral apoplexy* due to cerebral hemorrhage follows rupture of a cerebral vessel which has degenerated. In the case of *aneurism* which is due to degeneration of the vessel, the degeneration is almost always a sequel of syphilis and is not due to the senile changes. Arteriosclerosis may be due to other causing than aging and it will produce the same conditions as the senile degeneration.

The loss of elasticity of the vessel is partly overcome by the increased force with which the heart propels the blood but the force is partly dissipated and lost in the more distant parts of the body, especially in the fine vessels supplying the organs. The heart responds to the diminished propulsive force of the vessels by increasing its own and this is accomplished by a gradual thickening of its muscular walls. There is in earlier life a wide margin of safety between the ordinary activity of the heart and the limit of its functional capacity. After the heart has reached the limit of its overgrowth further excessive demands upon it reduce the margin of safety until the limit of its functional capacity is reached. The progressive degeneration of the vessels necessitates ever-increasing work of the heart and finally, when the limit of its functional capacity is reached, it can no longer respond. The heart may then become paralyzed and sudden death ensues. More often the heart muscle loses its tone, it expands and cannot contract completely, the walls become thinner and the cavities enlarge. *Cardiac dilatation* is an extremely grave condition in old age. Even slight exertion will suffice to cause spasm or paralysis of the organ or after a few moments of excessive activity it becomes so weak that it cannot propel the blood to the brain. The brain being deprived of nutrition it and the cranial nerves become inactive and paralysis of the vital centres results. This is probably the most frequent mode of death in old age.

The pernicious effects of tissue starvation caused by impaired circulation and depraved blood are found in every organ and tissue. The organic matter of the bone wastes and the bones become brittle and fracture easily. The head of the femur gradually becomes depressed until it forms a right angle with the shaft and owing to the brittleness of the bone even a slight jar will suffice to produce a fracture at the neck between the head and the shaft. On account of the loss of organic matter fractures do not heal readily in the aged. In the chest the intervertebral discs become hard and in extreme old age they may ossify.

The same thing happens to the cartilages by which the ribs are attached to the spinal column and to the sternum, the sternum and the ribs become hard and lose their resilience and the whole bony chest wall becomes a rigid box which interferes with the expansion of the lungs. Late in life bone substance itself wastes. A notable example of this is seen in the lower maxilla after the alveolar process, in which the teeth are implanted, has wasted. The waste of the lower jaw gives to the senile face its weak and weakened appearance.

The aches and pains in the joints from which the aged frequently suffer and which are generally called rheumatism, and often treated as such, are due to *arthrosclerosis* or hardening of the joint. The ligaments and cartilages harden, the synovial sacs, the water pads between the ends of the joints, become dry and the articular cartilages covering the ends of the bones waste through attrition. *Rheumatoid Arthritis* or *Arthritis deformans* in which the joint becomes immobile and the part, generally the hand, becomes deformed, occurs almost exclusively in middle aged and elderly persons. This condition, for which many causes have been assigned, is probably only an extreme senile change in which the ligaments contract as well as harden. In rare instances the ossification of many or nearly all the joints will occur, as happened in the case of the celebrated ossified man exhibited a few years ago.

Muscle wastes and the waste is either not replaced at all or it is replaced by fibrous tissue or fat. The fat either accumulates between the muscle fibres producing *fatty infiltration* or it invades the muscle cells producing *fatty degeneration*. The fatty change in muscle is pathological and occurs when the blood supply is insufficient for fibrous tissue growth. Fatty degeneration is, however, the normal senile change in brain and marrow. A fat deposit upon the abdomen is usually looked upon as an early sign of aging. This may appear early through inactivity and it may be absent in persons who are active, especially if they do much stooping. Late in life the fat disappears.

In old age the diaphragm becomes flaccid and the folds of peritoneum which hold the abdominal organs in place become loose, permitting a *ptosis* or sinking of the organs in the abdominal cavity. Owing to the waste and atony of the muscular fibres of the stomach this organ becomes dilated and its contractility is lessened and owing to the waste of the secreting glands digestion is slower and food remains longer in the stomach. For these reasons the generally accepted "little and often" rule for feeding the aged is irrational. The intestines in old age become dilated, the walls are weakened and the whole mass of bowels sinks. The transverse colon sinks at the centre but it is fixed at the hepatic flexure on the right and the splenic flexure at the left and these two bends often form kinks which interfere with the free passage of feces. This is a contributing cause for constipation, the most frequent ailment among the aged. In many cases the rectum becomes dilated until it forms an immense pouch in which feces accumulate for days.

Aside from a diminution in the amount of

bile secreted there is apparently little change in the functions of the liver. The bile remains longer in the gall bladder than in earlier life and it becomes thicker, often forming *cholestrin gall stones*. Such gall stones are frequently found after death though they gave no evidence of their existence during life. They are, however, softer and not as jagged as the pathological stones which give the severe symptoms in gall stone colic. The changes in the kidneys differ from all other senile changes inasmuch as the fibrosis begins at birth and is progressive until impaired nutrition occurs. Thereafter the fibrosis which until then was confined to the space between the apices of the pyramids invades the deeper tissues. In its gross appearance the senile kidney resembles the kidney in *interstitial nephritis* (Bright's disease), but the lining membrane of the tubules and loops show no change and the functional impairment is slight. Less urea and other normal substances are eliminated but there is little or no albumin in the urine and no casts are found. Many pathologists do not differentiate between the senile kidney and the kidney of nephritis and report all kidneys showing the gross changes as nephritis. The failure to differentiate between the two accounts for the number of nephritis cases found at autopsy that gave no symptoms of the disease during life.

Were it possible to examine the kidney during life it would be possible to determine the extent of the senile changes from the extent of the fibrosis. At present we have no standard or basis upon which we can estimate the extent of the senile changes. The blood pressure which is generally employed to determine the extent of the arteriosclerosis is uncertain as there are many other causes for high blood pressure beside arteriosclerosis and a low blood pressure can exist in the presence of arteriosclerosis. A more reliable estimate of the extent of the senile change can be formed from the condition of the sternum. The *ensiform appendix*, the lowest part of the sternum, is cartilaginous in early life and it begins to ossify from above downward during maturity. Normally the ossification does not reach the tip until very late in life. In early and rapid aging this appendix ossifies early and rapidly and it may be completely ossified before the 60th year. Ordinarily the ossification extends down about two-thirds of its length at the age of 60 and below this it has the soft resilient feel of cartilage.

Mental Change.—The mental changes in advanced life proceed independently of the physical changes although the degeneration of the blood vessels and the impairment of the blood affect the nutrition of the brain and its functions. Brain power may show evidences of impairment before there is any evidence of physical change and on the other hand certain faculties continue to improve in their capacity for two decades or more after the brain begins to lose weight. The faculty of memory, however, begins to lose in power before the brain has reached its complete development.

Forgetfulness of names and dates is usually the first symptoms of senile impairment and this may attract the person's attention during the fifth decade of life. Long before this is noticed the individual unconsciously avoids tasks which demand excessive employment of

this faculty. The diminishing power to receive and store impressions and ideas does not make the sharp impression upon the mind as does the diminishing power to recall. He may have been able to learn a new language in a few months in youth and now he finds that he cannot retain a few new words notwithstanding frequent repetition, and unless compelled by necessity he loses interest in the new language and makes no further effort to learn it. Formerly he may have been able to recall at will a tune heard weeks before; now a new tune will make a momentary pleasant impression but unless a conscious effort is made to retain it, it is soon forgotten. In old age a conscious effort must be made to retain impressions which formerly impressed themselves automatically and a conscious effort must be made to recall them. The difficulty in retaining new impressions is due partly to degeneration of the sensory end organs. The lens of the eye flattens and hardens in old age producing *presbyopia*, the far-sightedness of the aged. Objects close by become blurred and the eye does not adapt itself rapidly to see objects at varying distances. The visual impressions are therefore indistinct and they are not received as clear images which the memory will retain. The drum of the ear either hardens forming *otosclerosis* or it wastes and becomes perforated. In either case the sound waves produce an abnormal impression upon the terminals of the auditory nerve and *presbycusis*, partial or complete deafness, results. In the nose the Schneiderian membrane wastes and the sense of smell is impaired and may be entirely destroyed. The taste buds degenerate and the sense of taste is impaired and the aged person wants sharp, spicy, sour, salty or sweet food. The sense of touch and feeling is likewise impaired in old age and persons are less sensitive in touch and in the appreciation of surface pain. They are more apprehensive but surface sensation is actually diminished. The seeming fortitude of aged persons to endure pain is explained by diminished local sensation and weakened mental power to appreciate it. For this reason diseases like pneumonia, peritonitis, pleurisy, gastritis, in which pain is an early symptom, are often neglected until the disease is far advanced and is recognized by other symptoms.

As the mind becomes progressively dulled to impressions obtained through the sensory organs the impressions of mild sensations become evanescent and only powerful impressions, or those to which the mind is specially directed, are retained.

Difficulty in absorbing and retaining new ideas is often an early sign of mental aging. A person finds that where formerly a single reading of a book left a clear mental picture he must now read a paragraph several times and make a conscious effort to understand its import. For the same reason he cannot follow a play which has a complicated plot. The aged person falls asleep at the play, sermon or lecture because the ideas projected come faster than he can assimilate them and the effort to follow them causes brain fag and mental exhaustion. Brain fag sets in more rapidly with advancing age and in many cases the quantity of work done, rather than the quality, is the indication of the extent of the

mental impairment. Writers who could work for hours without intermission must now take frequent rests. If they continue after brain fag sets in, mental confusion follows and this ends in complete mental exhaustion and the mind becomes a blank. The power of imagination becomes weakened, new ideas do not arise as readily and the writer is often unable to find the appropriate word or phrase to express his ideas. It is sometimes possible to detect in the work of an aged writer at what points brain fag set in by the deterioration of the character of his work.

Judgment and reason may remain unimpaired but the mind works more slowly and becomes sooner exhausted. Judgment is, however, readily affected by the emotions and the aged lose control over their emotions. Intense joy or sorrow lasts but a moment and is soon forgotten yet they will weep where there is but little occasion for grief and they will laugh over trivialities. Fear and hatred will often arise without adequate cause and will persist long after the cause is forgotten. Love is never intense and where it appears as a new emotion in an old man toward a young woman the sexual and egotistic elements predominate over the spiritual element. In most cases where remarkable mental ability has been retained in old age close observation revealed a deterioration of all the faculties except the one upon which all the mental power of the individual had been concentrated. The mental ability in this one direction became so prominent that the deficiencies in other directions were overlooked.

The mental attitude of the aged person who has nothing to occupy his mind but his body and his fate is a dull, hopeless resignation to the inevitable. Retrospection brings regrets, the contemplation of the future arouses a haunting dread and the mind is concerned only to preserve the body in the best possible condition to prolong life. If the mind is occupied with serious work which necessitates the whole attention of the individual he is cheerful, hopeful and ambitious. The neglect to furnish aged inmates of institutions with occupations which will keep the mind from self and death is responsible for the generally depressed air of these inmates and the frequency of senile dementia in institutions. In *senile dementia* there is a gradual dulling of the intellect involving every faculty, the will and emotions. There are no marked delusions but a gradual weakening of the perception and conception of things and ideas until there is a complete mental blank.

The aged adhere to old habits and ways and find it difficult to adapt themselves to modern ideas. They resent the efforts of friends and relatives who try to induce them to adopt modern ideas and their resentment may develop into hatred so intense and persistent as to become a mania. This unreasonable hatred of those toward whom there should exist the natural affection arising from close relationship may be unsuspected during the life of the aged individual and may not be known until it is found that the person who had incurred this hatred had been left out of a will. The term *oikomania* has been applied to this mental condition.

Changes in Type.—The process of aging

produces a remarkable phenomenon in the approximation of the sexes toward a neuter type. The male pelvis in old age approaches the female type and the female chest resembles the male chest. There is frequently a growth of hair on the face of the female while the hair on the face of the male becomes scanty. The atrophy of the lower maxilla gives to both a weak and weakened appearance. Her voice becomes lower in pitch, his becomes higher. The female acquires some male characteristics and the male becomes effeminate, but the general trend is toward a neuter type. This interesting phenomenon, called virilence in the female, has received little attention.

Care of the Aged.—The general care of the aged in the home and in institutions has received but little scientific study. In recent years the diseases of the aged have received some attention and are studied as a special branch of medicine to which the term *Geriatrics* has been given. Even the slight research work that has been done in this direction has already brought to light some unsuspected causes for early and rapid degenerations but the great problem of old age, the basic cause or causes, is still unsolved.

Duration of Life.—Various formulæ have been devised for estimating the normal duration of life. Nascher's estimate of 90 years is based upon the normal length of each of the three periods, development, maturity and decline. If these periods are not hastened or shortened each lasts about 30 years and each is broken about the middle by a violent change called a climacteric. A senile climacteric occurs about the 75th year during which there is a readjustment of functions, and this is followed by senility, the final stage of life. Cases of extreme longevity are very rare. They are really freaks of nature corresponding to giants in growth.

Bibliography.—Of the voluminous literature dealing with old age, beginning with Cicero's *'De Senectute'* (B.C. 45), a few works have literary interest but only those of recent years have scientific value. The works of the Middle Ages were either philosophical treatises, or works dealing with the prolongation of life based upon the assumption of the existence of the alchemist's panacea. The best known of this period is Roger Bacon's *'De Retardandis Senectutis Accidentibus'* (1290?), translated and published under the title *'The Cure of Old Age'* by Robert Brown (London 1683). Of the earlier works of modern times, C. W. Hufeland's *'Makrobiotik'* (Jena 1796), is best known. This work passed through many editions, was translated into several languages and is still occasionally quoted. The more recent works of this nature are E. Metchnikoff's *'The Nature of Man'* (London and New York 1903), and *'Prolongation of Life'* (ib. 1910); A. Lorand's *'Old Age Deferred'* (Philadelphia 1910); H. Weber's *'Means for the Prolongation of Life'* (4th ed., London 1914). Jean Finot's *'Philosophie de la Longévité'* (Paris 1900) is an optimistic philosophical study (English translation, New York 1909). M. J. P. Flourons' *'De la Longévité et de la Quantité de Vie sur le Globe'* (Paris 1854) is a scientific study based upon statistical research and is frequently quoted. C. S. Minot's *'Problems of Age Growth and Death'* (London

and New York 1908), and C. M. Child's *'Senescence and Rejuvenescence'* (Chicago 1915), are profound biological studies. The first scientific medical work dealing with old age is Sir John Floyer's *'Medicina Gerocomica'* (London 1724). All modern medical works on the subject are based upon E. Canstatt's *'Krankheiten des höheren Alters und ihre Heilung'* (Erlangen 1839). The most recent works are J. Schwalbe's *'Lehrbuch der Greisenkrankheiten'* (Stuttgart 1909); Boy Tossier's *'Maladies des Vieillards'* (Paris 1912); R. Saundby's *'Old Age, Its Care and Treatment'* (London 1913); I. L. Nascher's *'Geriatrics: Diseases of Old Age and their Treatment'* (2d ed., Philadelphia 1916), and Nascher, I. L., *'Care of the Aged'* (Boston 1919).

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OLD-AGE INSURANCE AND PENSIONS.—The problems of old-age destitution and legislative efforts to meet it are significant of the modern industrial era in which a very large proportion of the productive population are dependent for their living upon a weekly wage or monthly salary. In an agricultural community the aged remain part of large family units and develop no economic problems of their own. Modern industrial development through the competitive striving for efficiency has shortened the productive period of human existence at the same time when improvements in medicine, hygiene and sanitation have extended the span of human existence. As a result every industrial community sooner or later finds itself confronted with the industrial problem of superannuation and the social problem of old-age dependency, and efforts to provide for these conditions in some scientific way claim the attention of modern government to a rapidly increasing degree. In every country where the problem was carefully investigated, or systematic provision was made, a very large proportion of the aged persons was found to be without any income or earnings. In Great Britain, e.g., out of 1,250,000 persons over 70 years of age in 1908, 414,000 were in poorhouses and other institutions, and 667,000 were found to have practically no sources of income. In France over half a million of persons over 70 years of age, in 1907, were found to possess an income of less than \$6 a month. Though the percentage were less striking in Australian colonies, there too, notwithstanding the generally better economic conditions, a very large proportion of the aged were found in need of support.

Through the same channels which were built to meet the problem of sickness (see *HEALTH INSURANCE*), workmen's organizations, friendly societies, mutual aid societies, etc., made efforts to relieve the conditions of their aged members. But this proved to be a very difficult undertaking and many societies came to grief through inability to meet the obligations assumed, so that in many countries it became necessary to pass laws prohibiting the payment of old-age pensions to friendly societies. On the other hand, large establishments, finding that superannuated employees interfered with the efficiency of the plants, were forced to make

provision for the retirement of their employees, at certain ages. Finally the States sooner or later were obliged to face the problem of some systematic provision for their aged citizens. The discussion of plans for systematic treatment of the problem of old age antedate in many States all other forms of social insurance.

The advantages of the insurance method suggested themselves because the "hazard" of old age dependency could strike only a comparative minority of those who survived at 65 or 70, and besides the possibilities of the law of compound interest working themselves out throughout a long period of years offered very alluring prospects. As early as the fifties, State institutions for voluntary insurance of old-age annuities were organized in France and Belgium and in 1864 even in Great Britain. Developments within the field of old-age insurance were really more typical and characteristic of the theoretical evolution of social insurance than in any other branch. The organization of State insurance funds for furnishing voluntary insurance at cost, the granting of more or less substantial State subsidies to stimulate such gratuitous old-age pensions, followed each other in fairly rapid succession. Organically tied up with old age was the problem of chronic invalidity, which may be considered, both economically and physiologically, as equivalent to premature old age.

Including the systems of gratuitous State pensions, the following classification of legalized methods of old-age provision may be made.

I. Voluntary State insurance without subsidies. Great Britain, 1864; Canada, 1908.

II. Voluntary State insurance with subsidies; France, 1850; Belgium, 1851; Italy, 1898; Spain, 1908; Serbia, 1910.

III. Compulsory old-age insurance. Germany, 1889; Austria (salaried employees only) 1906; France, 1910; Luxemburg, 1911; Rumania, 1912; Sweden, 1912; Netherlands, 1913. Also a large number of special industries in other countries; as e.g., Austria (mining, 1884); France (mining, 1894; seamen, 1898; railroads, 1909); Italy (railroads, 1885); Russia (railroads, 1888), etc.

IV. Old-age pensions. Denmark, 1891; New Zealand, 1898; New South Wales, 1900; Victoria, 1901; France, 1907; Australia (act covering entire commonwealth) 1908; Great Britain, 1908.

From the point of view of efficiency the first method proved a dire failure; the simple provision for safe and cheap old-age annuities failed to attract any considerable proportion of the wageworkers. Even the fairly liberal subsidies, given in several Latin countries, though somewhat more successful, were very far from becoming universal, in fact attracted the lower middle class and the better paid mechanic rather than the great mass of unskilled labor. After some 10-15 years of experience in Italy only a few hundred thousand workmen insured and the average amount of insurance was very small indeed.

The German system of compulsory insurance for old age and invalidity was very much more successful numerically, even though its benefits are rather small. For over 20 years it remained practically the only national compulsory old-age insurance system, but within the last five years before the war a very rapid extension of the same principle in several countries took place. In these new acts, the established methods of the German system were rather closely followed.

These consist in the compulsory insurance of all wageworkers in industry, transportation, commerce, agriculture and domestic service, and salaried persons receiving less than 2,000 marks per annum. The dues are collected in small weekly payments and for this purpose the insured are divided into five income classes with a definite weekly contribution for each. The employers and employees contribute equal shares of weekly premium, which is collected from the employer by means of special stamps, which are pasted in the books of the insured. The final old-age pension begins at the age of 70 and depends upon the wage class of the insured. To every pension a subsidy of 50 marks is added out of the State treasury.

Though the system is known as old-age insurance, the provisions for invalidity are really

WAGE CLASS	Annual wage in marks	Annual wage in dollars	Weekly contribution				Old-age pension at age of 70					
			Old law		New law		Insurance pension		State subsidy		Total	
			Pf	Cents	Pf	Cents	Marks	Dollars	Marks	Dollars	Marks	Dollars
1.....	350	83.80 & under	14	3.3	16	3.8	60	14.28	50	11.90	110	26.18
2.....	350 to 550	83.80-130.90	20	4.8	24	5.7	90	21.42	50	11.90	140	33.32
3.....	550 to 850	130.90-202.30	24	5.7	32	7.6	120	28.56	50	11.90	170	40.46
4.....	850 to 1,150	202.30-273.70	30	7.1	40	9.5	150	35.70	50	11.90	200	47.60
5.....	1,150 & over	273.70 & over	36	8.6	48	11.4	180	42.84	50	11.90	230	54.64

WAGE CLASS	Invalidity pension									
	Basic pension		State subsidy		Total		Supplementary amount for each paid-up week of insurance			
	Marks	Dollars	Marks	Dollars	Marks	Dollars	Pf		Cents	
1.....	60	14.28	50	11.90	110	26.18	3		0.7	
2.....	70	16.66	50	11.90	120	28.58	6		1.4	
3.....	80	19.04	50	11.90	130	30.94	8		1.9	
4.....	90	21.42	50	11.90	140	33.32	10		2.4	
5.....	100	23.80	50	11.90	150	35.70	12		2.9	

more important, as over 75 per cent of the pensioners receive their pensions before reaching the age of 70. This is due to the liberal interpretation of the term "invalidity" under the German act, which is not limited to total loss of earning capacity but covers reduction of the normal earning capacity to one-third. The basic invalidity pension is smaller than the old-age pension but the actual amount depends upon the number of paid-up weekly contributions. In the preceding table the main facts in regard to the old-age pensions and contributions are presented. The contributions are given under the old law as well as under the revision of 1911, the latter, however, being larger because some widows' and orphans' benefits have been grafted upon the old age and invalidity system.

In addition there are very complex regulations concerning return of payments in case of remarriage, in case of death and so forth. The later old-age insurance acts on the whole follow the German type of legislation, although there are numerous variations of detail.

Objection has often been raised to this system because of its apparent complexity, and the much simpler method of gratuitous provisions has been advanced as an alternative. This method was first applied on a national scale in Denmark (1891), spread to a few Australasian colonies, and in 1907-08 by national legislation to France, Great Britain and Australia.

The financial arrangements of these pensions laws are very simple. They establish a system of periodic (weekly or monthly) payments to all persons over a certain age (60 in Denmark; 65 in New Zealand and Australia; 70 in Great Britain and France) provided the need is established on the basis of maximum limits both of property and income; there are additional requirements as to citizenship, residence and evidence of worth or good moral character, in general. The French and Australian system also include pensions for permanent invalidity. The actual amount of pension varies according to the circumstances of the individual case, but in most acts there is a definite scale, based upon income from other sources. The Danish pensions vary from 50 kroner (\$16.30) to 200 kroner (\$53.60) per annum, the French from 5 to 20 francs per month (\$0.96 to \$3.86), in Great Britain from one to seven and one-half shillings per week (\$0.24 to \$1.83) and in Australia up to \$2.50 per week.

In addition to the greater simplicity it is argued that this method of straight pensions puts the cost where it belongs, upon the national treasury, and can be collected by a proper tax system. It is also pointed out that the introduction of an old-age pension system immediately meets the existing problem of old-age destitution, while the system of old-age insurance to be effective and reasonably cheap needs a long series of years to work itself out, to allow for the effect of mortality and compound interest.

As against this pension method, it is argued that it remains essentially a method of public outdoor relief, that it has a demoralizing effect directly discouraging thrift (since the pensions are only given on evidence of need) and moreover that it establishes a low dead level of pensions. Pensions gratuitously given

to everybody must necessarily be low, while the method of compulsory insurance permits of a more satisfactory provision based upon the customary wages of the insured. The problem of comparative advantages of these two methods constituted one of the most discussed problems before the international congresses on social insurance.

The inability of solving the immediate problem of old-age destitution through the compulsory insurance system is generally recognized by the inclusion in most old-age insurance acts of complicated so-called transitory provisions, which offer a very much larger State subsidy to the pensions of persons who have reached a certain age at the time the Insurance Law goes into effect. It is evident that for those who are at the time near the pension age, the straight pension element so much predominates over the insurance element, that it might be said that a compulsory old-age insurance scheme has to be ushered in by an old-age pension scheme. Another obvious limitation upon the compulsory old-age insurance method is that it is adaptable only to waged workers or employees while a certain proportion of old-age destitution arises out of other social classes. There is no logical objection to both systems existing side by side, as is proven by the passage of a compulsory old-age insurance law in France in 1910, three years after the pension law was established.

In nearly all civilized countries there is in operation a system of straight pensions to government employees, whose number is increasing in proportion to the rapid development of governmental activities and the industrial activities of the modern state. Many pension systems exist not only for the military establishments but also for the civil employees and finally for the industrial employees of governments. The following countries possess pension systems: Denmark since 1891, New Zealand since 1898, Belgium since 1900, France since 1907, Australia since 1908 and Great Britain since 1908. The straight old-age pension plan has become popular in the United States primarily because of our familiarity with the British plan, while for a generation Germany was the only example of a national compulsory old-age system. France has combined both the compulsory and straight plans. In a sense also the British system may be considered as embracing both plans since a system of compulsory invalidity insurance has been introduced in connection with sickness insurance.

Denmark.—Denmark established the first system of straight old-age pensions by the Act of 9 April 1891. Little attention was attracted to the system for many years until the British plan brought all systems before the public. The Danish plan was intended to be a system of outdoor relief to free the recipient of this form of relief from the various disqualifications, both legal and moral, which poor-relief carries. By this legislation it was admitted that an honest workman, disabled in his declining years, was entitled to support without being classed as a pauper, without losing his rights as a citizen and without losing caste, of which the poor-relief always deprived him. The age of 60 was fixed as the pension age. About 78,000 persons are now in receipt of pensions which aggregate nearly 10,000,000 kroner annu-

ally. Fixed amounts are not stipulated in the law and it has been left to the local distributors to settle, based on their personal knowledge, how much should be given in each case to the parties in question, without too much injustice occurring. The average amount in 1918 was \$33.

France.—The law of 14 July 1905 made it obligatory in France for the state to provide assistance, from 1 Jan. 1907, for aged persons, the infirm and incurable. The scheme is non-contributory and is confined to the necessitous poor. Those admitted to the scheme must be Frenchmen who are without sufficient means and who are incapable of providing by their labor for the necessities of their own existence. They must also satisfy one of the following two conditions: they must be either (a) over 70 years of age, or (b) younger but suffering from an infirmity or a malady which is considered incurable. If they satisfy these conditions, they become entitled to a pension of not less than 60 francs (\$12) a year and not more, except under exceptional circumstances, than 240 francs (\$48) a year. The assistance may be granted either in money or in the form of suitable accommodation and treatment in a hospital or similar institution.

Germany.—The German system is of special interest both because of its avowed intention to stimulate and endow thrift and also of the fact that the contributions imposed are compulsory. The first law on this subject was passed in 1889 and applied compulsorily to all persons over 16 years of age, working for wages or salaries up to \$500 a year, except government and other public officials who were otherwise provided for. In order to draw an old-age pension, the claimant must have attained the age of 70 and must have been insured for a period of 1,410 weeks, termed the "time of waiting." The insured persons are divided into four wage classes and the contributions as well as the pensions differed according to these classes. The employers are responsible for the whole contributory part, but could subtract the contribution of the employees at next pay-day. The premiums were levied in the form of stamps which were issued for the several wage classes. Receipt cards were obligatory and had places for 52 or more stamps and had to be exchanged for new ones when filled up. Some modifications were introduced in the Act of 1899, by which the burden of the payment of premiums was equalized. Later a fifth wage class was added and a central pension office established.

New Zealand.—The act providing old-age pensions was passed in 1898. It provided for the payment out of the Consolidated Fund of a pension of \$90 per annum, or \$1.72 per week, without contribution by the beneficiaries. An amending act of 1 Sept. 1905 increased the full pension to \$130 per annum, or \$2.50 per week. The act applies to all residents of the colony who fulfil the necessary conditions. The qualifications of an applicant are briefly as follows: He must have reached the age of 65; he must have resided continuously in the colony for 25 years; he must not during the past 12 years have been imprisoned for four months; he must not at any time have deserted his wife and children; he must have lived a sober and reputable life for at least five years previous;

his income must not reach \$300, etc. Payment is made by 12 monthly instalments through the post office.

Australia.—The old-age pension system came into force in New South Wales and Victoria in 1901, and closely followed the New Zealand system, and in Queensland in 1908. These plans were superseded by the Commonwealth Act of 1 July 1909, by which the pension age is 60 years for women and 65 for men. A residence of 20 years is required. Pension commissioners fix the pension rate for each special case. It must not exceed \$130; nor must the recipient's total income from all sources exceed \$260. Good character and citizenship are other necessary conditions.

Austria.—In 1906 Austria established compulsory old-age and invalidity insurance after the model of Germany. Only salaried employees are benefited by the act. There are six salary classes.

Belgium.—Minor schemes of insurance had received government aid long before a comprehensive system was enacted into law on 10 May 1900. The two main objects of this law are as follows: (1) Assisted Insurance.—To encourage the working classes to save and to assist them by state contributions, by constituting a fund which will secure to them at the age of 65 an annuity not exceeding 360 francs, or about 18 cents per day. (2) Non-contributory Pensions.—To grant workmen or women, or ex-workingmen or women, special grants of 65 francs per annum when they are in want.

United States.—The old-age pension method is familiar to the American people through the system of war pensions, which are paid to a large number of war veterans at a cost of over \$150,000,000 a year. The British Old-Age Pension Act of 1908 has also stimulated the demand for old-age pensions rather than insurance. While no legislative action, except by some States and municipalities for their own employees, has yet been accomplished, the subject has called within recent years for considerable discussion. Several States have had investigating commissions and the reports of two Massachusetts commissions are perhaps best known. While both of these have been adverse to any immediate legislative program, the subject continues to receive considerable attention. A recent report of the Wisconsin Industrial commission suggests both methods as possible alternatives. Bills for old-age pensions have been introduced in the United States Congress, in Massachusetts and other States.

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OLD BAILEY, London, England, an ancient historic criminal court, prior to 1903 adjoining Newgate Prison, between Holborn Viaduct and Ludgate Hill, where now stands the Central Criminal Court. A prison was attached to it. In the Old Bailey the surviving

judges of Charles I were tried after the Restoration, in 1660, and it witnessed also the trials of the patriot, Lord William Russell, in 1683, Jack Sheppard in 1724, Jonathan Wild in 1725, the poet Savage in 1727, Dr. Dodd in 1777, Bellingham, the assassin of the statesman Perceval, in 1812 and the Cato Street conspirators in 1820. In the days when the criminal law of England was much more severe and far-reaching than it is to-day, Old Bailey Court became known not only in England but all over the English-speaking world for its severity and the number of convictions made and death sentences imposed. In the trial of Charles Darnay for treason, in the 'Tale of Two Cities' Dickens has graphically described Old Bailey. It is now officially designated as the "Central Criminal Court," but non-official England still knows it as "Old Bailey."

OLD BAY STATE, a name given to Massachusetts, whose shores are washed by Cape Cod Bay. Prior to the adoption of the United States Constitution, Massachusetts was known as "the Colony of Massachusetts Bay."

OLD CASTILE. See **NEW CASTILE**.

OLD CATHOLICS, religious denominations formed by certain seceding Roman Catholics in 1870, whose basis of belief and practice was declared to be the revival of the traditions of the Apostolic Church and the recognition, as authoritative, of the first seven œcumenical councils of the Church and none others.

The Cause of the Revolt.—An œcumenical council, commonly known as the Vatican, was convened at Rome and assembled 8 Dec. 1869, which included 49 cardinals, 9 patriarchs of the Eastern Church, 4 primates, 121 archbishops, 479 bishops and 52 abbots and other monastic dignitaries. On 15 Jan. 1870 the number present had increased to 744, and by March to 764. When the object of the council, the definition of papal infallibility, was made known, a protest was made, outside the council, by Dr. Döllinger, the most illustrious scholar of Roman Catholic Germany, supported by the French Minister Darn and the Austrian Von Buesh and a small party of bishops. Nevertheless the dogma was at length promulgated and received the assent of the Roman Catholic hierarchy throughout the world. Its terms were as follows:

"We teach and define . . . that the Roman pontiff, when he speaks *ex cathedra*, that is, when in discharge of his office of Pastor and Doctor of all Christians he defines, in virtue of his supreme apostolic authority, a doctrine of faith or morals to be held by the Universal Church, is endowed with the divine assistance promised to him in Blessed Peter, with that infallibility with which our divine Redeemer willed that the Church should be furnished in defining doctrine of faith or morals, and therefore that such definitions of the Roman pontiff are irreformable of themselves and not in virtue of the consent of the Church." This dogma was promulgated 18 July 1870.

The universities of Germany alone opposed the new Vatican decree. Dr. Von Schulte, professor at Prague, was first to utter a written protest. At Nuremberg a vote of dissent was passed by a meeting of Roman Catholic professors and scholars in August 1870. "Father

Hyacinthe" (M. Charles Loyson) issued his 'Appel aux Evêques Catholiques,' denying that the decree was binding on the Church. The learned Dr. Döllinger set forth in a letter his reason for dissent as "a Christian, a theologian, an historical student, and a citizen." His excommunication was immediately proclaimed from all the pulpits of Munich. He was, however, supported by the professors of the University, and an address to the king, written in the same spirit of protest, received 12,000 Roman Catholic signatures. Finally an assembly of the dissentients was held at Munich the following September and was attended by 500 delegates from all quarters of Europe. The lectures of Reinkens delivered in 1871 made the issues plain to the world, and his arguments were echoed and enforced in the inaugural address delivered by Dr. Döllinger as rector of the University of Munich.

Constitution of the Old Catholic Church.

—The movement gradually gained such momentum that organized action was forced upon its supporters. On 4 June 1873 Dr. Reinkens was consecrated their bishop at Rotterdam by the Jansenist Bishop Heydekamp of Deventer and, as the cause was spreading rapidly in Switzerland, a congress was held there and was attended by both English and American theologians (12-14 September). The election of Bishop Reinkens was recognized by the German government, and in the following year a synod and conference were held at Bonn. The results of these discussions were embodied in canons by which the clergy were allowed to marry, compulsory fasting and confessions were abolished, the vernacular was ordered to be used in public worship, and it was made permissible in the churches to administer the communion in both kinds to Anglicans. In Switzerland the Old Catholics, or as they there preferred to style themselves, Christian Catholics, chose Professor Herzog for their bishop and he was duly consecrated by Bishop Reinkens 18 Sept. 1876. The University of Bern elected an Old Catholic faculty and in 1890 there were 55 congregations under Bishop Herzog, with some 50,000 lay members and 72 ministering clergymen. In Austria the Old Catholics organized themselves in 1888 and in 1900 were reported to number 16,000 souls. In France a Gallican Old Catholic movement was set on foot by Père Hyacinthe under the jurisdiction of the Arminian archbishop of Utrecht. The Old Catholics in Italy were led by Count Campello, those in Spain by Cabrera and in 1890 and 1892 there was an international Congress of Old Catholics at Lucerne, another at Rotterdam in 1894 and a third at Vienna in 1897. On the death of Bishop Reinkens in 1896, Vicar-General Theodor Weber was elected to take his place and consecrated in Bonn with a jurisdiction extending over the German Empire. In this large diocese the Old Catholics number 61 priests (four of them retired and two holding professorates), and from 45,000 to 50,000 lay members; and were building many churches, parsonages and seminaries. At Bonn and Essen they have founded hospitals and poorhouses. Among the periodicals devoted to the interests of the Old Catholics' movement are *Internationale Theologische Zeitschrift* (Bern); *Der Katholik* (Bern); *Alt-katholisches Volksblatt* (Bonn); *Deutscher Merkur*

(Bonn); *Amliches Altkatholisches Kirchenblatt* (Bonn); *Le Catholique National* (Bern); *Le Catholique Français* (Paris); *La Luz* (Madrid); *Giro Camo Savonarola* (Piacenza); *Il Labaro* (San Remo); *Dé Oud Katholiek* (Rotterdam); and *Revue Internationale de Theologie*. Consult Beyschlag, 'The Origin and Development of the Old Catholic Movement' (American Journal of Theology, Vol. II, Chicago 1898); Goetz, 'Die geschichtliche Stellung und Ausgabe des deutschen Alt-Katholicismus' (1896); Mayor, 'Facts and Documents' (1875); Mullinger ('Theodorus'), 'The New Reformation'; Scarth, A. M. E., 'The story of the old Catholic and Kindred Movements' (London 1883).

OLD CHURCH SLAVONIC LANGUAGE AND LITERATURE, in Slavic philology, the name of the parent tongue of Slavonic group languages and literature. In the 9th century the Slavic biblical and liturgical books were translated by the "Slavonic apostles" Cyril and Methodius, into a dialect which probably was spoken in Macedonia and the vicinity of Salonika, where these scholars were born and lived in their boyhood. The Slavs, like all primitive peoples, practised divination at first by means of marks and cuts on wood. Later the Southern Slavs used an alphabet called Glagolitic (*Glagolitsa*), which has survived as a liturgical script in certain parts of northern Dalmatia. After their baptism the Slavs were compelled to write the Slavonic tongue with Greek and Latin letters, without any proper rules. Constantine the Philosopher, named Cyril in monastic life, was the first teacher who made them an alphabet of 38 letters (hence the name Cyrillic, in Slavic *Kyrilitsa*). The question into which Slavic dialect were translated church books is still unsettled. The Bulgarian and some German philologists believe that this dialect was the old Bulgarian language. The noted Serbian scholars Daničić and Novaković, and the Russian historian, Kačanovsky, assert that this was old Serbian, while Kopitar, Miklosich and Jagić maintained that old Slavic was identical with old Slovene, as it was spoken in the province of Pannonia, in the 9th century. But there is no doubt that in such decisions much was due to local patriotism or political sentiments. As the liturgical literary organ of the church, Old Church Slavic completely outgrew its original domain. It spread gradually from province to province wherever the divine service was carried on in the Slavic tongue. It penetrated to all the South-Slav lands, and was to be found among Serbo-Croats, Bulgars and the Eastern Slavs (Russians). In all these regions the church language officiated according to mediæval conceptions, both as the national and the common speech, just as the Latin type did among the Roman and Teutonic peoples. In exercising its "civil" functions it laid itself open to the different local influences, as to intonation, form and a continually enlarging vocabulary. Since the 11th century one can accurately speak of the Serbian, the Russian and the Bulgarian recensions, or rather of Serbo-Slavonic, Russo-Slavonic and Bulgaro-Slavonic. It is remarkable to notice that the Church Slavic of the Middle Ages even took into its scope for a considerable time, tongues

which were not Slavic. This happened, to Rumanian in the south, and to Lithuanian in the north.

The sway of Church Slavic as the mediæval literary speech of all the Orthodox Slavs lasted many centuries. In Russia it obtained until the time of Peter the Great, and among the Serbs and Bulgars until the end of the 18th century. Peter the Great put the first obstacle in the way of the monopoly of Church Slavic as the Russian literary speech. He ordained a new form, a kind of modernized letter adopted under Dutch influence, and called this the citizens' alphabet. The hitherto superfluously ornamented letters and characters of the abbreviated words and expressions were kept in reserve for church use. Thus the Old Slavic was limited only to liturgical purposes. Even theology as doctrine and church oratory and administration were henceforth carried on in the new Russian language, which was used in the church service only on special occasions.

Among the Orthodox Southern Slavs, particularly the Serbians, a mixture of Church Slavic in Russian form with a popular rendering was in vogue to the end of the 18th century. Vuk Stefanović was the first reformer to shake off the remnants of this artificial dialect. The pure speech of the Serbian people came into its own as the common organ of officialdom and literature. The influence of Vuk Stefanović in Bulgaria arrived somewhat later and more tardily. So even till to-day all Orthodox Slavs have one and the same church language, which is essentially restricted to church uses. The limits to which it is employed are much narrower than those allowed to the Latin in the Catholic Church. As to the ancient literature in Old Church Slavic, it was mostly written by clergymen of all ranks, and very often by the monarchs themselves, who either chose to, or were forced to, renounce the throne and to join monastic life. They generally wrote their books and documents in the cloisters: at Hilendar (Mount Athos), at Studenica, Dečani, Rilo, Pečerskiy and many another monastery in the Balkan Peninsula and southern Russia. The writers imitated Greek literature, which was very handy to them and extremely rich in content. Properly speaking the Old Slavic literature represents Byzantine literature *en miniature*. It embraces almost the same branches of literary production: theology, history, rhetoric, mysticism, asceticism, polemics, exegesis and other religious topics existing in almost any country at that time. There have been collected up to now 5,000 manuscripts, which represent the production of the old period of Slavic literature, but it cannot be affirmed that there are so many finished works. Besides compilations and translations there are original writings and documents mostly on the lives of the Slav and Yugoslav saints. The disciple of Cyril and Methodius, Clement (styled in the titles of his works, "the Slavonic apostle") wrote many sermons and panegyrics of saints. To him and his pupil Gorazd, is assigned 'Vita SS. Cyrilli et Methodii,' a valuable biography of the Slavic missionaries. Of the year 1073 is the 'Izbornik' or 'Miscellany' of Prince Sviatoslav, written for that prince by John the diak or deacon. This is a kind of a Russo-Slavonic encyclopedia, drawn mostly from

Greek sources. Its style is praised as clear and simple. The reputed author of the earliest Russian Chronicle, Nestor (1056-1114), a monk of the Pečerskiy cloister of Kiev, wrote his books in Herodotean manner, and gave important ethnological data of Slavonic races. Similar works are found in Serbo-Slavonic recension under the name 'The Ancient Serbian Biographies.' The best writers of the time were Archbishop Sava or Saint Sava (1164-1236), his brother, King Stefan Prvovenčani (i.e., the 'first crowned'), and the monks Domentian, Theodosius and Gregorius Tsamblak. The highest literary creation of the period is undoubtedly 'The Lives of the Serbian Kings and Archbishops,' by Archbishop Danilo (d. 1338). With the Serbian 'Enlightener' (*Prosvetitelj*) Sava and the Russian historian, Nestor, began the long series of Slavic annalists, whose works remind us of the 'Anglo-Saxon Chronicle,' with dry details and quaint stories. The chronicles and biographies in the Old Slavic literature are almost without literary value, but as historical material they are useful. In the field of legislation there are some codes of laws in early Slavonic literature which represent many features of interest. Such are the 'Russkaya Pravda' of Yaroslav (11th century) and the 'Zakonik Stefana Dušana' (14th century). Both of these codes show that the Slavs were at that time quite on a level in civilization with the rest of Europe. From the 15th to the end of the 18th century, the cultural life of the Southern Slavs and their literature was almost entirely centred at Ragusa (Dubrovnik), the only portion of the Yugoslav country which was free from the Ottoman yoke. But because this literature was no longer written in the Old Church Slavonic, it remains beyond the scope of this article.

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MILIVOY S. STANOYEVICH.

OLD COLONY, a name applied to the southeast part of Massachusetts, the section occupied by the Plymouth Colony, and later given to the State.

OLD CREOLE DAYS, a collection of short stories published in 1879 by George W. Cable, then a young man living in New Orleans. The setting of the stories is that of the picturesque old French and Spanish city in the early years of the 19th century just as it was merging into the American city of later years. Against the background of the Rue Royale with its balconies, cafés and gardens, or the historic mansions on the bayous and the Mississippi, charming types of Creole men and women, with now and then picturesque backwoodsmen or more practical Americans, are portrayed in these stories, that may challenge comparison with the best short stories of modern literature. Mr. Cable is as supreme a master of style as he is of delicate characterization and romantic incidents. One cannot praise too highly the atmosphere of charm and distinction that he has thrown about one of the outstanding human situations in American history. While the author now and then reveals a tendency, so marked in his later writings, to suggest his own interpretation of social problems engendered by certain caste feelings, these stories have the freshness and the charm of a master artist. While it is difficult to speak too highly of the 'Café des Exilés,' 'Tite Poulette,' or 'Madame Délicieuse,' there is something more elemental in 'Posson Jone' and 'Jean-Ah Poquelin.' The last-named story, in its revelation of the hero's resistance to the American invasion and of a brotherly love that knows no limit in its self-sacrifice, is one of the moving tragic stories of modern times.

EDWIN MIMS.

OLD CURIOSITY SHOP, a novel by Charles Dickens, written in 1840-41, as a serial for *Master Humphrey's Clock*, a weekly periodical based on the model of Addison's *Spectator*, to publish short stories, essays and miscellaneous papers. In the fourth number, according to the public request for another 'long story,' Dickens commenced the 'Old Curiosity Shop.' It is a novel of a difficult trend with an involved plot. The character of Little Nell stands out as that of a precocious child of inherited tendencies in a somewhat overdrawn exhibition of pious seriousness and long submissive suffering, which plays upon the sympathy and emotions of sentimental readers. Jeffrey and Landor, however, compared the delineation of this character to that of Cordelia. The story is relieved by the lively wit of Dick Swiveler, the Marchioness, Quilp and the description of the wandering Bohemians which maintain the best characteristics of the humor Dickens had originated in the 'Pickwick Papers'; 'Nicholas Nickleby,' etc.

OLD DOMINION, a name given to Virginia. In the original charters pertaining to the lands of Virginia, it was frequently called "the colony and dominion of Virginia." Massachusetts was given the name "Old Colony" and Virginia "Old Dominion."

OLD-FIELD LARK, a local name in the Southern States for the meadow-lark (q.v.).

OLD FOLKS AT HOME, a famous Southern plantation song, words and music written in 1850 by Stephen Collins Foster (q.v.). The song realized some \$15,000 for the author.

OLD FORGE, Pa., borough in Lackawanna County, on the Lackawanna River, and on the Lehigh Valley, and the Delaware, Lackawanna and Western railways, about five miles southwest of Scranton. It was settled in 1830 and remained a part of the Old Forge township until 1899, when it was incorporated as a borough. It is in the anthracite coal region and a large number of the men and boys of the borough are engaged in coal-mining. The chief industries beside the mining and shipping of coal are glass-blowing, manufacturing silk goods, and making chemicals and fertilizers. It has a fine high school building and good grade schools. The government is administered by a burgess, who holds office three years, a borough council and subordinate officials. Pop. (1920) 12,237.

OLD GLORY, a popular name for the flag of the United States. It was first applied in 1831 by William Driver, a sailing captain of Salem, Mass., who died at Nashville, Tenn., in 1886. Previous to the outbreak of hostilities between the North and South "Old Glory" was flung to the breeze every day from the window of Captain Driver's Nashville house; but when the conflict began the old flag had to be secreted. It was kept out of sight till General Nelson's wing of the Union army appeared in Nashville 27 Feb. 1862, when Captain Driver presented it to the general to be hoisted on the Capitol. It was run up, and Captain Driver himself did the hoisting. Its name and history soon became familiar to all the soldiers in General Nelson's command.

OLD GRIMES, the hero of a popular humorous American ballad and song, by Albert Gorton Greene (q.v.). The title is an adaptation from one of the metrical tales by George Crabbe, but the personage described in the ballad is an exaggerated study of an eccentric New Englander who flourished in the earlier half of the 19th century.

OLD GUARD, The, a popular name applied to a body of French troops in the army of Napoleon I. The Guard consisted of five regiments; was distinguished for bravery, and at the battle of Waterloo made the final charge of the French army. Previously it had suffered severely in the Russian campaign. The Guard was created by Napoleon in 1804, out of picked men from every part of the service and from members of the Consular Guard. The Old Guard was peculiar in that it had its own general staff and received orders from its own commander-in-chief alone.

OLD HICKORY, an affectionate nickname given to Andrew Jackson (q.v.) by his militia troops, on account of his toughness and

endurance of hardship. It seems to have been first conferred on occasion of his march back from Natchez in February 1813, when, after having sent him there to foil an expected British attempt on New Orleans, Secretary Armstrong ordered him to disband his men. Jackson in great wrath marched them home in a body, undergoing great discomforts on the way.

OLD HUNDRED, a popular religious hymn tune adopted from a 15th century melody. The tune is found in the Flemish Psalter (1540) and in the Dutch Psalter (1561). In England it was originally sung to the 100th Psalm. The melody was adapted to Beza's CXXXIV Psalm, included in the Geneva Psalter (1554), and was arranged by the musical editor of the book, Louis Bourgeois. Hence the tune has been frequently credited to him. It was included in the Psalms with music by Marot and Beza (Lyons 1563); and two years later, in Claude Goudimels' collection of tunes published in Paris. It is thus evident that it was both well known and popular by the middle of the 16th century. In England it was originally known as the "hundredth tune"; and from this designation came the name "Old Hundred." Consult Fitzgerald, 'Stories of Famous Songs' (1897).

OLD IRONSIDES, a name applied to the United States frigate *Constitution* (q.v.).

OLD KENTUCKY HOME, a famous plantation song, written and set to music by Stephen Collins Foster in 1850.

OLD LINE STATE, a popular name for the State of Maryland, which in the early colonial days was the dividing line between the Crown land grants of William Penn and Lord Baltimore.

OLD MAN; OLD WOMAN, ornamental and culinary herbs. See ARTEMISIA.

OLD MAN OF THE MOUNTAIN, a name given to a huge rock on Profile Mountain, in the Franconia Range, N. H. When viewed from certain positions it bears a marked resemblance to a man's face. The name is sometimes given to Profile Mountain.

OLD MAN OF THE MOUNTAIN, the mediæval name of the ruler of the Assassins. See MOHAMMEDANISM.

OLD MAN OF THE SEA, (1) frequently in Greek poetry, an epithet applied to Nereus. (2) In the 'Odyssey,' an epithet also of a sea-deity, Phorcys or Phorcus. (3) In the 5th voyage of 'Sinbad the Sailor' in the 'Arabian Nights' Entertainments, an old man, who, under pretense of being carried by Sinbad across a brook, fastened himself upon the latter's back and could not be dislodged. Sinbad finally made him intoxicated, threw him upon the ground and broke his head with a stone. In a derived sense, the expression is often used of a bore, or of a burden that cannot be escaped.

OLD MORTALITY, a novel by Sir Walter Scott published in 1816. It deals with the struggle between the Covenanters and the forces of the Crown under Claverhouse (see GRAHAM, JOHN, VISCOUNT DUNDEE), about 1670. The title is the nickname given to Robert Paterson (q.v.), who bestowed years of care upon the gravestones of Covenanters.

OLD NICK, popular sobriquet of the Devil, derived from Saint Nicholas (Ger. Nicolaus, diminutive Nickel, often used of the Devil) and more remotely from Nekker (or Nikker), a Teutonic water-sprite whose appearance to sailors foreboded death and drowning. Christianity, when it got the upper hand in the Germanic countries, still retained a liking for this old Teutonic culture god; but the priesthood did its best to discredit him. Hence he survives to-day with two exactly opposite characteristics. As Saint Nicholas and Santa Claus he is the beneficent culture god and lover of children as he was beloved and respected by the Pagan people. As Old Nick he lives up to the reputation the Christian priests gave him when they degraded him from his high estate. He was the carrier of souls to the future world, and as such boded disaster. In this respect he is closely related to the Irish Ban She; and from this side of his character his Old Nick attributes were deduced. Old Harry, Old One, Old Scratch are other names similarly used.

OLD NORTH STATE, *The*, a name sometimes given to North Carolina (q.v.).

OLD OAKEN BUCKET, *The*, a poem by Samuel Woodworth (q.v.), an American poet, written in 1817 and first published as 'The Bucket.' The air to which it is set is an adaptation of Frederick Smith's music of Moore's song 'Araby's Daughter.'

OLD ORCHARD, Me., town in York County, on the Atlantic Ocean, and on the Boston and Maine Railroad, about 10 miles southwest of Portland. It is a famous summer resort, on account of its smooth ocean beach 12 miles long, where surf bathing is safe, and there are good opportunities for fishing. Deep-sea fishing is a favorite sport, but those who prefer still-water fishing go to Biddeford Pond nearby. In 1903 conventions were held here under the auspices of the Christian Workers' League, the Christian Alliance, and the Woman's Christian Temperance Union, and a Musical Festival, a White Cross Convention, and a Methodist Convention. The population is several thousand in the summer months, but the regular residents number about 1,700.

OLD POINT COMFORT, Va., a famous watering place in Elizabeth City County; on the point of a small peninsula where Chesapeake Bay and Hampton Roads enter the Atlantic Ocean. It is near Fort Monroe and about five miles north of Norfolk. The climate is equable, the opportunities for bathing, fishing and boating are excellent; the garrison at the Fort, and the cities of Norfolk and Portsmouth nearby all add to the attractions. The place has two excellent hotels which are frequented summer and winter. Commercially the town is active in the shipment of fish, oysters and vegetables.

OLD RED SANDSTONE, *in geology*, a name loosely used by Hugh Miller (q.v.) in his 'The Old Red Sandstone' and 'Footprints of the Creator,' for the formation below the Carboniferous (q.v.), and above the Silurian (q.v.) New Red Sandstone (q.v.) was by contrast used of similar red strata of Permian Age. Miller's books did much to draw the attention of scientists to this group of Paleozoic rocks, and the term became popular. In scientific usage it was soon ousted by 'Devonian' (q.v.),

which as suggesting Devonshire the typical English locality is less misleading than Old Red Sandstone, inasmuch as these rocks consist of other sandstones than red, for example, white, yellow and green, and of many beds of clay and limestone. These beds are believed to be largely of estuarine and terrestrial origin, containing both marine and land fossils. The Devonshire rocks, on the other hand, are not sandstone but chalk; the identity or similarity of geological genesis between the rocks of Devon and Miller's Scotch sandstones was proved by the similarity of fossil remains. In America the main groups falling under the head of the Devonian or Old Red Sandstone System are those styled by the New York Geological Survey, the Catskill, Chemung, Portage, Hamilton, Marcellus, Upper Helderberg, Schoharie and Oriskany groups (qq.v.).

OLD SQUAW, or **OLD WIFE**, the long-tailed duck (*Clangula hiemalis*), a sea-duck present in the nesting season in all boreal regions, and visiting the United States in winter. It is blackish and whitish; head, neck and lower parts mostly white in winter; a patch of gray on the head; breast brownish black; bill black and orange; tail very long—a means of instant recognition of the drake. The tail of the female is short, and her plumage is mostly grayish brown. Gunners sometimes call the drake "old injun" and the female alone "old squaw"; also "south-southerly," etc. Most of the names are taken from its noisy habits, for it is almost continually calling, but its cries are musical. They are favorite with gunners more from the skill required in shooting them, on account of their swift flight and wary ways, than for excellence of flesh; they rarely present themselves for a shot except when they come into the bays and river mouths for food at sunrise, flying in long lines. They also are met with on the Great Lakes.

OLD TESTAMENT, Canon of the. See BIBLE, Vol. III, p. 613.

OLD TESTAMENT, Jewish Translations of the. See BIBLE, Vol. III, p. 652.

OLD TESTAMENT INTERPRETATION, History of. See BIBLE, Vol. III, p. 638.

OLD TESTAMENT STATISTICS. See BIBLE, Vol. III, p. 673.

OLD TESTAMENT TEXT CRITICISM. See BIBLE, Vol. III, pp. 629-633; 669-671.

OLD-WOMAN-WHO-NEVER-DIES, according to a Mandan myth, is a supernatural character who lives in the moon. She is the mother of six children, three sons and three daughters, the Sun, the Night, the Morning Star, the Evening Star, and two other stars, one of which circles round the polar star. Old-Woman-who-never-dies sends the geese and wild fowl in the spring, and she makes the corn grow. Dances are given in her honor in the spring and in the autumn at which she is entertained among other things to send the buffalo. The great stag, the white-tailed stag and the blackbirds help the Old-Woman-who-never-dies to guard the corn fields and the mice and the moles aid the good work. She lives in the south and when the birds go south in the fall they go to her and she feeds them out of her magic kettle which never becomes empty.

OLDBERG, öld'bérg, **Arne**, American musician: b. Youngstown, Ohio, 12 June 1874. He studied at Vienna and Munich under Leschetizky and Rhineberger, and since 1899 he has been professor of music at Northwestern University. He was president of the Chicago Manuscript Society in 1901-03. His compositions in chamber music include several quartets, a trio and three quintets, and among his orchestral compositions are two symphonies, two overtures, a theme and variations, an orchestral rhapsody and an organ concert. He has also composed numerous pianoforte pieces.

OLDCASTLE, öld'kas-l, **Sir John**, **LORD COBHAM**, English nobleman: b. Herefordshire in the 14th century; d. London, 25 Dec. 1417. He obtained his peerage by marrying the granddaughter of Lord Cobham. A zealous adherent of Wickliffe, he collected and transcribed his works and distributed them among the people. In the reign of Henry IV, at the head of an English army in France, he obliged the Duke of Orleans to raise the siege of Paris. Under Henry V he was accused of heresy, and not being able to satisfy his accusers he was condemned as a heretic, and committed to the Tower, but escaped. It was then reported to the king that 20,000 Lollards were to assemble at Saint Giles' for his destruction, with Lord Cobham at their head. This accusation seems to have been credited by Henry, and there certainly was an abortive attempt at a Lollard rising, with which Oldcastle was probably connected. He avoided capture for a time, but at last was taken, and as a convicted heretic and traitor was "hung and burnt" in Saint Giles' Fields. In later days he was represented as "the blessed martyr Lord Cobham," though, on the other hand, he figured as the boon companion of young Prince Henry, a roysterer and a coward. Hence his name was originally adopted by Shakespeare in his 'Henry IV,' instead of that of Falstaff. The old play of Sir John Oldcastle (1600) adopts the favorable view of his character. Consult Gilpin, 'Life of Sir John Oldcastle' (London 1765), and also lives by Gaspey (London 1843), and Brown (London 1848); Maurice, 'English Popular Leaders' (London 1872).

OLDENBURG, öld'dén-bërk, **Henry** (Ger. öld'dén-boorg), German writer and courtier: b. Bremen, Germany, about 1615; d. Greenwich, England, September 1677. He was graduated from the Gymnasium Illustre, Bremen, in 1639; sent as consul for Bremen to London and served in that capacity during the "Long Parliament" and Cromwell's Protectorate. In addition to attending to his diplomatic duties he devoted much time to literature. He was one of the first members of the society organized in 1660, which later became the Royal Society, and he was a friend of Milton, Spinoza, Bayle and many other leaders in the world of learning. He edited the 'Transactions' of the Royal Society (1664-77) and published numerous translations, among which are 'A Genuine Explication of the Book of the Revelation,' by A. B. Piganius (1671) and 'The Life of the Duchess Mazarine.'

OLDENBURG, Germany, (1) a town, capital of the state of the same name, 24 miles northwest of Bremen, on the Hunte, which here receives the Haaren and forms a

harbor. It has fine promenades on the site of the old fortifications, two grand-ducal palaces or residences, one of them containing a fine library, a handsome grand-ducal picture gallery, a modern town-house, a public library, museum of Germanic and other antiquities, fine theatre, railway station, gynasium and commercial school. Among its foremost industries are manufactures of tobacco, glass, leather, soap, earthenware, corks, linoleum, yarn, knit goods, brick and musical instruments. Pop. over 30,000. (2) The grand-duchy of Oldenburg, comprising the duchy of Oldenburg and the principalities of Birkenfeld and Lübeck, has an aggregate area of 2,479 square miles. It borders on the North Sea and is surrounded east, south and west by Hanover. In the Diet or Reichstag of the German Empire the duchy is represented by three deputies and in the Bundesrath or Federal Council by one member. The ducal house of Oldenburg dates from the commencement of the 12th century, and among its branches are the kingly houses of Denmark and Greece. Pop. about 400,000.

OLDFIELD, old'fēld, **Anne**, English actress: b. London, England, 1683; d. there, 23 Oct. 1730. Her dramatic powers attracted the attention of Farquhar, the dramatist, and through his influence she made her appearance at Drury Lane. She soon overcame adverse criticism and rapidly rose to be the leading actress of her day. Her preference was for rôles in plays of the "genteel comedy" order, but when finally persuaded to take tragic parts she is said to have startled even her fellow actors by her power. Though received in the highest social circles her private life furnished ground for censure, as she openly lived with Arthur Mainwaring, and after his death with General Charles Churchill. She was buried in Westminster Abbey with high honors. Her most famous rôles were Lady Betty Modish in 'The Careless Husband'; Jane Shore; Cleopatra; Sophonisba. Consult Baker, 'English Actors from Shakespeare to Macready' (New York 1879); Doran, 'Annals of the Stage' (Bath 1888); Geneste, 'Some Account of the English Stage' (Bath 1882).

OLDHAM, öld'am, **John**, American colonist: b. England, 1600; d. Block Island, R. I., 1636. He came to Plymouth from England in 1623, but because of designs against the Plymouth government entertained by him with John Lyford, a Church of England clergyman, he was banished from the colony. He subsequently made his peace with the colonists and was of service to them on several occasions. Removing to the Massachusetts Bay Colony he settled in Watertown, which he represented in the first General Court. His murder by Indians on Block Island in 1636 was the chief incident leading to the Pequot War (q.v.).

OLDHAM, William Fitzjames, American Methodist Episcopal bishop: b. Bangalore, India, 15 Dec. 1854. He was educated at the Madras Christian College, at Allegheny College, Meadville, Pa., and at the University of Boston. He entered the Methodist Episcopal Ministry in 1883, and in 1884 founded the Malaysian Mission of the Methodist Episcopal Church at Singapore, Straits Settlements and

in the East Indies. In 1885 he founded the Anglo-Chinese School at Singapore, which in 1918 had 1,000 students. In 1895 he founded a chair of missions and comparative religions at the Ohio Wesleyan University and was its occupant in 1895-1900. He was assistant secretary of the Missionary Society of the Methodist Episcopal Church in 1900-04; was missionary bishop for southern Asia in 1904-12; and in 1912 was appointed corresponding secretary of the Board of Foreign Missions. He was Graves lecturer at Syracuse University in 1912 and 20 May 1916 he was elected a bishop.

OLDHAM, England, town in Lancashire, six miles northeast of Manchester. From an insignificant village in the 18th century, Oldham during the 19th century became one of the chief seats of the cotton industry, and an important coal-mining centre. In the town and the immediate neighborhood there are over 300 cotton mills, which employ about 40,000 mill hands. Its numerous other industries include wool-weaving, hat-making, iron-founding and the manufacture of engines, gas-meters, sewing machines and cotton weaving and spinning machinery. Although irregularly built on hilly ground and of no great architectural pretensions, Oldham is distinguished for its municipal enterprise and the administrative ownership of its various public utilities, as gas, water, electric-lighting plant, street railroads, baths, wash-houses, hospitals, cemeteries, markets and museums. Pop. about 150,000.

OLDHAMIA, a genus of carboniferous brachiopods, known as fossils in the rocks of India and China. The name has also been applied in Great Britain to some remains of indeterminate character, probably of sea weeds. It also applied to a fossil alga found in the Cambrian rocks of Ireland.

OLDMIXON, *ôld'mik-sŏn*, **John**, English political writer: b. Axbridge, Somerset, 1673; d. 1742. In his 'Essay on Criticism in Prose' (1728), he attacked Pope, who returned the compliment by abusing Oldmixon in the 'Dunciad.' He published also 'The British Empire in America' (1708); 'A History of England' (1730-39); 'The Secret History of Europe' (1712-15); 'Memoirs of the Press' (1710-42). He was distinguished for his hatred of the Stuart family.

OLDTOWN, Me., city in Penobscot County, on the Penobscot River, and on the Bangor, Aroostook and the Main Central railroads, about 11 miles northeast of Bangor. It was settled in 1820 and was a part of Orono until 1840, when it was incorporated as a town; and was chartered as a city in 1891. It is in a lumber region, and the chief manufactures are wood products, machinery, patent medicines, chemicals and foundry products, pulp, boots and shoes, woolen goods and large quantities of lumber in different forms. It has a free public library in different forms. It has a free and a fine city hall. The revised charter provides for a mayor and council elected annually. Pop. 6,630. Consult Howard, 'History of Penobscot County.'

OLDYS, *ôl'dis*, **William**, English antiquary: b. probably London, 14 July 1696; d. College of Arms, 15 April 1761. He was a natural son of Sir William Oldys, Chancellor of Lincoln.

He suffered financially through the South Sea Bubble in 1720, and in 1724-30 he was the guest of the Earl of Malton. He assisted Dr. Knowler in editing the 'Earl of Strafford's Letters and Despatches' (2 vols., 1739). On his return to London in 1730 he found that his library and manuscripts had been sold, among them an annotated copy of Gerard Langbaine's 'Dramatick Poets,' which later formed the foundation for Cibber's 'Lives of the Poets' (1753). Despite this loss he had succeeded in 1731 in collecting a valuable library which he sold to the Earl of Oxford, and in 1738-41 he was literary secretary to the earl. Upon his patron's death Oldys was forced to subsist upon irregular employment from the booksellers, relieved in 1742-46 by his work with Dr. Johnson in preparing a catalogue of the library of the Earl of Oxford and the 'Harleian Miscellany' (8 vols., 1744-46). In 1747-60 he contributed much valuable material to the 'Biographia Britannica,' but owing to financial difficulties he spent the years 1751-53 in Fleet Street Prison. Through the efforts of friends his debts were then paid and he was appointed Norroy king-of-arms. He lived at the College of Arms the remainder of his life. His works include 'The British Librarian' (1737-38); 'Life of Raleigh,' prefixed to Sir Walter Raleigh's 'History of the World' (1736; separate ed., 1740); 'Life of Charles Cotton' (1760).

OLE BULL. See **BULL**, **OLE BORNEMANN**.

OLEAN, *ô-le-ân'*, N. Y., city in Cattaraugus County, on the Allegheny River at the mouth of Olean Creek and on the Pennsylvania, the Erie, the Pittsburg, Shawmut and Northern railroads; about 68 miles in direct line south by east of Buffalo. It was settled in 1804 by Major Hoopo and David Heuston, was incorporated as a township in 1808, as a village in 1854 and was chartered as a city in 1893. It is in a fertile agricultural region and near the Pennsylvania oil fields and is a distributing point for large quantities of petroleum which is brought by pipe lines from the oil fields south of the city and considerable of it is sent by the same means to other cities. The chief manufacturing establishments are lumber mills, tanneries, oil-refineries, glass factories, machine, railroad and copper shops, wagon and carriage factories, brewery, brick yards, flour mills and furniture factories. The educational institutions include public schools, one parish school, commercial colleges and the Foreman Library. The two banks have a combined capital of \$225,000 and the total assets are over \$4,000,000. The government is vested in a mayor, elected for two years, and 12 aldermen, six of whom are elected each year. Pop. (1920) 20,506.

OLEANDER, a genus of shrubs (*Nerium*) of the order *Apocynaceæ*. The two or three species have narrow, leathery, evergreen leaves and terminal cymes of flowers, usually pink, followed by pods containing twisted seeds. The common oleander (*N. oleander*) is a native of subtropical and tropical Asia and of the Mediterranean region, whence it has been introduced into other warm countries as an ornamental shrub and hedge plant and into greenhouses for growing in tubs. In the Bermudas it is so abundant that the landscape is perceptibly tinted

by its bloom at some seasons. Otherwise the shrub seems to have few uses though charcoal from its soft light wood is used in Algeria for making gunpowder. The plants are easily grown from cuttings placed in water or in wet sand. They thrive best in rather moist soil, but will also do well upon high land if they obtain a good root-hold. The sweet-scented oleander (*N. odorum*), a native of Japan, India and Persia, is less sturdy than the common species and is less cultivated.

OLEASTER, or SILVERBERRY, a shrub (*Elæagnus angustifolia*) of the order *Elæagnaceæ* (q.v.), an ornamental plant introduced from western Asia and southern Europe into temperate climates as an ornamental plant. It grows about 20 feet tall, is often spiny, has narrow light green leaves about two inches long, small, fragrant bell-shaped flowers, followed by yellow, oval silvery-scaly fruits. It seems to prefer well drained limy soils and sunny situations. It is very popular in cold climates, especially in the Dakotas and Minnesota, where it has proved hardy.

OLEFIANT GAS. See ETHYLENE.

OLEIC ACID, $C_{18}H_{34}O_2$, the most important member of the "oleic" series of unsaturated organic acids occurs as the glyceride triolein, $C_3H_5(C_{18}H_{33}O_2)_3$, in most liquid and solid fats as olive, almond and codliver oils, lard, tallow, etc., olive oil being about 72 per cent pure olein. To obtain the free acid the fat is saponified with alkali, the soap so formed dissolved in water and the fat acids liberated by the addition of dilute hydrochloric or sulphuric acids. This impure oleic acid is heated for a time with powdered lead oxide (litharge). The lead salts so obtained are extracted with ether which dissolves only the lead oleate. On acidifying the ethereal solution with dilute hydrochloric acid the lead is precipitated as lead chloride, leaving the pure oleic acid in solution from which it can be obtained by evaporation of the ether. The decomposition of triolein into oleic acid and glycerine may be accomplished by other means such as heating with superheated steam or with water and sulphuric acid. Oleic acid is a thin colorless oil at ordinary temperatures but solidifies when cooled to 4° C. (39° F.). Crystallizes from alcohol in silky needles melting at 14° C. (57° F.). Specific gravity at 19° C. (66° F.) is 0.897. It decomposes when heated to boiling at ordinary atmospheric pressure, but may be distilled unchanged under diminished pressure or with superheated steam. Insoluble in water, very soluble in alcohol, ether and most other organic solvents. It is a mono-basic acid forming many well defined salts, many of which are of use in the arts or in medicine. Sodium oleate is the chief constituent of castile soap; potassium oleate is found in soft soap; lead oleate is the "lead plaster" of the pharmacist. When well cooled oleic acid is treated with nitrogen trioxide it is changed to a solid isomeric, elaidic acid, which is used to some extent in making candles.

OLEINE. True oleine is the glyceride of oleic acid. Composition, $C_3H_5(C_{18}H_{33}O_2)_3$. It occurs in most vegetable and animal fats, notably in olive oil, lard and tallow. A colorless, odorless, nearly tasteless oil, insoluble in water, only slightly so in alcohol, soluble in ether. Alkalies saponify it to the alkali salt of oleic

acid (soaps) and glycerine. Nitrogen trioxide changes it to its solid isomeric elaidine. It is difficult to obtain it perfectly free from the glycerides of other acids occurring with it. The term "oleine" is applied to various commercial products, such as the liquid fats used by the soap-maker and the liquid fatty acids utilized by the candle manufacturer.

OLENEK, ô-lyë-nôk', a river of northern Siberia, which rises between Mounts Boldisno and Dsholokon and after a tortuous northeastern course of about 1,000 miles enters the Arctic Ocean 100 miles to the west of the Lena delta. It is six miles wide and 20 feet deep at its mouth, on the left bank of which is the village of Ust Olenok.

OLEOGRAPH, ô'lë-ô-gräf, an imitation of oil painting produced by means of a process similar to that of chromo-lithography. The use of embossing to imitate the rough texture of the painting is sometimes employed and the print when finished is mounted on canvas, sized and varnished to heighten the effect. The artistic value suffers through the attempt at imitation, frank reproduction coming under a different category.

OLEOMARGARINE, a mixture of fats used as a substitute for butter. Oleomargarine was invented by a Frenchman, Mège-Mouries in 1870. His idea was to produce a substance very like butter in physical properties and chemical composition that would be more wholesome than and as cheap as poor butter. He used the best of beef-suet as a basis; 1,000 parts of well washed and finely chopped fat were digested at 45° C. (113° F.) with 300 parts of water, one part of carbonate of potash and two-stomachs of sheep or pigs. After two hours the membranes had dissolved under the influence of the pepsin of the stomachs and the melted fat had risen to the surface. It was drawn off, salted and allowed to cool whereupon most of the stearin and palmitin crystallized out. This semi-solid mixture was subjected to hydraulic pressure and the fluid oleo 50-60 per cent pressed out. The oleo was churned with 10 per cent of its weight of milk together with a little butter color and the product worked up like regular butter. Many changes have been made in the manufacture of oleomargarine since its invention by Mège-Mouries. The process given below as described by Armsby (*Science*, Vol. VII, pp. 471-472) is essentially the same as that described by Armour and Swift and is a fair representative of that followed in this country. From the beef-tallow is prepared the oleomargarine oil of Mège. The caul fat of freshly killed beeves is, after thorough washing first in tepid water and then in iced water, allowed to stand in a cold room until thoroughly cold. It is then rendered at a temperature between 130° and 175° F. The resulting oil is allowed to cool slowly until a considerable portion of the stearin and palmitin has crystallized out and the pasty mass is then subjected to hydraulic pressure. The still fluid (about two-thirds of the whole) flows out into a tank of cold water, where it solidifies into a granular mass which is known to the trade as "oleo" oil or simply "oleo." The name "oil" is somewhat misleading as the product is a granular solid of a slightly yellow color. Fresh leaf lard treated in substantially the same way as the

beef tallow yields the "neutral lard" or "neutral" of the trade, also a granular solid of a white color.

The objects of this treatment are twofold, first, to produce fats as free as possible from taste or odor; second, to remove some of the difficultly fusible stearin and palmitin, in order that the finished product may melt readily in the mouth. Having thus secured the fats in the proper condition, the manufacturer proceeds to mix "oleo" and "neutral," the proportions varying according to the destination of the product; a warm climate calling for more "oleo," a cold one for more "neutral," and to flavor the mixture with butter. This flavoring is conducted in large steam-jacketed vessels provided with revolving paddles, by which their contents can be thoroughly agitated. Here the "oleo" and "neutral" are melted and thoroughly agitated with a certain proportion of milk, or sometimes of cream and a proper amount of butter-color. Forty-eight gallons of milk to 2,000 pounds of product are stated to be a common proportion. After sufficient agitation, the melted mass is run into cold water and as it cools is broken up by paddles so as to granulate the mass. After thorough washing it is salted and worked exactly like butter. The product is known as oleomargarine. Although it contains hardly more than a trace of butter, the latter flavors the whole mass so strongly that when well salted, as it usually is, it might readily pass with an inexpert or careless consumer for rather flavorless butter. Oleomargarine is the cheapest product made. By adding to the material in the agitator or "churn" more or less pure butter what is known as butterine is produced, two grades of which are commonly sold, namely, "creamery butterine" containing more and "dairy butterine" containing less butter. Certain other substances such as cottonseed-oil, sesame oil sugar, glycerine and glucose are used to some extent by a few, usually unimportant makers. On the question of the wholesomeness of artificial butter there is a wide difference of opinion, but most authorities say that a butter substitute carefully made from the fresh clean fat of healthy beeves or swine is wholesome.

The physical properties of oleomargarine are so similar to those of butter that it is very difficult to distinguish between them by any superficial test. For a good test that can be applied in the household, consult Farmers' Bulletin No. 131, United States Department of Agriculture (to be obtained for the asking from the Secretary of Agriculture). The analytical chemist is able to detect oleomargarine by making use of the fact that it contains a large percentage of fatty acids not soluble in water and a lower percentage of those volatile with water vapor than butter does. There has been both Federal and State legislation regarding this substance. The Federal law of 1886 imposed a special tax on the manufacture (\$600 per annum), the wholesaler (\$480) and the retailer (\$48). In addition the manufacturer must sell it in stamped packages, the stamps making an extra tax of two cents a pound. The act of 1902 abolished this tax of two cents but established new rates, namely, 10 cents a pound on artificially colored oleomargarine, while oleomargarine free from any color that would cause it to look like butter was rated at one-fourth of a cent a pound. The special

taxes on the maker, etc., were not changed. Most States have an extra tax of their own. They vary widely and change frequently. Some merely add a few cents a pound while others fix so high a rate or such conditions of manufacture or sale as to be practically prohibitory.

The production of oleomargarine in this country in 1888 was 34,325,527 pounds, which increased to 126,316,427 pounds in 1902. Only about 3 to 4 per cent of it was exported. Oleo-oil however, was exported in large quantity (161,651,413 pounds in 1901), more than half going to the Netherlands. In 1909 oleomargarine to the value of \$14,000,000 was manufactured in the United States; while the exports in 1914 amounted to 2,533,000 pounds valued at \$263,453; and oleo oil 97,017,000 pounds valued at \$10,157,000, most of the former going to the West Indies and of the latter to Denmark, Germany, Norway, Sweden, Belgium and Great Britain and colonies. Consult, Bannt, W. T., 'A Practical Treatise on Animal and Vegetable Fats and Oils' (Philadelphia 1896); Wiest, E., 'The Butter Industry in the United States' (New York 1916); New York Commercial Manufacturing Company, 'Oleomargarine Butter' (New York 1880); United States Department of Agriculture 'Year Book' (Washington 1895-96); United States Census 'Bulletin No. 138' (Washington 1902); United States Office of Internal Revenue 'Revised Regulations Concerning Oleomargarine' (Washington 1907).

OLEOMETER, ô-le-ôm'e-ter, a species of apparatus adapted for determining the relative densities and proportions of oils contained in seeds, nuts and other materials. The construction of the apparatus permits of a small quantity of volatile solvent being used to extract the oil, being distilled back upon the material under treatment and filtered through it successively several times.

OLÉRON, ô-lâ-rôn, France, an island in the Bay of Biscay, its nearest point two miles from the coast of the department of Charente-Inferieure, opposite Rochefort. It is 19 miles long by about five broad, and is very fertile. On it are the port of Le Château and the towns of Saint Pierre d'Oléron and Saint Georges d'Oléron. In history, the island is noted for the *Jugements ou Rôles d'Oléron*—Judgments or Laws of Oléron, a code of maritime law compiled by command of Eleanor of Guienne before she married Henry II of England, and modeled on the 'Book of the Consulate of the Sea' (a maritime code regulating commerce in the Levant). It was drawn up from the decisions of the maritime court of Oléron, in the duchy of Guienne, and was intended for the use of mariners in the Atlantic waters. It was introduced into England in the end of the 12th century and into Flanders in the 13th. The usages and decisions upon which it was based were those observed in the wine and oil trade between Guienne and the ports of England, Normandy and Flanders. The code formed the basis of modern maritime law. It was published for the first time in the 'Collections des Lois Maritimes' of M. Pardessus. An English translation was published as 'Rutter of the Sea.' See COMMERCIAL LAW.

OLEVIANUS, ô-lâ-vê-ä'-noos, Kasper, German religious reformer: b. Treves. 10 Aug. 1536; d. there, 15 March 1587. He studied law

in Paris, Orleans and Bourges, where he became acquainted with the teachings of Calvin. Further theological learning was acquired by him in Geneva and he began to teach the Reformation doctrine in Treves in 1559, and to promote the spread of the new movement under the inspiration of Calvin. This roused the hostility of the archbishop, and the reformer was compelled to retire to Heidelberg, where he was appointed member of the church consistency, and court preacher. He now in collaboration with Ursinus produced the Heidelberg Catechism. His Lutheran sympathies led Louis VI to depose him from his ecclesiastical preferments in 1576; and he went to Berleburg and thence in 1584 to Herborn, where he advocated the doctrines of the Reformation in the territories of Count von Wittgenstein and Nassau. His special contribution to the progress of the Reformation was of a practical and administrative character, and from him the Reformed churches received that Presbyterian type of organization and policy which has become permanent in Europe and America, where his method of government by synods has become universal. Consult Harbaugh, 'Fathers of the German Reformed Church'; Hagenbach, 'Väter und Begründer der Reformierten Kirche' (1857); Cuno, F. M., 'Blätter der Erinnerung an Dr. Caspar Olevianus' (Barmen 1887).

OLFACTORY NERVE, or OLFACTORY SENSE. See NOSE AND THROAT.

OLGA, Saint, a popular saint of the Russian Church. She was a peasant girl taken to wife by the Grand-duke Igor of Kiev, who met her by chance when on a hunting party in Pskoff. She possessed remarkable talents and an exalted character. After her husband had lost his life when returning from an unsuccessful expedition to Constantinople (945), she managed the government for his son, Sviatoslav, a minor, until he came of age in 955. Then going to Constantinople, she was baptized by the Patriarch Theophilactes and took the name of Helena. On her return to Russia she labored earnestly and successfully for the propagation of the Christian faith. After her death in 969 she was canonized by the Greek Church under her original name and her festival is kept on the 11th day of July (O. S.). Consult Castremont, D'Elissalde, 'Histoire de l'Indroduction du Christianismo sur le continent russe, et la vie de Sainte Olga' (Paris 1879).

OLIBAN (OLIBANUM), a gum-resin which flows from incisions in certain species of *Boswellia*, a genus of trees of the family *Burseraceae*, noted for the production of aromatic gums, growing on bare rocks in the mountains of southern Asia and northeastern Africa. Olibanum is the *lebanah* of the Hebrews, *libanos* or *libanotos* of the Greeks, thus of the Romans, of all which terms the ordinary English translation is "frankincense" (q.v.). It is produced mainly by *B. serrata*, a large tree growing on dry and rocky ridges from Abyssinia and southern Arabia to northern India; but the best oliban comes principally from Somaliland and from Arabia. Aden is the chief point of collection, exporting from 1,500,000 to 2,000,000 pounds annually, much of which goes to India and China. The gum occurs in commerce in semi-transparent yellowish

tears and masses; has a bitter nauseous taste; is hard, brittle and capable of being pulverized; and diffuses a strong aromatic odor when burned. It was formerly used in medicine, but now is chiefly employed as incense in Roman Catholic churches and Indian and Chinese temples. It contains 56 per cent of resin soluble in alcohol, 30 per cent of gum soluble in water, and from 4 to 8 per cent of an aromatic oil. Another species of *Boswellia* supplies in India an inferior gum of similar properties, both used as incense and as a substitute for pitch.

OLID, Cristóbal de, krēs-tō'hāl dā ò-lēd', Spanish soldier: b. about 1490; d. Naco, Honduras, 1524. He was brought up in the retinue of Diego Velázquez, governor of Cuba, who in 1518 sent him with a small force to find Grijalba, of whom nothing had been heard since his setting out for Yucatan. In Yucatan he met Cortes and was induced by him to desert Velázquez and join the other in his adventurous schemes. In 1524 was captured and beheaded by one of Velázquez's kinsmen.

OLIER, ô'lyá', Jean Jacques, French priest: b. Paris, 20 Sept. 1608; d. there 2 April 1657. He was educated at the Jesuit College of Lyons, the College of Harcourt and at the Sorbonne. He was ordained priest in 1633 and in company with other priests traveled through Suvergne and Velay as a missionary. His reputation reached Louis XIII and through the advice of Richelieu Olier was appointed coadjutor of the bishop of Châlons-sur-Marne, an honor he declined in order to carry out his project of founding a seminary for priestly education. In 1642 he established a seminary at Vaugirard, near Paris, and gradually gathered other priests to aid the work. Later in the year he was appointed to the charge of Saint Sulpice, Paris, a parish notorious for its evil practices. Olier accepted the charge without abandoning the seminary and succeeded in making Saint Sulpice a model parish. He made a determined stand against duelline and brought to his support a number of the most valiant among the nobles, who took a vow not only to refrain from giving or accepting challenges but to refuse to act as seconds. The Seminary of Saint Sulpice was chartered in 1645, and in 1655 the cornerstone of the church of Saint Sulpice was laid. Other seminaries under Olier's direction were founded at Clermont, Le Puy, Viviers, Bourg, Saint Andéol, and Montreal, Canada. Consult 'Vie de M. Olier, Fondateur du Séminaire de Saint Sulpice' (1853); Jervis, 'History of the Church of France' (Vol. 1).

OLIGARCHY, a form of government in which the supreme power is vested in a small class of persons. See GOVERNMENT.

OLIGOCENE, in geology, a name introduced by Beyrich (1855) for beds in North Germany, especially at Mainz, including portions of formations of the upper Eocene and the lower Miocene, and so forming a fourth subdivision of the Tertiary (q.v.), namely into Eocene, Oligocene, Miocene and Pliocene. The rocks of the Oligocene are freshwater, brackish, or marine in origin and display a quasi-tropical flora; they occur in the Paris Basin, in Switzerland, where they are called Molasse, and rather rarely in North America, where the more important beds identified with the Oligocene occur

in the Northwest Territory, North Dakota, along the White River, and from Florida to Texas, the last being styled the Vicksburg beds by Conrad and the Orbitoidic beds by Heilprin, who first called attention to the frequent occurrence in it of a fossil foraminifer, *Orbitoides mantelli*.

OLIGOCHÆTA, ôl-î-gō-kē-tā, a suborder of chætopod annelids (see CHÆTOPODA) of which the earthworm (q.v.) is the most familiar example. The species are almost solely inhabitants of the earth or of fresh water, have the segments of the body similar, and differ from the marine chætopods (*Polychæta*, q.v.) in their greater simplicity of structure. They lack all appendages — cirri, palpi, tentacles, as well as parapodia, the bristles arising directly from the body-wall, either distributed regularly or arranged in four bunches on each segment. Usually eyes are lacking and there is no metamorphosis in development. These animals are hermaphroditic, and usually some of the segments are markedly glandular, forming a girdle (clitellum) which secretes the cocoon in which the eggs are laid. The group is divided into the aquatic or parasitic species (*Limicola* or *Microdrile*) and the terrestrial forms (*Terricola* or *Macrodrile*). The aquatic species are mostly minute.

OLIGOCLASE (Greek, "slight fracture"), one of the feldspar unisilicates, with the possible formula $(\text{CaNa}_2)\text{Al}_2\text{Si}_6\text{O}_{28}$. It crystallizes in the triclinic form, but with angles very near to those of the monoclinic feldspar orthoclase (q.v.); has a single clean fracture; is not affected by acids; varies in color from white to greenish; has a specific weight of 2.62–2.65 and a hardness of 6; occurs in granite and other early rocks in Switzerland, Germany, Sweden and in the United States in New Hampshire, Connecticut, North Carolina and elsewhere. A reddish variety with fine iron oxide crystals is used as a gem and is called sun stone.

OLIN, Stephen, American Methodist clergyman: b. Leicester, Addison County, Vt., 7 March 1797; d. Middletown, Conn., 16 Aug. 1851. He was graduated at Middlebury College, Vt.; was appointed principal of the Tabernacle Academy, South Carolina, and subsequently entered the ministry of the Methodist Episcopal Church. In 1826 he was appointed professor in the University of Georgia. In 1833 he was transferred to the Virginia Conference, and elected president of Randolph Macon College. Later he spent some time in foreign travel, and in 1842 became president of Wesleyan University, Middletown, Conn. He was an impressive preacher, and a prominent advocate of the evangelical alliance. He wrote 'Travels in Egypt, Arabia Petrea, and the Holy Land' (1843); 'Greece and the Golden Horn' (1854); 'The Relations of Christian Principle to Mental Culture' (1848), and several works of essays which appeared posthumously. Consult his 'Life and Letters' (1853).

OLINDA, ô-lên-dā, Brazil, a seaport town of Pernambuco, five miles north of the city of Pernambuco, which replaced it as the capital and commercial centre of the state, after the Dutch burned Olinda in the 17th century. Olinda was founded in 1535. For a long time it was the most important city of northern

Brazil. In addition to being the capital of the province of Pernambuco it was also the administrative headquarters of the Dutch Colony established there in the 17th century. Long after it ceased to be the provincial capital it remained the favorite residence of old and wealthy families. Pop. 12,000.

OLIPHANT, ôl'î-fant, Laurence, English traveler and author: b. Cape Town, South Africa, 1829; d. Twickenham, near London, 23 Dec. 1888. He was the son of a chief justice of Ceylon, and after a boyhood spent in England went to Ceylon in 1841 and was subsequently private secretary to his father. Although later called to the bar he spent much of his time in travel, visiting the Crimea in 1852, and Canada and the United States (1853–54) as private secretary to Lord Elgin, and in 1855 he served under Omar Pasha in the Crimean War. The next year he joined Walker, the filibuster, at New Orleans, and was attached to Lord Elgin's China mission 1857–59. The year 1860 saw him with Garibaldi in Italy and the year after he was first secretary of legation at Yeddo, Japan, where he was wounded by assassins. He afterward traveled in Egypt, Poland and Palestine. He sat in Parliament for the Stirling Burghs 1865–67, but having by this time come under the influence of the mystic, Thomas Lake Harris (q.v.), he resigned his seat and entered the brotherhood which Harris had founded at Brocton, Chautauqua County, N. Y. At Brocton, under the orders of Harris, he was forced to do the hardest kind of farm labor, and there his mother joined him, but was not permitted to hold any confidential intercourse with him. Both mother and son gave up their private means to the community. In 1870 Oliphant returned to Europe and was *Times* correspondent during the Franco-Prussian War. In 1872 he married and the next year, with his wife and mother returned to Brocton. All three of the Oliphants were now the obedient slaves of Harris, and while his wife and mother were employed in menial duties Oliphant was called upon to engage in commercial enterprises for the good of the community. Husband and wife were presently separated by the command of the inexorable Harris, the wife being removed to a branch of the community in California. At last, in 1882, they emancipated themselves from the Harris influence, and after more wandering Oliphant finally settled at Haifa, in the Bay of Acre, and busied himself with schemes for assisting the Jews to return to Palestine. Although he had broken with Harris he still retained visionary beliefs not easy to define. In spite of his singular mysticism he was a shrewd man of business, a polished man of the world, and a writer of rare talents. Among his many books are 'A Journey to Khatamandu' (1852); 'The Russian Shores of the Black Sea' (1853); 'Earl of Elgin's Mission to China and Japan' (1857–59); 'The Tender Recollections of Irene McGillicuddy' (1878); 'Piccadilly,' a novel (1865); 'Altiora Peto' (1883); 'Sympneumata' (1886); 'Mas-solam' (1886); 'Episodes in a Life of Adventure' (1887); 'Haifa, or Life in Modern Palestine' (1887); 'Masollam' (1888); 'Scientific Religion' (1888). Consult 'Memoir of Laurence Oliphant and Alice, his Wife,' by Mrs. Margaret Oliphant (1891).

OLIPHANT, Margaret Wilson, novelist and biographer: b. Wallyford, near Musselburgh, Scotland, 4 April 1828; d. Wimbledon, Surrey, England, 25 June 1897. She was a cousin of Laurence Oliphant (q.v.). She removed with her parents to Liverpool in childhood and in 1852 was married to her cousin, Francis Wilson Oliphant, an artist in stained glass, who died in 1859, leaving her with three children and no means to support them except her pen. She began literary work early, publishing 'Passages in the Life of Mrs. Margaret Maitland' in 1849, and this was quickly followed by several other tales of Scottish life. After the death of her husband her family was supported entirely from the earnings of her pen, and during her long literary career she published 120 books and quite as many contributions to *Blackwood's Magazine* in the shape of reviews, etc. Few women of her time have surpassed her in the amount of work accomplished and the even excellence of what she wrote. Of her many novels among the best are those comprising 'The Chronicles of Carlingford' (1863-76) — of which 'Salem Chapel' (1863) and 'Miss Majoribanks' (1866) are the most important, — 'Within the Precincts' (1879); 'Harry Joscelyn' (1881); 'The Ladies Lindores' (1883); 'The Sorceress'; and 'The Cuckoo in the Nest' (1892). She was not a great novelist, for she lacked constructive power, and her plots are not always effective; but her careful and sympathetic analysis of character, her humor, pathos, invention and naturalness entitle her to a high place among novelists of the second rank. Of several tales of the supernatural by her 'A Little Pilgrim in the Unseen' (1882), is the best known, but is surpassed in power by 'A Be-leaguered City' (1880); and 'Old Lady Mary' (1884). In addition to her work in fiction she produced a large number of biographies and works of literary history, such as the 'Life of Edward Irving' (1862), a remarkable piece of sympathetic biography; 'The Makers of Florence' (1874); 'The Literary History of England 1790-1825' (1882); 'Life of Laurence Oliphant' (1883); 'The Victorian Age of English Literature,' with her son F. R. Oliphant (1892); 'Historical Characters of the Reign of Queen Anne' (1894); 'Annals of a Publishing House' (1897); etc. In spite of much sorrow in her life her outlook upon existence was cheerful and tolerant, and her influence upon English fiction was wholesome in every respect. For a half century her admirable fictions were the delight of a wide circle of cultivated readers in this country and her own, and her 'Chronicles of Carlingford,' at least, have in them something of the same quality which renders 'Trollope's Dorsetshire tales so enduring. Consult 'Autobiography and Letters of Mrs. Oliphant' edited by H. Coghill (1899). Consult Coghill, Mrs. H., 'The Autobiography and Letters of Mrs. M. O. W. Oliphant' (New York 1899).

OLIVAREZ, Gaspar de Guzman, COUNT or, *gás'pär dā gooth-män ô-lē-vā'rēth*, Spanish statesman: b. Rome, 6 Jan. 1587; d. Toro, Spain, 22 July 1645. He was educated at the University of Salamanca, was a gentleman of the bed-chamber to the Prince of Asturias, and gained the favor of his royal master to such an extent that soon after the latter succeeded to the

throne as Philip IV, Olivarez was appointed Prime Minister. For 22 years (1621-43) his power was almost unlimited. He was Duke of San Lúcan Barrameda, and was known as the "COUNT-DUKE." His sole object soon became the extortion of money from the people to supply the expenses of the war with Holland, France and other powers. His severity occasioned revolts in Catalonia and Andalusia, and the Portuguese threw off the Spanish yoke, and acknowledged the Duke of Braganza king in 1640. The foreign wars were so fatal to Spain, whose armies were defeated by the French, and whose fleets were destroyed by the Dutch, that the king was compelled by universal public discontent to dismiss Olivarez in 1643. Consult Cánovas del Castillo, Antonio, 'Estudios del Reinador de Felipe IV' (Madrid 1889); Silvela, F., 'Cartas de Sor Maria de Agreda y del rey Felipe IV' (Madrid 1885).

OLIVE, PRINCESS OF CUMBERLAND, title assumed in 1821 by Mrs. Olivia Serres: b. Warwick, 3 April 1772; d. 21 Nov. 1834. Her maiden name was Wilmot; she married John Thomas Serres in 1791 and was separated from him in 1803. She wrote poetry and fiction and several pamphlets (1813-17) urging the claim of her uncle, James Wilmot, to be the author of 'Junius Letters.' In 1821 she was arrested for debt, and moved a stay as being daughter of the Duke of Cumberland. She asserted that £15,000 had been left her by George III, who recognized her as Cumberland's daughter, but she died without being able to see the king's will. Her claims were continued by her daughter Lavinia (1797-1871), who married Thomas Ryves, a portrait painter, was divorced from him in 1841, and in 1866 procured a verdict that her mother was not the daughter of the Duke of Cumberland. This *cause célèbre* was built upon most outrageous forgeries, but both Mrs. Serres and Mrs. Ryves succeeded in interesting Sir Gerald Noel and others in their pretensions.

OLIVE THORNE, American writer on ornithology. See MILLER, HARRIET MANN.

OLIVE, one of the leading fruits of the world. It is borne by a small tree (*Olea europæa*) of the order *Oleaceæ*, and is the most important member of its genus, which includes between 30 and 40 species. This tree is a native of western Asia and probably of the Mediterranean region, and attains a height of about 25 feet, bears small lanceolate evergreen leaves and axillary racemes of fragrant yellowish-white flowers followed by oblong or ovoid fruits (drupes). From remote antiquity it has been cultivated as a food-plant, especially for the oil pressed from its fruits. Throughout the coast of the Mediterranean the olive has been grown upon a commercial basis for many centuries, individual trees being known to be more than 1,000 years old. It was introduced during the 18th century into California, which is now the leading olive-producing district of the United States, but part of Arizona and New Mexico are adapted to olives and are gradually coming into notice. The assumption is made that seed was introduced in 1769 from Mexico and planted at the San Diego Mission, whence cuttings were taken to other missions throughout California; and this olive, the only one known in the State until about 1880, was called the

"Mission" variety. Since 1880 numerous varieties have been introduced from olive-growing countries of Europe.

The olive succeeds best in warm, dry climates. It will withstand some frost, but at blossoming time this is believed to impair if not to destroy the crop; and the same result is often attributed to high wind and very dry air at that time. A rich, well-drained soil is preferred, but the tree will succeed and produce excellent crops upon a very great variety of soils; it is usually a mistake, however, to plant it upon rocky hillsides, as too numerous failures in California prove. While not exacting as to food, the trees must have an adequate fertilizer. To return to the soil of the pomace after the oil has been expressed, together with slight dressings of commercial fertilizers and judicious cultivation, will keep the trees in lusty bearing condition. The trees are usually set about 30 feet apart either in hexagons or in squares, the former plan being preferred in California because it is more economical of land, and permits of plowing in three directions instead of only two. The land is kept cleanly cultivated throughout the season.

The olive is propagated by layers, suckers, sprouts, cuttings, tips of twigs, grafts, buds and seeds. The last three, being tedious and slow, are rarely employed. The favorite method is by means of tips. These are obtained from small dormant branches, partly defoliated, rooted in moist sand and then transplanted in nursery rows. The trees should begin to bear when about eight years old and reach full productivity when about 30.

Olive Oil.—The principal uses of the olive are for oil production, for pickling, either green or ripe, and for drying. For the production of oil, the ripe fruits are carefully gathered by hand, bruised as little as possible and preferably crushed at once, otherwise they are partially dried in very thin layers through which air must circulate freely to avoid molding and fermenting, unsound fruit being prone to decay and impair the flavor and odor of the oil. An old practice was to crush the fruit by means of heavy mill-stones in pits, but the oil thus extracted from the kernels has been found to injure both the flavor and the keeping quality of the oil obtained from the pulp. Modern crushers, therefore, do not break the stones. The crushed pulp is then pressed in linen sheets, the pressure being applied very gradually. A second pressing is made after the pulp has been mixed with cold water. Other pressings are sometimes given, each one resulting in a grade of oil inferior to the preceding. The two first grades are sometimes mixed. Since the separation of the oil from the juice by gravity is hazardous on account of liability to ferment, the impurities are washed out quickly by special apparatus in which a current of cool water comes in contact with a small quantity of the juice; mixes with it, separates the larger particles of pulp and allows the oil to rise through a tall column of water which further washes the oil-globules as they rise. After being allowed to stand for a time in a cool room this oil is racked off and sold as "new oil," or may be again allowed to stand for further clarification. Since the American market demands a clear oil, however, much of the domestic oil is filtered, a process which, especially if often re-

peated, impairs the flavor and makes the oil seem greasy. Throughout the process, scrupulous cleanliness is essential, because olive oil is prone to absorb any taint either in the utensils or in the air. The oil is pale yellow, inodorous, and has a specific gravity of .918 at a temperature of 15° C. It is largely used in cookery and pharmacy, for lubricating and illuminating purposes, and for making Castile and other kinds of soap, for which purpose the lower grades are most employed. In the United States it is often adulterated with cottonseed-oil. Gallipoli oil, which is used in dyeing, is made from the fermented fruit.

Olive oil also has important medical uses. In doses of from one to two ounces for adults, and one teaspoonful for infants, it acts as a laxative. It is also used in intussusception of the bowels; as an antidote in cases of acrid poisoning; as a local neutral protective from the atmosphere; in place of suet, lard, etc., as an inunction to increase the fat of the body, or to reduce the heat of the skin, and by workmen in lead factories as a laxative, and to prevent the absorption of lead. Combined with camphor, morphine, etc., it is applied to wounds, burns and bruises, and forms the basis of many liniments. It is used to allay the pain of insect bites, and (warmed) in the ear, to destroy insects. It is also employed as an application to swollen breasts, as a lubricant of surgical instruments, sounds, pessaries, etc., and as an injection in cases of constipation; but for this last purpose it is inferior to castor oil. In large doses, it is believed by some physicians to hasten the discharge of gall-stones, sometimes apparently softening them.

Pickled Olives.—For pickling the fruits are gathered by hand before they are likely to become soft during the process, a degree of maturity not readily described except by saying that the time is just before the fruits would change from green to the mature fruit tint, which varies with the variety from yellow to almost black. They are first placed either in pure water, which must be changed each day, or in a weak solution of lye. This is to remove the bitterness and acidity and to soften the skin. After the latter process, which may occupy from one to three months, the lye is removed by soaking in pure water. Then the olives are subjected to a series of immersions in salt solutions of gradually increasing strength, the maximum being dense enough to float an egg. They will now keep for years if properly stored. Pickled green olives are much less a food than a table delicacy or relish; but pickled ripe olives, which are prepared by much the same process and are gaining in favor, are considered primarily as a food. However, there is little difference in their food value. Dried olives are popular in some Mediterranean countries, but are little known in the American market.

The average composition of pickled green olives is: water, 58; fat, 27.6; carbohydrates, 4.3; protein, ash, etc., 7.8; that of pickled ripe olives: water, 65.1; fat, 25.5; carbohydrates, 3.8; protein, ash, etc., 5.6.

Besides the species mentioned above, several other related species are valued more or less. *Olea chrysophylla*, a tropical African species, has been introduced into southern California, where it is planted for ornament, the

under surfaces of the leaves being bright golden yellow. *Olea*, or *Osmanthus, fragrans*, is the fragrant olive of China and Japan, where its flowers are used for perfuming tea. It is also cultivated in greenhouses for its inconspicuous but exceedingly fragrant flowers.

In ancient Greece the olive was sacred to Pallas Athene and was a symbol of chastity and peace. Like the laurel it was used for making wreaths for crowning the victors in athletic sports. Olive wood is very hard and beautifully grained, and is valuable for cabinet work.

Olives vary in size from 100 to more than 400 to the pound. The exports of the United States are about 6,000,000 gallons of oil and 5,000,000 gallons of green olives. The United States production of olive oil in 1912 amounted to 350,000 gallons.

Consult Bailey, 'Cyclopedia of American Horticulture' (1900-02); Goldmann, F., 'Der Oelban in Palästina' (Freiburg 1897); Hayne, 'California Experiment Station Bulletin No. 129' (1900); Neville-Rolfe, E., 'Report on the Cultivation of the Olive in Italy' (London 1897); Pierce, N. B., 'Olive Culture in the United States' (*United States Department of Agriculture, Yearbook* 1896).

OLIVE-BACKED THRUSH, an American thrush. See THRUSH.

OLIVE-SHELL, the polished and often beautifully colored shell, of nearly the size and shape of an olive, of a marine gastropod mollusk (family *Olividae*), allied to the volutes and cones, many species of which inhabit the warm seas, creeping about the bottom in search of animal food at considerable depths. The front of the foot is developed into a strong sort of fender, and fleshy flaps (mesopodium) are reflected laterally over the shell. An allied genus of smaller size is *Olivella*, one species of which has been used in the South Pacific islands as a kind of shell-money. Consult Cooke, 'Mollusca' (1895).

OLIVEIRA MARTINS, ô'lê-vā'rā mār-têns, Joaquim Pedro de, Portuguese author: b. Lisbon, 1845; d. 24 Aug. 1894. He entered commercial life at 14 but continued his studies and in 1870 he became manager of the mine of Saint Eufemia near Cordova. It was during this period that he wrote 'O. Socialismo.' In 1874 he returned to Portugal as administrator of the railway from Oporto to Povoá. He had meantime seriously devoted himself to the study of economics, geography and history, and his 'A Circulação fiduciária' (1871), received the gold medal of the Royal Academy of Sciences at Lisbon as well as gaining for him membership in that institution. He was elected president of the Society of Commercial Geography of Oporto in 1880, and in 1884 became a director of the Industrial and Commercial Museum there. He entered Parliament in 1886, and in 1888 he removed to Lisbon where he became editor of the *Reporter*. He became administrator of the Tobacco Régie in 1889. He was his government's representative at international conferences at Madrid and Berlin in 1890; and for his address at the fourth centenary of Columbus at Madrid in 1891 he was awarded membership in the Spanish Royal Academy of History. He was appointed Minister of Finance in 1892 and sub-

sequently was vice-president of Junta do Crédito Público.

Together with his many activities in business and public life he attained a position of leadership in the literature of Portugal during the last half of his life. He was a man of high moral character and perceptions, an ardent patriot and gifted with keen psychological sense as well as a broad and sympathetic grasp of sociological conditions. He possessed as well vivid imaginative powers, an easy grace of expression and a knowledge of history which gave him an important share in the literary revival his country experienced in the latter part of the 19th century. Author of 'Bibliotheca das sciencias sociais' (1881-93); 'Elementos de anthropologia' (1880); 'Historia da civilização ibérica'; 'Historia de Portugal'; 'Historia da republica Romana'; 'Portugal contemporaneo'; etc. Consult Barreto, M., 'Oliviera Martins' (1887); D'Ayalla, F. D., 'Os Ideás de Oliviera Martins' (1897); De Quental, A., 'Oliviera Martins' (1894).

OLIVENITE, natural hydrated arsenate of copper, occurring in most copper ores. It varies in color from brown to green, and in form from crystal, usually oblique tetrahedral prisms, the common form in the English copper mines, to amorphous, being then styled "wood copper" or "wood arsenate" because of its fibrous nature. Both forms occur in the Utah copper mines.

OLIVER, Andrew, American colonial official: b. Boston, 28 March 1706; d. there, 3 March 1774. He was graduated at Harvard College in 1724, was elected to the general court and became secretary of the province. He was a brother of Peter Oliver, chief justice of Massachusetts. When the Stamp Act was passed by the English Parliament he made himself obnoxious by accepting the office of distributor of stamps, and on 14 Aug. 1765 was hanged in effigy from the "liberty tree." In the evening of the same day the mob cut down the effigy and burned it in front of Oliver's house. Oliver was so much alarmed that the next day he publicly resigned his office. In 1771 he was appointed lieutenant-governor, succeeding his brother-in-law, Hutchinson, and pursued the same public course, promoting, as far as possible, the plans of the British ministry. This was proved by his letters obtained by Franklin in England and sent back to America in 1772. When, therefore, the general court petitioned the king for the removal of Hutchinson, Oliver's name was also included. The petition was refused, but Hutchinson was let out of office very shortly after the death of Oliver.

OLIVER, Frank, Canadian journalist and statesman: b. Peel County, Ontario, 1853. He went to Manitoba in 1873 and to Edmonton in 1876, and in 1880 he established the *Edmonton Bulletin*. He served in the northwest council in 1883-88 and in the legislative assembly which succeeded the council in 1888-96. In 1896 he was elected to the Canadian House of Commons for Alberta, and in 1905-11 was Minister of the Interior under Sir Wilfrid Laurier. He afterward represented Edmonton in the house.

OLIVER, George Tener, American lawyer: b. Ireland, 26 Jan. 1848; d. 22 Jan. 1919. He was of American parentage and was educated at

Bethany College, West Virginia. He was admitted to the bar in 1871 and in 1871-81 was engaged in practice at Pittsburgh. He later entered the iron and steel industry, and after 1900 he was publisher of the *Pittsburgh Gazette* and the *Pittsburgh Chronicle Telegraph*. He was elected to the United States Senate in 1909, serving out the unexpired term of Senator P. C. Knox, and in 1911 he was re-elected.

OLIVER, Henry Kemble, American musician: b. Beverly, Mass., 24 Nov. 1800; d. Boston, Mass., 10 Aug. 1885. He was a boy soprano in the choir of Park Street Church, Boston, and was graduated at Dartmouth College in 1818. He was mayor of Lawrence, Mass., in 1859, and in 1861-65 he was treasurer of the State of Massachusetts. He was afterward mayor of Salem, and in 1880 removed to Boston, where he lived thenceforth. He was organist and musical director of churches in Lawrence and Salem; and founded a Glee Club and a Mozart Association in Salem. He wrote 'The National Lyre' with others (1848); 'Collection of Church Music' (1860); 'Original Hymn Tunes' (1875); 'Federal Street' (1832); sung at Boston Peace Jubilee, 1872; the hymns, 'Morning'; 'Harmony Grove'; 'Merton'; etc. He also wrote a 'Te Deum' and several motets and chants.

OLIVER, James, plow manufacturer and inventor of the chilled plow: b. Scotland, 28 Aug. 1823; d. South Bend, Ind., 2 March 1908. He came to America in 1835 with his parents, who, after residing for a year in Seneca County, N. Y., settled in Mishawaka, Ind., in 1836. He learned the trade of a molder, and in 1855 began the manufacture of plows at South Bend, Ind., founding the establishment of which he became president. After years of exhaustive study and expensive experiments he invented the first successful chilled plow, which made his name famous throughout the world. See Plow.

OLIVER, James Edward, American mathematician: b. Portland, Me., 27 July 1829; d. Ithaca, 27 March 1895. He was educated at Harvard, became an assistant on the *American Nautical Almanac* and later was appointed assistant professor of mathematics at Cornell University, succeeding to the chair after two years. He was a member of the American Academy of Arts and Sciences, the American Philosophical Society and the National Academy of Sciences; author of 'A Treatise on Trigonometry' (1886).

OLIVER, Peter, American jurist: b. Boston, 26 March 1713; d. Birmingham, England, 13 Oct. 1791. He was a brother of Andrew Oliver (q.v.), and was graduated at Harvard College in 1730; held several offices in Plymouth County, Mass., and in 1756 was appointed a justice of the Superior Court, although he had never become a lawyer. In 1771 he was made chief justice. Oliver was a Loyalist, and when, in 1774, the legislature ordered the judges to refuse a fixed salary from the king, he alone declined to comply and was impeached in consequence. He wrote in favor of the British rule in a Loyalist publication called the 'Censor,' and went to England in 1776, when the British troops evacuated Boston. There he passed the remainder of his life. He possessed

considerable literary skill and was a collector of antiquarian materials.

OLIVER TWIST, begun while Dickens was still at work on 'Pickwick Papers' and published in 1837-38, was one of the earliest and is still among the best known and widely read of the author's novels. Almost more than any other of his stories, except 'Pickwick,' it is modeled upon that loose agglomeration of adventures known as the picaresque novel, most familiar to English readers in such stories as Smollett's 'Roderick Random' and 'Peregrine Pickle,' and of which the best known examples are 'Gil Blas' and 'Don Quixote.' It is, however, much more beneficent and moving than most of its prototypes and is full of sympathy and pathos. Oliver Twist, a waif, after being half-starved and ill treated in an orphan asylum, runs away to London, where he falls in with and is exploited by the underworld of the Jew, Fagin; Charlie Bates, the Artful Dodger; Bill Sikes and other disreputable people, but is finally rescued through the providential advent of the kindly disposed people of whose colorless amiability the Cheeryble brothers in 'Nicholas Nickleby' are the best known. Oliver finally appears to be a scion of respectable stock and the villains of various descriptions are condignly discomfited by a considerable variety of arrests, terrors, murders and mortal accidents. The story is one of the most rapidly moving and affecting of Dickens' earlier works in its sympathy with oppressed childhood, and the figures of the underworld are usually thought to be among the most interesting in Dickens' great gallery of such characters. Those of Bill Sikes and Nancy are particularly realistic, and though Fagin, Bumble and some of the others are somewhat grotesque, they have become household words. The higher classes are, as usual in Dickens' novels, less convincingly drawn and far less real.

WILLIAM T. BREWSTER.

OLIVERS, Thomas, British Methodist preacher: b. Tregynon, Wales, 1725; d. London, March 1799. He received little education and earned a scanty livelihood as a cobbler. Upon hearing Whitefield preach at Bristol he was converted, became a preacher of the Methodist Society at Bradford, Wiltshire, and later came under the supervision of Wesley. He spent the years 1753-75 as a traveling preacher, and in 1775-79 he was supervisor of the Methodist press, a position for which he had not the necessary education and from which he was removed. He afterward lived in retirement in London, and was buried in Wesley's tomb. He wrote numerous tracts, but his hymns were more important and his 'The God of Abraham praise' is still included in the best collections.

OLIVES, Mount of, or MOUNT OLIVET, the historic hill on the east side of Jerusalem, separated from the city by the valley of Jehoshaphat and the brook Kedron, and rising to a height of over 2,700 feet. It is celebrated as the scene of many Biblical incidents, especially in the ministry of Jesus Christ. It has four eminences extending from north to south, known respectively as Galilee or Viri Galilæi, Mount of Ascension, Prophets and Mount of Offense. The northernmost of these derives the name by which it is known among

Christians from the fact that it is supposed to be the hill on which two angels addressed the apostles after the Ascension, as "Ye men of Galilee." The next in order, proceeding southward, gets its name of Mount of Ascension from the supposition, originated by the Empress Helena, that this was the scene of our Lord's ascension, a supposition at variance with the narrative of Luke (xxiv, 50, 51), where it is said that Christ "led them out as far as to Bethany." This was the most important of all the eminences. At its foot lay the Garden of Gethsemane. The next eminence southward is rather a portion of the previous one than a separate height, and is remarkable for containing a celebrated catacomb, known as the "Tombs of the Prophets" (perhaps in allusion to the words of Christ in Matt. xxiii, 29). The southernmost eminence is called the Mount of Offense, because it is supposed to be the "Mount of Corruption" on which Solomon erected the high places for strange gods (1 Kings, xi, 7; 2 Kings, xxiii, 13). On the hill is the small village of El Tour on the north of which is the Chapel of the Ascension belonging to the Mohammedans but used on festival occasions by Christians. On the east are several Russian buildings, including a handsome church, a hospice for pilgrims and a tower from which a magnificent view is obtained, especially of the Dead Sea, Jordan Valley and surrounding country. South of the village are the Paternoster Church, or Church of the Lord's Prayer, belonging to the Roman Catholics, and also a Carmelite convent. Modern olive trees represent the historical trees from which the mount derived its name, and which were cut down during the siege of Jerusalem 70 A.D. From the village of El Tour a road to the southeast leads to Bethany, passing Bethphage.

The Mount of Olives seems to have been a sacred place back in the semi-heathen days when it appears to have been devoted to the worship of the moon. The mount was known in later days as the Mountain of Light and on it a beacon was lighted to announce the coming of the new moon. This practice was kept up in even later days of the Jewish sovereignty. Consult Baedekes, 'Palestine and Syria' (London 1906); Hofman, 'Galileae auf dene Oldberg' (Leipzig 1896); Leary, L. G., 'The Real Palestine of Today' (New York 1911).

OLIVET, Mich., founded in 1844 and incorporated in 1866, is mainly important as the seat of Olivet College, a coeducational and non-sectarian institution, founded in 1844 by John J. Shipherd, as Olivet Institute and chartered as a college in 1859. It is closely allied with and under the management of the Congregationalists. Besides the regular preparatory and collegiate courses, the curriculum offers courses in pedagogy, the sciences, biology and music. The college confers the degree of A.B. The main buildings are Parsons Hall, Shipherd Hall, Mather Hall, a building for the laboratories and the biological museum and Burrage Hall, the home of the library, which in 1905 contained 30,000 volumes. There is also a small gymnasium and the campus contains 15 acres. The Olivet Congregational Church is the church chapel and is the joint property of the college and church. The property of the college in buildings and endowments was valued

in 1910 at \$350,000; the faculty numbered 26; students, 260, and graduates, 732.

OLIVETANS. See ORDERS, RELIGIOUS, OF THE WORLD.

OLIVINE, natural silicate of iron and magnesium (Mg_2FeSiO_4), also called peridot and chrysolite, occurring in lava and as a principal constituent of basaltic rocks. It is rhombic and holohedric, of hardness $6\frac{1}{2}$ -7 and of specific gravity 3.3-4. It is possibly an original magnesian component of rocks now altered to serpentine. Olivine is transparent, olive green or brown, with a colorless streak and conchoidal fracture.

OLLA PODRIDA, òl'y'a pō-drē'da (Sp., literally, rotten or putrid pot), a popular Spanish dish consisting of various kinds of meat stewed with vegetables. The term has also been applied to any incongruous mixture, particularly literary collections, to which the word hodgepodge might similarly be employed.

OLLENDORF'S SYSTEM, an educational term applied to a 19th century method of learning languages, invented by H. G. Ollendorf (1803-65), and designed for those who teach themselves. The grammars are intended to give the students a mastery of the conversational forms of language, grammatical rules being few.

OLLION, Henri, French educator: b. Boisle-Roi, France, 1 April 1878. He was educated at the Jesuit colleges of Lyons and Avignon and the universities of Tübingen, Leipzig, Lyons and Paris. He was successively master of conferences and after 1909 professor of philosophy at the Catholic University of Lyons and professor of philosophy at the Institute for the Higher Education of Young Girls, Lyons. In 1914 he was commissioned captain of the 213th Infantry regiment and was awarded the Croix de Guerre. He published 'Philosophie de la grammaire' (1900); 'Lettres inédites de Locke à Thoynard, et notes sur la correspondance de Locke' (1908); 'La philosophie générale de John Locke' (1909); 'Lettres inédites de Locke à Thoynard, Limborch et E. Clarke,' with M. de Boer (1912). M. Ollion is a contributor to the 'Catholic Encyclopedia,' the *Revue de Philosophie*, the *Revue des Facultés Catholiques de Lille*, etc.

OLLIVANT, òl'i-vănt, Alfred, English novelist: b. 1874. He was educated at Rugby and at the Royal Military Academy at Woolwich, and was commissioned in the Royal Artillery in 1893, resigning in 1895. He subsequently devoted himself to literature, his first book, 'Owd Bob' (1898), published in America as 'Bob, Son of Battle,' achieving a remarkable success. His later works have sustained his reputation as a writer of high merit. Author of 'Danny' (1903); 'The Redcoat Captain' (1907); 'The Gentleman' (1908); 'The Taming of John Blunt' (1911); 'The Royal Road' (1912); 'The Brown Mare' (1916); 'Boy Woodburn' (1918).

OLLIVIER, ô-lê-vê-ă, Olivie Émile, French statesman: b. Marseilles, 3 July 1825; d. 20 Aug. 1913. He studied law and began the practice of his profession at Paris in 1848. Having taken part in the Revolution of 1848, he was appointed commissary-general at Marseilles under the republic, afterward becoming

prefect at Bouches-du-Rhône and then of Haute-Marne. In 1857 he entered the legislative assembly, where he became one of the leaders of the Liberal opposition and was one of "The Five" who were distinguished for eloquent and often successful opposition to the policy of Napoleon III. Gradually, however, he severed himself from his former political associates, and the severance was final when in January 1870 he accepted Napoleon's invitation to form a ministry. It was this ministry which declared war with Germany in July 1870, and was overthrown with disgrace in August 1870. Afterward Ollivier was several times a candidate for election to the Chamber of Deputies, but without success. He was elected a member of the French Academy; and his home became the resort of literary and musical Paris, for his wife was the daughter of Franz Liszt. Beyond that he took no part in politics, but devoted himself to writing works on legal and other subjects. These include 'Lamartine' (1874); 'Principes et Conduite' (1875); 'L'Eglise et l'Etat au Concile du Vatican' (1879); 'Thiers à l'Académie et dans l'Histoire' (1879); 'Le Concordat, est-il respecté' (1883); 'Nouveau Manuel de Droit Ecclésiastique Français' (1885); 'Michel-Ange' (1892); 'L'Empire Libéral' (6 vols., 1894-1908), a defense of his career; 'Solutions Politiques et Sociales' (1894), and 'Marie-Madeleine, Récits de Jeunesse' (1896). In 1870 he was elected a member of the French Academy.

OLMEDILLA, òl-mā-dél'yā, **Ramon Francisco de la Cruz Cano**, Spanish dramatist and poet: b. Madrid, 28 March 1731; d. Madrid, 4 Nov. 1795. He ranks high among the original dramatists of Spain, and he is undoubtedly the best of them in his century. He began by modeling his plays upon strictly classical lines for which he professed an ardent admiration, and remodeled or translated plays from French and Italian. During this period of translation and imitation he acquired an intimate knowledge of the theatre and developed his dramatic talent, which he tried out in almost every kind of dramatic work, legitimate drama, tragedy, comedy, serio-comedy, tragic-comedy, comic opera, farce and sainete. This wide field of action gradually drew him more and more from the rigid lines of strict classical drama, and he soon began to find his own particular and peculiar dramatic sphere in the sainete and the zarzuela, two mediums which permitted him to depict scenes from Spanish life of the middle classes. The former is a short, one-act play, with little or no regularly constructed plot, the aim of which is to give a picture from real life. Olmedilla made the sainete witty and familiar, and achieving this he succeeded in making it so popular that it has continued in public favor to the present day with no sign of declining popularity. The sainete is still to be found on the weekly bill of fare of most theatres in Spain where the moving picture has not driven out the acted drama. The value of Olmedilla's work in this line lies in the fact that he created a species of drama peculiarly national and thus helped to free the Spanish stage from the rigid bonds of classical tradition, and to bring it back to naturalness by thus depicting scenes from real life in a truly realistic manner that attracted the sympathy of the general public. His

influence upon Spanish drama was deep and far-reaching. He turned it from regal to democratic subjects and he cut the bonds that had long bound it to certain forms and prescribed fields.

Next to Lope de Vega he is the most prolific genius in Spanish drama; and he has reached out and covered a wider and more varied field than the only dramatist who can claim to dispute dramatic honors with Shakespeare. In his 30 years of active life he produced over 500 plays, many of which are still unpublished. These touch almost every phase of the life of the Spanish people. Olmedilla also gave form and popularity to the zarzuela, or musical comedy, which has become one of the distinctive features of the Spanish stage. Previous to his time the zarzuela had been based on foreign models and had served for the amusement of the wealthy. But Olmedilla faced about and found his characters for it in the life around him just as he had done for the sainete. All this could have but one result, the renaissance of Spanish drama and its development along new and more national lines. He gave to the Spanish drama an easiness, grace and naturalness of dialogue which it had not previously possessed; for he avoided affectation and exaggeration both in form of speech and versification. He was a master scene maker; but one weakness was his frequent inability to link up his scenes into a properly jointed and related story. This was probably partially due to his constant attention to the sainete and the zarzuela, both of which were developed by him along the same irregular lines and subject to the same weaknesses. But what he lacks in this respect he makes up in his brilliant pictures and conversation of the mass of the common people of Madrid. He passes in review street vendors, dwellers in back streets, all the common and uncommon characters of the Spanish capital with their propensity for talking, their immense fund of good humor and their natural wit; and he makes his audience laugh with them. Yet he never prostitutes the stage which he left purer and infinitely more human than he found it, and hence galvanized into that life which brought with it the renaissance of the Spanish stage. He naturally has had many imitators who have helped, consciously or unconsciously, to change the whole course of Spanish drama, by fixing the attention of the dramatist on every class of society from the highest to the lowest and forcing him to find everywhere the real heart of society and to fit it into the frame of human interest. A list of Olmedilla's works would read more like a catalogue than a part of a literary biography; only a few, therefore, of the best-known dramatic productions are given below: Sainetes, 'La Petray la Juana'; 'La moja mojada'; 'Las castañeras picadas'; 'Manolo'; 'El casero burlado'; 'La comediade Maravillas'; 'Los bandos del Avapiés'; 'El Manuelo'; 'Zara'; 'El Rastro por la Manana'; 'El Careo de los majos'; 'Las tertulias de Madrid'; 'El marido sofocado'; 'El fandango de *candil*'; 'El hambriento en Nochebuena'; 'la visita de duelo'; 'Los payos en el ensayo'; 'Los hombres solos,' and 'Caldereros y vecindad.' Consult Cotarelo y Mori, 'Ranion de la Cruz y sus abras' (Madrid 1899); 'Pérez Galdós, 'Ramon de la Cruz y su epoca' (*Revista de España*, 1870-71).

OLMEDO, José Joaquín, hō-sā' hō-ä-kën òl-mā'thō, Ecuadorian poet: b. Guayaquil, Ecuador, 20 May 1781; d. there, 19 Feb. 1847. He was educated in Quito and Lima, taught law for a time in the University of Lima and then practised in his native city. He engaged actively in public affairs, was vice-president of Ecuador and governor of the department of Guayas, and in 1845 led a successful revolution against General Flores, but though he directed the provisional government he was defeated for the presidency. But his fame as a poet will outlast his political record, and few poets have been more widely read in South America than he. One of his best poems is 'La Victoriade Junin,' a song to Bolívar (1826). His 'Collected Works' (Valparaíso, 1848; Paris 1853, and Mexico 1862) have been widely circulated. See LA VICTORIA DE JUNIN. Consult Gutiérrez, J. M., 'América Poética' (Valparaíso 1846); 'Poesías inéditas de Olmedo' (1861); Herrera, Pablo, 'Apuntes biográficos de D. J. J. Olmedo' (1887).

OLMSTEAD (öm'stēd or ūm'stēd) **CLAIM, The**, in American history, a celebrated case in admiralty law. Originally it was a case of capture on the high seas, and involved questions of prerogative regarding which the decisions of the Federal commissioners were set at naught by a State Court of Admiralty. One Olmstead and others, of Connecticut, being pressed into British service aboard the sloop *Active* in 1777, took possession of the sloop, and were in turn captured by Houston, commanding the Pennsylvania armed brier *Convention*. The Pennsylvania State Court of Admiralty awarded a large share of prize money to the State and to the officers and crew of the *Convention* and the owners, officers and crew of a privateer which assisted in the capture. Olmstead and others appealed to the Federal commissioners of appeals and received a favorable verdict. This the Pennsylvania State Court set aside and deposited the moneys with David Rittenhouse, State treasurer. His executrixes were sued in 1802 before the newly organized United States Supreme Court and judgment was executed in favor of Olmstead and others, in 1809, against violent opposition from Pennsylvania.

OLMSTED, öm'stēd or ūm'stēd, Charles Sanford, American Protestant Episcopal bishop: b. Olmstedville, N. Y., 8 Feb. 1853; d. Old Saybrook, Conn., 21 Oct. 1918. He was educated at Saint Stephen's College, Annandale, N. Y., and the General Theological Seminary, New York, and was ordained priest in 1877. He was subsequently rector of Saint Asaph's Church, Balā, Pa., and in May 1902 was consecrated bishop of Colorado. He published 'December Musings,' verse (1898); 'The Discipline of Perfection' (1902).

OLMSTED, Charles Tyler, American Protestant Episcopal bishop: b. Cohoes, N. Y., 28 April 1842. He was graduated from Trinity College, Hartford, Conn., in 1865, and after studying for the ministry at Saint Stephen's College, Annandale, N. Y., took orders; was assistant in Trinity Parish, New York, 1868-84; rector of Grace Church, Utica, N. Y., 1884-99, and vicar of Saint Agnes Chapel, New York, 1899-1902. In October of the year last named he was consecrated bishop-coadjutor of the

diocese of central New York and in 1904 became bishop. He died 26 March 1924.

OLMSTED, Denison, American physicist and astronomer: b. East Hartford, Conn., 18 June 1791; d. New Haven, Conn., 13 May 1869. He was graduated at Yale in 1813 and later began the study of theology there, but in 1817 became professor of chemistry, mineralogy and geology at the University of North Carolina. He made a geological survey of North Carolina, the first State survey in the United States, publishing reports of the work in 1824-25. He was appointed professor of mathematics and natural philosophy at Yale in 1825, but from 1836, at his request, occupied only the chair of natural philosophy, which he held until his death. He, and his associate, Elias Loomis, were the first Americans to observe Halley's comet in 1835. He was notable for his theory of hailstones and his observations of the aurora borealis. He was a contributor to scientific reviews and author of textbooks, of which more than 200,000 copies were sold. Among them are 'Introduction to Natural Philosophy' (2 vols., 1831); 'Compendium of Astronomy' (1841); 'Rudiments of Natural Philosophy and Astronomy' (1844), etc.

OLMSTED, Frederick Law, American landscape architect: b. Hartford, Conn., 26 April 1822; d. Waverly, Mass., 28 Aug. 1903. He had some early instruction (1837-40) in civil engineering, went to sea, after a year before the mast studied agricultural science and engineering at Yale, and later was for seven years a farmer and horticulturist upon his own land. In 1850 he made a tour, largely on foot, of Great Britain and parts of the Continent, for the study of methods of agriculture and landscape gardening. In 1852-53, 1853-54 and 1856 he traveled in the South and Southwest, investigating the effects of slavery upon the economic and social condition of slave States. The results of his observations appeared in three successive volumes, 'A Journey in the Seaboard Slave States' (1856); 'A Journey in Texas' (1857); and 'A Journey in the Back Country' (1861). In 1861 a compiled work, based upon the three preceding, appeared in London as 'The Cotton Kingdom,' an account, says H. T. Tuckerman, "copious, specific and authentic," which, it is stated, was frequently quoted by such leaders of English opinion as favored the Northern viewpoint in the Civil War. In 1856 he again visited Europe, giving particular attention to parks; and three other trips were subsequently made. In 1855 the State legislature of New York passed an act for the construction of a large central park in New York city and in 1857 Olmsted was made superintendent of the preparatory work. With Calvert Vaux (q.v.) he presented a plan for the park which was selected for the prize from 33 plans submitted in competition. Olmsted then became architect-in-chief, with Vaux as assistant, and despite political difficulties in four years practically completed the task. He employed at one time a working force of nearly 4,000 with a high degree of efficiency. In 1861 he was appointed by Lincoln to the United States Sanitary Commission, of which he became secretary and general manager. He displayed in this post great administrative ability. Besides conducting a necessarily large correspondence, he obtained legis-

lation, visited the field and prepared reports. He aided in the formation of the Union League Club and was prominent in the organization of the Southern Famine Relief Association. In 1863 he resigned from the commission and became first commissioner of the Yosemite National Park and the Mariposa Grove. He was in partnership with Vaux and Withers at New York in the practice of landscape architecture in 1865-72, was for a time president and treasurer of the New York Park Commission, and later for about six years was landscape architect to the commission. In 1878 he removed to Boston and there continued his professional practice. This was very large, and in the pursuit of it he visited every State in the Union and eight times crossed the Continent. In 1895 he retired. A list of the public and semi-public grounds formed wholly or largely after his plans would be very extensive. It has been estimated that among the expressions of his art are more than 80 public parks, including prominently, besides Central Park, the Mount Morris, Riverside and Morningside parks of New York; the Prospect and Washington parks of Brooklyn; the Washington and Jackson parks of Chicago; the Back Bay Fens of Boston, one of the most interesting domains of the kind in America; also in Boston, Leverett, Jamaica, Franklin and Marine parks; Belle Isle Park of Detroit; the Cherokee, Shawnee and Iroquois parks of Louisville; Delaware, South and Cazenovia parks of Buffalo; Lake, West Side and River parks of Milwaukee; and Washington Square in Baltimore. He laid out the grounds for the World's Columbian Exposition at Chicago in 1893, whose landscape features were so remarkable a success. He designed the general scheme for the preservation of the natural scenery at Niagara Falls. He planned the grounds of the capitol at Washington, besides the marble terrace and the grand staircase and other structures exterior to the building. Among his further works are designs for the grounds of numerous suburban land divisions, railway stations, schools, colleges and private estates. It is somewhat difficult to express in concise form Olmsted's distinctive service to the landscape gardening of America. But it may perhaps be defined as having been the originating of the use of natural landscape resources, existing under urban or partially urban conditions toward the making of pleasure-grounds. He studied the genius of American scenery, and in the adaptation of his methods thereto made a real if unobtrusive contribution to the art of the United States. In his public parks he avoided the formal and the monumental as he had seen it in Italy and France and combined system with wild nature in an unconventional result which is distinctive. It has been said that one of the secrets of his success was that he never endeavored to make unsuitable conditions conform to preconceived ideas, but made logical use of such conditions as they were. At the time of his death it was asserted with pardonable exaggeration, if exaggeration it were, that he had done more than any other of his generation to develop the aesthetic possibilities of the country. He was a founder of the Metropolitan Museum of Art, of the American Museum of Natural History and of the New York State Charities Aid Association, of which for many years he was vice-president. In addition

to the books above cited he wrote 'Walks and Talks of an American Farmer in England' (1852), frequently reprinted, and papers and reports on special problems of his profession. For an account of Olmsted's work on the sanitary commission, consult Stillé's 'History' (1866), also *Century Magazine*, October 1893.

OLMSTED, Frederick Law, landscape architect: b. Staten Island, N. Y., 24 July 1870; he was graduated at Harvard 1894. He studied landscape architecture under his father and began practice as landscape architect in 1895. Landscape architect for Metropolitan Park Commission of Boston since 1898; Baltimore Park Commission since 1902; Roland Park Company, Baltimore, since 1898; Sage Foundation Homes Company, Forest Hills, Long Island, N. Y., since 1908; and for various other land companies and for many private properties. Member of Commission on Improvement of Washington, 1902; instructor in landscape architecture, 1901-03; professor, 1903-15; lecturer, 1915—, Harvard University. Member of National Commission of Fine Arts since 1910; member of the Board of Supervising Architects of the Group Plan, Cleveland, Ohio, since 1912; chairman Planning Board of Town of Brookline since 1914; chairman of the executive committee, National Conference on City Planning, since 1910. He has acted in a consulting capacity for and designed portions of the parks or other public improvements of many towns and cities and numerous institutions, land subdivisions and private properties. He is author of numerous reports and articles on parks, municipal improvements, city planning and landscape architecture, and of the following city plan reports: Boulder, Colo.; Baltimore, Md. (both alone and jointly with A. W. Brunner and J. M. Carrère); Detroit, Mich.; Holyoke, Mass.; New Haven, Conn. (jointly with Cass Gilbert); Pawtucket, R. I.; Pittsburgh, Pa.; Rochester, N. Y. (jointly with A. W. Brunner); Utica, N. Y.; Woonsocket, R. I.; York, Pa.

OLMSTED, John Charles, landscape architect: b. Geneva, Switzerland, 14 Sept. 1852; d. 24 Feb. 1920. He was graduated Ph.B. at Yale 1875 and studied landscape architecture under Frederick Law Olmsted. With partners designed parks in Essex County, N. J., Cambridge, Mass., New Orleans, La., Fall River, Mass., Hartford, Conn., Chicago (South parks), Newburgh, N. Y., Newport, R. I., Watertown, Buffalo, Rochester, N. Y., Seattle, Spokane, Wash., and other cities; formed partnership with Frederick Law Olmsted, Jr. (q.v.) in 1898; also designed many private places and grounds of Chicago Exposition, 1893, etc.

OLMŮTZ, ol'mŭts, Czechoslovakia, the second city of Moravia, 38 miles northeast of Brunn, on the March, which almost encircles it. Since 1886 the defensive works have given place to promenades and pleasure-grounds. It has a fine Gothic cathedral erected in 1306; one or two other interesting churches; a remarkably fine townhouse, the ancient residence of the archbishops and several good modern educational buildings. Its industries and trade are unimportant. Olmütz is the see of an archbishop, and the seat of several courts and public offices. It formerly possessed a university, but this is now abolished except the theological



FREDERICK LAW OLMSTED

faculty, connected with which is an extensive library. Olmütz was taken by the Swedes, under Torstensson, in 1642, in the Thirty Years' War. Frederick the Great besieged it for seven weeks in 1758 without success. The Conference of Olmütz was here February 1850, between Russia and Austria respecting the affairs of Germany and especially in reference to the revolts in Hesse and Schleswig-Holstein against their rulers, the Elector of Hesse and the king of Denmark. By the mediation of Russia, Schleswig-Holstein was given to Denmark, and the Elector of Hesse was reinstated. The city possesses excellent schools, including two higher gymnasia, a realschule, a government commercial school and three training schools for teachers. It has several breweries and among its industries are the manufacture of tin, wire, hardware, chemicals, leather, chocolate, sugar and flour. It also has a considerable commerce in agricultural products and machinery.

OLNEY, ðl'nī, Jesse, American geographer and educator: b. Union, Conn., 12 Oct. 1798; d. Stratford, Conn., 31 July 1872. In 1828 he published 'A Geography and Atlas,' which was a standard work for 30 years, and effected a revolution in the methods of teaching geography. He taught school in New York State and Hartford, Conn., sat in the Connecticut legislature for 10 terms and in 1867 became State comptroller. He published 'The National Preceptor' (1831); a series of textbooks (1831-52), including a series of 'Readers,' a 'Common School Arithmetic,' a 'History of the United States,' and a volume of poems, 'Psalms of Life.'

OLNEY, Richard, American lawyer and statesman; b. Oxford, Mass., 15 Sept. 1835; d. 9 April 1917. He was graduated from Brown University in 1856 and from the Harvard Law School in 1858. In 1859 he was admitted to the bar and practised law in Boston, being particularly successful as the chief counsel for the Boston and Maine and other railroads. In 1874 he was elected on the Democratic ticket to the Massachusetts legislature, but was not especially active in politics. In 1893 he was appointed Attorney-General by President Cleveland, and was instrumental in breaking the railroad strike of 1894, by obtaining an injunction against the strikers from the United States Circuit Court of Illinois, enjoining them from interfering with interstate commerce and the United States mails. This injunction was enforced by the use of national troops, and was sustained by a decision of the Supreme Court, it being the first case of "government by injunction" (q.v.) in case of a strike. In 1895 he became Secretary of State, in which position he had charge of negotiations with England in regard to the boundary dispute with Venezuela; and wrote a remarkable official note, sustaining the right of the United States to interfere and giving a wide interpretation to the Monroe Doctrine (q.v.). In 1896 he withdrew from the Democratic party on account of the free silver plank in the platform, but in 1900 he supported Mr. Bryan, publicly declaring his reason for so doing to be because he could not support the Republican policy in regard to the tariff, trusts and imperialism. In 1903 he was prominently

mentioned as Democratic Presidential candidate in 1904. In 1906 he was leader of the policy-holders' fight against the New York and Mutual life insurance companies. In 1913 he declined appointment by President Wilson as Ambassador to Great Britain.

OLNEY, Ill., city, county-seat of Richmond County, on the Illinois Central, the Baltimore, Ohio and Southwestern and the Cincinnati, Hamilton and Dayton railroads, about 115 miles east of Saint Louis. It was settled in 1843. It is an agricultural region and the chief manufactures are flour, brick, tile and dairy products. It has a large trade in its manufactures, and in hay, seeds and fruits. It has a sanatorium and a free public library. The government is vested in a mayor, who holds office two years, and a council. Pop. (1920) 4,491.

OLONETZ, ò-lò-něts, Russia, a northern government bounded north and east by Archangel, southeast by Vologda, south by Novgorod, southwest by Saint Petersburg and Lake Ladoga, and west by Finland; area, about 50,000 square miles. The administrative headquarters is Petrozavodsk. The surface of this government is generally flat; although in the northwest some hills occur, while part of the south is traversed by the ridge which forms the water-shed between the basins of the Baltic and the Volga. The most marked natural feature is the large number of lakes, streams and morasses. The number of lakes—one of them, Onega, nearly 5,000 square miles in superficial extent—has been calculated at 1,500. The climate is rigorous. The winter is long, the summer heat, though of short duration, great. Timber constitutes an important part of the wealth of the government; porphyry and marble are extensively quarried between lakes Ladoga and Onega; iron-ores and copper are worked; and hemp and flax thrive in many of the swampy districts. The chief means of support of the inhabitants are forestry, hunting and fishing. The principal manufacture is that of leather. Pop. about 460,000.

OLUSTEE, ò-lūs'tē, or OCEAN POND, Battle of, the most sanguinary battle of the Civil War in point of numbers. On 5 Feb. 1864 General Gillmore, commanding Department of the South, ordered General Seymour to embark about 6,000 men in transports at Hilton Head and sail for Jacksonville, Fla. The transports were accompanied by five gunboats under command of Admiral Dahlgren. The objects of the expedition were to procure an outlet for cotton and lumber; to cut off one of the enemy's sources of commissary supplies, beef cattle; to obtain recruits for colored regiments; and to inaugurate measures for the speedy restoration of Florida to her allegiance to the Union. To assist in the latter John Hay, President Lincoln's private secretary, was given a military commission and accompanied the expedition. Seymour arrived at Jacksonville on the 7th, dispersed a small guard and occupied the place. On the afternoon of the 8th Col. Guy V. Henry, with cavalry and mounted infantry, moved out some eight miles, and late in the evening surprised about 350 cavalry, under Lieutenant-Colonel McCormick, at Camp Pinegan. Henry charged them, capturing four guns,

with caissons. He reached Baldwin, 20 miles from Jacksonville, on the 9th, where he captured another gun and a considerable quantity of cotton. Baldwin was at the junction of two railroads from Jacksonville and Fernandina. On the 10th Henry advanced to Little Saint Mary's and encountered Major Harrison, with two companies of cavalry, and drove him with slight loss on either side, and then marched to within three miles of Lake City, where on the 11th he had a skirmish with the Confederates, and under Seymour's order fell back to Barber's at the South Fork of the Saint Mary's where Seymour concentrated his entire command, and where he had received orders from Gillmore not to risk a repulse in advancing on Lake City, but to hold Sanderson's, unless there were reasons for falling back. Seymour was delayed for want of transportation, but on the morning of 20 February left his camp at Barber's with the intention of advancing on Lake City and, if successful, of destroying the railroad communication between east and west Florida at the Suwanee River. He had the mounted brigade of Colonel Henry, the three infantry brigades of Cols. J. R. Hawley, W. B. Barton and James Montgomery, and three batteries of artillery, in all about 5,500 men and 16 guns. When Seymour landed at Jacksonville, Gen. Joseph Finegan, the Confederate commander in east Florida, had an insignificant force to oppose him, but by the 13th had collected, at Lake City, about 4,600 infantry, 600 cavalry and three batteries of 12 guns. Col. C. Smith commanded the cavalry, and Gen. A. H. Colquitt and Col. G. P. Harrison the two infantry brigades. Thirteen miles east of Lake City Finegan threw up defensive works, a short distance east of Olustee station, crossing the railroad, the left near Ocean Pond, the right near a bay or jungle. Smith's cavalry, supported by two regiments of infantry, was sent to the front to skirmish with Seymour's advance and draw it on to the entrenched line. Colonel Henry, with his mounted force, the 7th Connecticut Infantry and Elder's battery, led Seymour's advance, and after a march of 15 miles, about 3 P.M. came upon Smith's pickets. Two companies of the 7th Connecticut, of Hawley's brigade, were deployed as skirmishers, and drove them back upon their supports, which opened fire, Elder's battery was pushed forward and opened fire, the rest of the 7th Connecticut was deployed and developed the Confederate position, and Henry's cavalry was disposed on the flanks. The ground was favorable for the movement of troops. It was level and, although covered with pine timber, was free from underbrush. Colquitt, with three regiments of his brigade, had been sent forward to support Smith and take command at the front, and had quickly formed line with his infantry, sending the cavalry to the left. This was the line that the 7th Connecticut developed, upon which Seymour massed his artillery in the centre, and sent the 7th New Hampshire to turn the Confederate left, but the regiment got confused in its movement and, coming under a heavy and deadly fire, broke in disorder and was with difficulty rallied to take part in the action at a later hour. The 8th United States Colored Infantry became hotly engaged on the left, its commanding officer was mortally wounded, and more than half its men had fallen, when the remainder

retreated in disorder. Colquitt's men advanced and delivered a very close and telling fire upon the artillery, shooting down men and horses, but were checked by the unrelenting fire of the guns and by Barton's and Montgomery's brigades, now brought up, and under whose fire the left of the Confederate line began to fall back. Meanwhile Finegan had sent everything to reinforce Colquitt, and on both sides the entire forces, except the cavalry, were desperately engaged, the struggle continuing until dusk, when Seymour withdrew, abandoning his dead and many wounded, and five guns, whose horses had been shot. He was pursued about two miles that day, and withdrew in good order to Sanderson's and thence to the Saint Mary's and Jacksonville. The Union loss was 203 killed, 1,152 wounded and 506 missing. The Confederate loss was 93 killed, 847 wounded and 6 missing. Consult 'Official Records' (Vol. XXXV); The Century Company's 'Battles and Leaders of the Civil War' (Vol. IV).

E. A. CARMAN.

OLYMPIA, ō-lím'pī-ā, a sanctuary of the Greek gods and a valley or plain lying in the middle of ancient Elis, in the western part of the Peloponnesus (Morea). It was also the scene of the Olympic games. Here were collected thousands of statues of the gods and of victors in the games, treasure-houses full of votive offerings, temples, altars, tombs and in a word the most precious treasures of Grecian art. The elder Pliny states that in his time the statues were as many as 3,000 in number. Here also were preserved important public and private documents, treatises and inscriptions of all kinds. The Altis (an old Elean form of "alsos," a grove), in which were situated the Olympiæum or great temple of Zeus, containing the colossal statue of the god by Phidias; the Heraeum or temple of Hera, the Metroön or temple of the mother of the gods, the treasuries of the different states which had sent votive offerings to the Olympian Zeus, the Prytaneum, in which the Olympic victors dined after the contests were finished, the Bouleuterion, in which all the regulations regarding the games were made, and other buildings and sacred objects, formed a quadrangle surrounded with walls, and having a length of about 1,800 feet and a breadth of 1,500. There also was the Exedra, a splendid building containing the reservoir of an aqueduct, erected by the Athenian orator and statesman, Herodes Atticus, and furnished by him with statues of the families of the emperors Antoninus Pius and Marcus Aurelius, and by the Eleans, out of gratitude to the builder, with statues of the family of Atticus himself. On the north it was bordered by rocky but gently swelling hills, the most southern of which was called Mount Cronius, or the Hill of Kronos. On the south it extended almost to the river Alphæus, and on the west it stretched to the Cladeus, a tributary of the former. Outside the walls, but in the immediate neighborhood of the Altis, were the hippodrome, or race-course for chariots and for single horses; the stadium or foot-race course; a theatre and a gymnasium. After being buried for ages under the soil washed down from the higher grounds, and conveyed by the inundations of the two streams between which it lies,

the plain of Olympia was again brought to view by a series of excavations begun in 1875 by the German government at the instigation of Ernst Curtius, and continued till the spring of 1881. Nearly all the buildings above mentioned were rediscovered, but unfortunately all in a much injured condition. Thousands of fragments of sculpture, bronzes, coins, terracottas, as well as numerous coins and inscriptions, were also among the discoveries. The originals all remained in the possession of Greece, but Germany bargained for the right to take the first casts from them, and a museum of Olympian casts and duplicates was formed at Berlin.

The excavations of Curtius cover practically all of Olympia, which was in no sense a town or even a village. It was simply one vast shrine covered with sacred edifices and buildings connected with them and the Olympic games. They show that the central part of the great enclosure was occupied by the great altar of Zeus, upon which were offered up the burnt sacrifices. This is a great block of undressed, unmounted stone, which stood in the open without covering or protection of any kind. When it was unearthed several layers of ashes of its victims were still lying upon it. It stood to the northeast of the great temple of Zeus, the ground plan of which was still complete when excavated, and around it were lying most of the columns just as they had lain when they were first overthrown by an earthquake before they were finally buried by débris carried into the valley by floods years after the erection of the building was begun by its architect, Libon of Elis, in the 6th century B.C. The excavations show that the description of it left by Pausanias is correct. It has a single row of 13 Doric columns at each side and six at each end. Many interesting and historically valuable remains of this temple have been recovered, some of them practically unimpaired; and this wealth of material from Greece's greatest temple shows why it was that it took until the middle of the 5th century B.C. to complete its construction. Among the material recovered from the ruins of the temple are statues that have become a part of the history of Greece and many inscriptions of great historic interest. Among the excavations is also the temple of Hera, about 100 metres north of that of Zeus, which it resembled in form, though it was only about two-thirds as large. It had 16 columns at each side, which were partly of wood and partly of stone, showing that they had all been originally of wood and that some of them had been replaced from time to time by stone columns. This is interesting as showing the history of the Doric columns, which were originally imitations of the forest trees under which the Greek altars were placed in primitive times. The temple of Hera was, therefore, evidently older than that of Zeus. In the ruins of the temple of Hera the famous statue of Hermes by Praxiteles was found and placed in the Museum of Olympia. One of the interesting parts of the excavations is the long line of 12 treasury buildings, which stretched eastward from close to the temple of Hera, and were erected, each by one of the Greek states in the form of small temples. In them were stored the equipment for the games and the offerings of the states. The ground plans and some remains of practi-

cally all the historical buildings of Olympia have been unearthed. Among these are two gymnasiums, the Metroön, or temple of the Mother of the Gods, and the Bouleuterion, or senate-house, an oblong hall of the 6th century, paralleled by a similar hall built at a later date, both of which are connected by a square building. To these must be added the Stadium, the Hippodrome and the Leonidæum.

OLYMPIA, Wash., city, capital of the State of Washington, county seat of Thurston County, on Budd's Inlet at the mouth of Deschutes River and on the Northern Pacific and Union Pacific systems. The Inlet is at the head of Puget Sound (and the city has steamer communication with Tacoma, Seattle, Victoria and other places on the Sound and on the Pacific Coast). It was settled in 1846 and chartered as a town in 1859, and as a city in 1890. Olympia has a Port Commission and the completion of the port of Olympia under the proposed plan will give the city superior water front and harbor facilities. Large quantities of oysters are shipped from Olympia and the water power derived from the several falls of the Deschutes River contributes toward making it a manufacturing city. The chief manufacturing establishments are lumber mills, veneer plants, knitting mills, fruit and vegetable canneries. It has an extensive trade in lumber and lumber products and in farm products, fruits and its own manufactures. The city is beautifully situated on gently rising wooded slopes. The principal buildings are the new State Capitol and the five office buildings in the group. Thirty-five acres of land constitute the grounds. Other principal buildings are the county court house, two modern bank buildings, public library, Federal building, Saint Peter's Hospital (Roman Catholic), High School and grade school buildings. Beside the City Public Library, it has the State Library, containing nearly 35,000 volumes, State Traveling Library, with over 40,000 volumes, and State Law Library. Pop. 8,537.

OLYMPIAD, in ancient Greece, the computation of time based on the period of four years between each celebration of the Olympic games (q.v.). The historian Timæus is said to have been the first to adopt this mode of reckoning time, and later Greek historians almost all followed his example. In reckoning by this era the year in which Coræbus gained the victory in the foot-race, corresponding to 776 B.C. of the Christian era, was taken as the first year of the first Olympiad. This mode of reckoning ceased when the games were abolished in 394 A.D., the second year of the 293d Olympiad. The interval between two Olympiads was four of our years, or a Greek *pentaeteris* of 48 moons and two intercalary months. To reduce from the Olympic to the Christian era, multiply the next number below the given Olympiad by four and add the number of the year in the given Olympiad, if the sum is 776 or less, subtract it from 777, and the remainder is the year B.C.; if it is greater than 776 subtract that number from it and the remainder is the year A.D.

OLYMPIAS, first wife of Philip II of Macedon and mother of Alexander the Great: d. 316 B.C. She was married to Philip in 359 but was put away by him so that he might marry Cleopatra, a niece of King Attalus, in 337. Olympias may have been cognizant of the

plot against Philip's life which resulted in his death in 336. She played a considerable part in politics during Alexander's rule. About 319 she regained a part in the government and was largely instrumental in the death of Cleopatra and her infant son in 323. In 317 she joined forces with the new regent, Polysperchon. They together invaded Macedonia and defeated Arrhidæus, the successor of Alexander and put him and his wife Eurydice to death. Established in power, she continued to wreak her vengeance on all those who had been opposed to her, and ordered the execution of several Macedonian nobles including Nicanor the brother of Cassander (q.v.). Cassander thereupon at the head of an expedition from the Peloponnesus compelled her to seek refuge in Pydna during the winter. The siege ended with her surrender of the city and her immediate execution in the spring of 316 B.C.

OLYMPIC GAMES, in ancient Greece, a general name given one of the four great national festivals. The games were usually celebrated on the plain of Olympia and were sacred to the Olympian Zeus, who had a temple and statue there. The festival was a quadrennial one; the period elapsing between two celebrations was called an Olympiad. Their origin reaches back into a remote antiquity, prior to the commencement of the historical era in Greece and by the Greeks themselves was attributed in various traditions to a divine source. The season of the year at which the games were held was about midsummer. In later times, when the contests were numerous, they lasted five days and the fourth day of the festival was the day on which the first full moon after midsummer fell and, therefore, according to the Greek mode of dividing the year, the 14th day of the month. The games thus lasted from the 11th to the 15th, inclusive. The number of the judges varied at different times, but ultimately was fixed at eight. Their decision was not final, but might be revised by the senate. Under the judges was a set of police called Alytæ, who kept order during the celebration of the games. None but Greeks of pure descent were allowed at any time to take part in the games, until the conquest of Greece by the Romans, when they also were admitted to the contests. If, however, a man could boast of pure Hellenic blood, it did not matter to what city he belonged or whether he was rich or poor, he had in any case an equal right to be recognized as a competitor, provided he complied with the regulations of the judges. Barbarians were permitted to be spectators of the games. Women were entirely excluded and were not even allowed to cross the Alpheus while the games were going on. For the first 13 Olympiads there was only one contest, a foot-race. In course of time the number of contests increased to 24, including shorter and longer foot-races, wrestling, boxing, chariot-racing, horse-racing, foot-racing in heavy armor, chariot-racing with mules and games for boys corresponding to most of those in which men engaged. The prize awarded to the victor was merely a garland of wild olive, but the honor of gaining such a prize was so highly esteemed that a victor in the Olympic games was regarded as bringing glory not only to himself but to his family and even the city or state

to which he belonged. The victor received his crown standing on a table made of ivory and gold. His own name and that of his father and his native state were proclaimed by a herald to the assembled multitudes. The celebration was concluded by religious ceremonies and processions and by banquets in honor of the victors. On returning to his native city the victor was honored with a triumphal procession and heard his praises celebrated in lyric verse, which was sometimes the production of the greatest poets of the time. In addition to this, special privileges were usually conferred on them for life. A place of honor was allowed them in all public assemblies, statues were erected to them and so forth. At Athens they were maintained for the rest of their life at the public cost.

The ancient Olympic games died out during the 4th century A.D. and were not revived until 1896, when the first of a new series, the "Modern Olympic Games," were played in Athens in a stadium especially built for the purpose. Great interest has been manifested in this revival and contestants from all the principal countries enter the lists at each Olympiad or four-year period. Many features of the ancient procedure are kept intact, as far as possible, but with modern modifications and additions.

The best records in the principal events, previous to 1911, were as follows:

- 100-Meter Run — Jarvis (America), 10 4-5s., Paris, 1900; Walker (So. Africa), 10 4-5s., London, 1908.
- 200-Meter Run — Hahn (America), 21 3-5s., Saint Louis, 1904; Tewksbury (America), 22 1-5s., Paris, 1900; Kerr (Canada), 22 2-5s., London, 1908.
- 400-Meter Run — Hillman (America), 49 1-5s., Saint Louis, 1904; Long (America), 49 2-5s., Paris, 1900.
- 800-Meter Run — Lightbody (America), 1m. 56s., Saint Louis, 1904; Sheppard (America), 1m 52 1-5s., London, 1908.
- 1500-Meter Run — Sheppard (America), 4m. 3 2-5s., London, 1908; Lightbody (America), 4m. 5 2-5s., Saint Louis, 1904; Bennett (England), 4m. 6s., Paris, 1900.
- 110-Meter Hurdles — Smithson (America), 15s., London, 1908.
- 200-Meter Hurdles — Hillman (America), 25 3-5s., Saint Louis, 1904.
- 400-Meter Hurdles — Hillman (America), 53s., Saint Louis, 1904; Bacon (America), 55s., London, 1908.
- Running High Jump — Porter (America), 6 ft. 3 in., London, 1908; Baxter (America), 6 ft. 2 4-5 in., Paris, 1900.
- Running Long Jump — Irons (America), 24 ft. 6 1-2 in., London, 1908.
- Running Triple Jump — Ahearne (England), 48 ft. 11 1-4 in., London, 1908.
- Standing Broad Jump — Ewry (America), 11 ft. 4 7-8 in., Saint Louis, 1904, and 10 ft. 11 1-4 in., London, 1906.
- Standing High Jump — Ewry (America), 5 ft. 5 in., Paris, 1900.
- Pole Vault — Gilbert and Cook (America), 12 ft. 2 in., London, 1908.
- Shot Put — Rose (America), 48 ft. 7 in., Saint Louis, 1904, and 46 ft. 7 1-2 in., London, 1908; Sheldon (America), 46 ft. 3 1-8 in., Paris, 1900.
- Discus — Sheridan (America), 136 ft. 1-3 in., Athens, 1906, and 134 ft. 2 in., London, 1908.
- Throwing 16-lb. Hammer — Flanagan (America), 170 ft. 4 1-4 in., London, 1908.
- Marathon Race — Sherring (Canada), 2h. 51m. 23 3-5s., Athens, 1906; Hayes (America), 2h. 55m. 18s., London, 1908; S. Louis (Greece), 2h. 55m. 20s., Paris, 1896.
- Pentathlon — Mellander (Sweden), 24 points, Athens, 1906.

The 1911 meet was held in July 1912, at Stockholm, Sweden, and was most successful. The scores of the American athletes (85 points) were far in the lead and nearly as great as those of all other nations combined.

The European War, 1914-18, interfered with the arrangements for the 1916 meet which was to have been held in Berlin. The 1920 meet was held in Belgium. The tables give the results.

RESULTS OF OLYMPIC TRACK AND FIELD CONTEST

TRACK EVENTS

EVENT	First	Second	Time
100 metres.....	Paddock, United States.....	Kirksey, United States.....	0:10 4-5
200 metres.....	Woodring, United States.....	Paddock, United States.....	0:22
400 metres.....	Rudd, South Africa.....	Butler, England.....	0:49 3-5
800 metres.....	Hill, England.....	Ely, United States.....	1:53 2-5
1,500 metres.....	Hill, England.....	Baker, England.....	4:01 4-5
5,000 metres.....	Guillemot, France.....	Mirmi, Finland.....	14:55
10,000 metres.....	Mirmi, Finland.....	Guillemot, France.....	31:45 2-5
Marathon.....	Kolhemainen, Finland.....	Lossman, Esthonia.....	2:32:35 4-5
110-metre hurdles.....	Thomson, Canada.....	Barron, United States.....	0:14 4-5*
400-metre hurdles.....	F. Loomis, United States.....	Norton, United States.....	0:54 *
3,000 metre steeplechase.....	Hodge, England.....	Flynn, United States.....	10:02 2-5
3,000-metre walk.....	Frigerio, Italy.....	Parker, Australia.....	13:14 1-5
10,000-metre walk.....	Frigerio, Italy.....	Pearman, United States.....	48:06 1-5
400-metre relay.....	United States.....	France.....	0:42 1-5*
1,600-metre relay.....	England.....	South Africa.....	3:22 1-5
3,000-metre team race.....	United States.....	England.....	8:51 1-5
Cross-country, team.....	Finland.....	England.....	
Cross-country, individual.....	Mirmi, Finland.....	Bockman, Sweden.....	
Pentathlon.....	Lethonen, Finland, 14 points.....	Bradley, United States, 25 points.....	
Decathlon.....	Loveland, Norway, 6,804.35.....	Hamilton, United States, 6,770.86.....	

FIELD EVENTS

EVENT	First	Second
Running high jump.....	Landon, United States, 6 ft. 4 1-5 in.....	Muller, United States.....
Running broad jump.....	Peterson, Sweden, 23 ft. 6 in.....	Johnson, United States.....
Hop, skip and jump.....	Timlos, Finland, 47 ft. 7 in.....	Jansson, Sweden.....
Pole vault.....	Foss, United States, 13 ft. 5 3-16 in.*.....	Peterson, Denmark.....
Javelin throw.....	Myrra, Finland, 215 ft. 9 1/2 in.*.....	Peltonen, Finland.....
Discus throw.....	Niklander, Finland, 146 ft. 7 7-16 in.....	Taipale, Finland.....
Hammer throw.....	Ryan, United States, 173 ft. 5 11-16 in.....	Lind, Sweden.....
Shotput.....	Porolla, Finland, 48 ft. 9 in.....	Niklander, Finland.....
56-lb. weight.....	McDonald, United States, 36 ft. 1 1/4 in.....	Ryan, United States.....
Tug-of-war.....	England.....	Holland.....

*World Record.

OLYMPUS, a mountain situated in Thesaly, at the eastern extremity of the range called the Cambunian Mountains. It is now generally called by the Greeks Elymbos or Olymbos. The Turks call it Semavat-Evi, the abode of the celestials. It rises to the height of 9,794 feet, being the highest mountain in Greece. The earliest Greeks looked upon it as the highest of all mountains and as the central point of the earth's surface. The gods of Homer dwelt on its summit. In after times the gods were said to reside in the exterior sphere of the heavens, above the firmament and this seat of the blessed received the name of Olympus. Hence the gods themselves were called Olympian gods and, as such, formed a body of which Zeus was the head. The 12 great gods composed the council in Olympus and the others the general assembly. They did not dwell together, but separate in several mansions built upon the different heights of the many-peaked Olympus. At the highest summit stood the palace of Zeus, where all assemblies and feasts were held. From thence he could look down upon the earth, fill the heavens with clouds and hurl his thunderbolts. The name Olympus was given to several mountains or chains of mountains, one in northern Mysia, two in the Island of Cyprus and others in Lycia, Lydia, Cilicia, Lesbos, Elis and Laconia.

OLYNTHUS, 5-lin'thus, now **AIS MAMAS**, Saloniki, an ancient town of Chalcidice,

at the head of the Toronaic Gulf, the modern Gulf of Cassandra. It was early inhabited by Greeks, was taken by the Persians under Artabazus, one of the generals of Xerxes, was subject to Athens and regained its independence when the Spartan general Brasidas extinguished the Athenian power in Chalcidice. From its excellent maritime position, it grew in wealth and importance, until, becoming too powerful, the Spartans captured it in 379 B.C. In 352 the Olynthians formed an alliance with the Athenians, which provoked the hostility of Philip of Macedon and in 347 the city was betrayed to him, the citizens were enslaved and every building was demolished.

OLYPHANT, 5-l'i-fänt, **Robert Morrison**, merchant and railroad president: b. New York, 9 Sept. 1824; d. 3 May 1918. He was the youngest son of a prominent New York merchant engaged in the trade with China and interested in Presbyterian mission effort there. He was educated at Troy, N. Y., Middletown, Conn., and in New York City. At 15 he entered Columbia University and graduating in 1842, from 1900 was the oldest living alumnus. After graduation he entered the employment of Talbot, Olyphant and Company, his father's firm, and visited China in 1844, returning a year later. In 1858 Mr. Olyphant reorganized the old firm of Olyphant and Company of China and again visited the Orient, where he remained for four years. He was the active

head of the firm until his retirement from mercantile business in 1873. In May of that year he was elected a member of the board of managers of the Delaware and Hudson Company and its allied interests: the Cooperstown and Charlotte Valley Railroad, the Champlain Transportation Company, the Chateaugay and Lake Placid Railway Company, the Chateaugay Iron and Ore Company and the Lake George Steamboat Company. He afterward served as assistant president, vice-president, and for 20 years as president. In his advanced years he held the position of honorary chairman of the executive committee. Besides the numerous philanthropies of city, State and his church, missionary endeavor in China, notably the Canton Christian College as a Fellow of the National Academy of Design, he was also actively interested in art.

OLYPHANT, ōl'i-fant, Pa., borough in Lackawanna County, on the Lackawanna River and on the New York, Ontario and Western and the Delaware and Hudson and the Wilkes-Barre and Eastern railways, about six miles above Scranton. It was settled in 1857 and incorporated in 1877. It is in the anthracite region and its chief industries are connected with mining and shipping coal. It manufactures blasting powder and has machine-shops and iron works. Its chief trade is in coal. The government is vested in a burgess, who holds office three years, and a council. The borough owns and operates the electric-light plant. Pop. 10,236.

OM, ōm, a Sanskrit word, to which the Hindu religion attaches peculiar sanctity and mystic significance. It is pronounced at the beginning and end of every lesson in the Veda and is also the introductory word of the Puranas. In the Vedas it is said to comprehend all the gods. According to the ('Upanishads,' the word "om" sums up in itself all truth and much of the latter work is taken up with explaining its mystical meaning. If "om" is not repeated at the beginning and end of every Vedic recitation they will prove of no avail or at any rate lose much of their virtue. "Om" symbolizes the union of the three great Hindu divinities, Vishnu, Siva and Brahma. See OM MANI PADME HUM.

OM MANI PADME HUM, ōm mā'nē pād'mē hoom, a sacred formula in the Buddhist religion, known as the "formula of six syllables," used especially in Lamaism. Among the Tibetans and the Mongols it is repeated on all occasions, important and unimportant, and is found written on all sorts of objects on which inscriptions can be made. It is the first thing which a child learns to repeat. When written in the form of a monogram its sacred character is exalted. The formula is explained to mean either, "Oh, the jewel in the lotus: Amen"; or "Salvation in the jewel-lotus: Amen." A Western definition makes it signify: "Oh, the jewel in the lily of purity: Amen." Avalokites vara or Padmapāni, the lotus-handed, the Buddha of eternal light and heavenly ruler of the Western Paradise; the reputed author of the formula is said to have been born from a lotus or water-lily (q.v.). Consult Schlayintiveit, Emil, 'Buddhism in

Thibet' (London 1863); Waddell, L. A., 'The Buddhism of Thibet' (London 1895). See OM.

OMAGUAS, ō-mā'wā, a people of south-eastern Colombia. Their territory is now greatly restricted and the people themselves are much reduced in numbers; but the Omagua language, which belongs to the Tupi-guarani family, is still spoken even outside the limits of the original tribal boundaries. In pre-Colombian times the Omaguas were spread over parts of Colombia, Peru and Brazil. They were accustomed to flatten the heads of their children in early infancy and hence the designation "Omaguas," which means flat-headed people, a name given to them by other more cultured races with whom they came into contact and who transmitted it to the Spanish conquerors. The name Cambena has also the same meaning. At the time of the conquest of Peru and later, reports were current in Peru itself and among the Spanish conquerors generally, of the great wealth and high civilization and the vast extent of territory of the Omaguas, whose chief dominion and capital seem to have been on the east side of the Cordilleras. Common report said that their's was the land of El Dorado (of the golden or gilded man), a place of fabulous wealth in gold and precious stones. Thus the capital of the Omaguas was undoubtedly confounded with that of the famous Chibcha civilization of the upland plateau of Colombia. Three successive expeditions were sent into the Omagua country to effect its conquest in 1536, 1541 and 1560, but the powerful defenders of the land defeated them and drove them back with great loss. From this latter date the Omaguas seem to have been allowed to continue their national life without other organized attempts to conquer them. This would seem to be, in itself, evidence in plenty that they possessed neither great wealth nor populous cities which would certainly have attracted the cupidity of the Spanish adventurers. There is plenty of evidence, however, that they were much more civilized than the Brazilian and other races who surrounded them; that they dressed in woolen garments, and that they possessed a well-organized form of government which held dominion over a very extensive tract of country. The Omaguas seem to have gradually retreated before the march of European civilization and conquest to the upper Amazon Country, where they continued to occupy numerous small villages along the Amazon River and in the interior. There the Catholic missionaries found them in 1645 and continued to maintain Jesuit missions among them until the Jesuits were finally expelled from the country in 1776. The excesses of the slave trade, attacks by Portuguese and later exactions and abuses of rubber gatherers drove the Omaguas into the deep forest where their descendants live to-day. In this retreat they left behind them about half a hundred once prosperous towns and villages. Many of them are to-day rubber gatherers.

OMAHA, ō'ma-hā, a tribe of American Indians of the Dhegiha group of the Siouan family residing in eastern Nebraska. The name is derived from an Indian word meaning "those who go up the stream or against the current." They number about 1,400. This tribe, which

is very closely related to the Kausa and Osage, has wandered considerably during the past 400 years. They originally lived on the Ohio and Wabash rivers about 1500 or earlier, but moved up the Mississippi to the country round the mouth of the Missouri. Then in company with the Ponca, they crossed the Missouri and resided for a while in Iowa, where they are said to have ranged as far as the famous Pipestone Quarry (Pipestone, Minn.). Meeting the hostile Dakota, they were forced to retreat and the Ponca went on to the Black Hills (about 1650), while the Omaha settled on Bow Creek, Nebraska. In 1761 a part at least of the Omaha were living on the east side of the Missouri River above Big Sioux River and beyond the Iowa and they seem to have been on friendly terms with the Dakota and to have occupied, with them, territory on the Minnesota River. In 1802 the tribe was very greatly reduced by smallpox and this induced them to move down the Missouri to the neighborhood of Sioux City, S. D., where they were found by Lewis and Clark in 1804. At this period and later on they were at war with the Sioux. By the treaty of 16 March 1854, the Omaha ceded to the United States all their lands west of the Missouri and south of a line running west from where the Iowa River leaves the bluffs. The territory north of this constituted a reservation. Part of the latter was sold to the United States in 1865 as a reservation for the Winnebago. In 1882 a law was passed granting the Omaha land in severalty. The dwellings of the Omaha were generally made of earth and were similar to those of the Mandan. But they also made use of bark lodges, and when they were on hunting expeditions they carried along with them skin tipis which could be quickly set up on the open plains where other shelter could frequently not be had in the buffalo country. Despite their nomadic habits the Omaha cultivated corn, beans, squashes and probably other vegetables and made provision for winter store. Consult Fletcher, A. C., 'Study of Omaha Music' (Cambridge 1893); 'The Omaha Tribe' (Washington 1911).

OMAHA, Neb., the largest city in the State and county-seat of Douglas County, is situated on a slightly eminence on the west bank of the Missouri River, 600 miles from its confluence with the Mississippi. Although a superficial survey of the city had been made in June 1853 no attempts were made toward a permanent survey. The Indian title had not been extinguished and the Indians were very tenacious of their rights and viewed with suspicion all the movements of the white men.

History.—It was not until March 1854 that a treaty was concluded with the Otoes, Missouris and Omaha Indians, ratified 21 June and promulgated 24 June, whereby the title of the Indians was surrendered and left the land to be taken up and enjoyed by the white men. In the spring of 1854 some settlers arrived and the first building was erected. The first general election in the Territory was held 20 Dec. 1854, and on 16 Jan. 1855 the first legislative assembly was convened at Omaha, and on 24 January commenced a contest (which lasted for 12 years), when the member from Cass County gave notice that, at an early day, he would in-

roduce a bill to locate the capital of Nebraska. The struggle was long and bitter, often at the expense of needed legislation, producing much ill-feeling and was more troublesome to manage than any question the legislature had been called upon to decide. After a long debate upon the proposition of the member from Cass, the question was decided in favor of Omaha by a vote of 14 to 11 in the lower house, only to be renewed at every subsequent meeting of the legislature, until Nebraska became a State, when the capital was removed to Lincoln. On 2 Feb. 1857, by an act of the legislature, Omaha became an incorporated city, it having been up to this time a county organization, and an election was held on the first Monday in March in that year, when a mayor, nine aldermen and other city officers were elected. The council held its first session 6 March. Under the direction of the council the mayor proved up the claim of the city east of the 6th principal meridian and the same was surveyed and laid out into city lots, streets and alleys.

The discovery of gold in Colorado in 1858 made Omaha the best point for outfitting for the mines. The streets were filled with emigrants on the way to the gold fields and daily trains left to cross the plains in search of gold. At the breaking out of the Civil War Omaha was made military headquarters, which greatly increased its business and importance. From the day that President Lincoln decided that the initial point of the Pacific Railroad should be "at a point on the western boundary of Iowa, opposite section 10, township 15, north of range 13, east of the 6th principal meridian in the State of Nebraska," the success of Omaha was assured, and from a city of 320 blocks it has grown to one of 37.9 square miles.

Government.—Omaha was the first of the larger cities to adopt the commission form of government. The city is governed by seven commissioners elected at large, the mayor being chosen from among the seven by the commissioners themselves. The mayor has charge of municipal affairs. In addition there is a building commissioner, a fire and police commissioner, commissioner of streets, commissioner of finance, commissioner of public parks and playgrounds and commissioner of public improvements. Each commissioner receives a salary of \$4,500 annually. By a special act of the legislature, Omaha, South Omaha and Dundee were permitted to consolidate by popular vote. Greater Omaha now combines these two thriving suburbs. Late in 1921 Florence and Benson also were annexed to Omaha as a part of the greater city.

Public Parks.—The chief suburban attractions of the city are its parks, 23 in number, which are connected by a boulevard system of 35 miles. Hanscom Park, the oldest, contains 60 acres. Riverview, in the bluffs overlooking the Missouri, contains 70 acres. Bemis Park contains 10 acres; Elmwood contains 215 acres; Miller Park, 80 acres, and Fontenelle Park, 110 acres. Prospect Hill Cemetery is located in the northwest part of the city on high and eligible ground. Forest Lawn is situated seven miles northwest of business centre of city; others are Mount Hope Cemetery, Jewish Cemetery, Bohemian, Ever-Green, Springwell, Holy Sepulchre, Saint Mary's and Cassidy's Roman Catholic cemeteries.

Buildings.—Among the more pretentious buildings are the Douglas County courthouse, a beautiful building occupying a full block in the heart of the city and recently completed at a cost of \$1,500,000, the Omaha High School building, completed recently at a cost of \$1,250,000, the largest high school building west of Chicago. Other pretentious buildings are the Omaha Bee building, the City National Bank building, Woodmen of the World building, Union Pacific headquarters, First National Bank building, Fontenelle Hotel, *World Herald* building, city hall, the home of all city officers, erected at a cost of \$550,000, and the United States custom-house, post office and courthouse, erected at an expense of \$1,800,000. This building, of the Roman style of architecture, is located in the heart of the city, with an entrance on four streets. The first floor is devoted exclusively to the post office, second to the customs, internal revenue and railway mail service, third to the United States District and Circuit Courts, fourth to the grand and petit juries, weather bureau and civil service departments.

Churches.—Omaha has 170 churches of all denominations. It is the seat of bishoprics of the Roman Catholic and the Protestant Episcopal churches. There are in the city 21 Roman Catholic, 21 Methodist, 20 Presbyterian, 20 Lutheran, 10 Episcopal, 14 Baptist, 6 Congregational, 4 Christian, 6 Jewish, 2 United Brethren, 4 Evangelical, 2 Christian Science churches with many other denominations represented by a single church.

Charities and Hospitals.—These institutions include the Creche, Child Saving Institute, Emanuel Orphan Home, 13 hospitals and the Nebraska Institute for the Deaf. Omaha is very well equipped with hospitals, having accommodations for over 1,300 patients at one time. Saint Joseph's, an endowed Catholic institution, is among the largest hospitals west of the Mississippi.

Finances.—Omaha although 34th city in population is 18th city in the United States in volume of business. It has 10 national banks, capital \$6,950,000; 9 State banks, capital \$935,000 with deposits aggregating, in 1921, \$105,701,034; a Federal Farm Loan Bank; a Federal Reserve Branch Bank and 9 building and loan associations with resources of \$49,758,972. The city's bank clearings, in 1921, totalled \$2,388,586,896. The assessed valuation of real estate is \$320,000,000. The tax levy amounts to .099 mills.

Libraries.—The libraries are those of the New York Life Insurance Company, Law library (2,500 volumes); Omaha public library (98,000 volumes); the library of Young Men's Christian Association; two Catholic libraries at Creighton College, one for the use of the faculty (8,000 volumes, being composed in part of rare and old books and manuscripts of the 15th, 16th and 17th centuries); the other for the use of the students (12,000 volumes). The Masons, Odd Fellows, Swedish, Danish and Bohemian societies all have valuable libraries. In October 1888 G. W. Lininger erected an art gallery in the Italian Renaissance style, at a cost of \$15,000, in which to house his judicious collection of paintings and other works of art. The present collection is valued at over \$300,000 and consists of old oil paintings, modern oil paintings, water colors, statues and

busts, vases and plaques, porcelains, curios and articles of vertu, and the whole is open to view and inspection of the public two days in the week.

Public Schools.—The schools of the city are under the control of a board of education of 12, elected at large. Women paying taxes and those who have children of school age may vote for members of the board. The superintendent is elected by the board.

There are 53 school buildings in the city, 49 graded, two high school buildings and two special buildings. The value of school property is \$4,000,000.

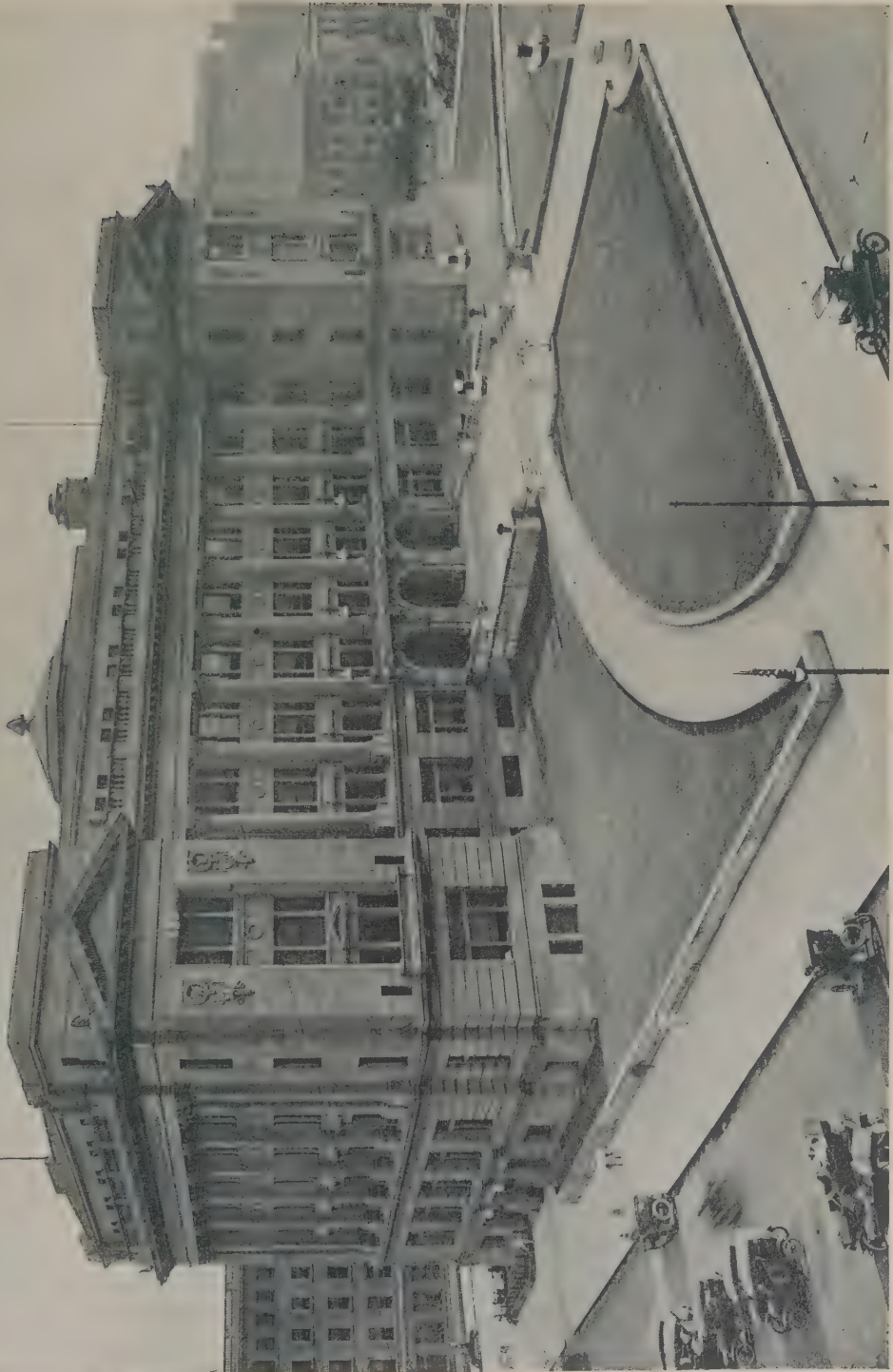
Industries.—There are many and diversified industries in Omaha with meat packing, ore smelting and oil refining in the lead.

The American Smelting and Refining Company commenced business in October 1870 with a capital of \$60,000. In 1882 the Grant Smelting Company was consolidated with the Omaha company. A reorganization was completed with a capital of \$2,500,000. They handle silver, lead, copper ores, from the Western States, Mexico and British possessions. The business of a single fiscal year of this plant was as follows: 331,792,488 tons lead, \$15,760,143; 121,301,418 ounces silver, \$10,650,710; 389,685 ounces gold, \$8,046,788; 21,324,785 pounds copper, \$3,731,837; 7,794,928 pounds blue vitriol, \$516,745. Omaha is in the centre of the great wheat and corn producing portions of Iowa, Nebraska, Kansas and Missouri, and the largest cattle and hog productions of the country are marketed here. For a single year elevators handled 68,000,000 bushels of corn, oats and wheat.

Railroads.—The geographical position makes Omaha a natural railroad centre. Ten great trunk systems, with 22 lines connecting to every part of the United States, enter the city, thus bringing it into communication with all parts of the Union. No Western city has greater railroad facilities. Within the past few years two railway stations have been erected, the Union depot at a cost of \$400,000, and the Burlington costing \$500,000. The Missouri River is spanned at Omaha by two railroad bridges and one motor and wagon bridge. The following are the lines out of Omaha for the East: Chicago, Burlington and Quincy; Chicago, Milwaukee and Saint Paul; Chicago and Northwestern; Chicago, Rock Island and Pacific; Illinois Central; Chicago and Great Western. To the North and Northwest: Chicago and Northwestern; Illinois Central; Saint Paul, Milwaukee and Omaha. West and Southwest; Union Pacific; Chicago, Rock Island and Pacific; Kansas City, Saint Louis and Council Bluffs. South and West: Missouri Pacific; Wabash; Kansas City, Saint Louis and Council Bluffs.

Trade and Commerce.—Over 900 firms, covering every line of mercantile industry known in the United States, are engaged in wholesale and jobbing. The business extends east to the Mississippi River, north to Manitoba, south and southwest to Texas and Mexico, west to the Pacific. Omaha is a port of immediate transportation of foreign goods, which has permitted the merchants to receive merchandise and pay duties at home without the delay on the seaboard. The value of the jobbing business in 1890 was \$47,000,000, and in 1921, \$345,-

OMAHA, NEB.



Douglas County Court House

OMAHA, NEB.



Douglas Street, west from 17th Street

952,025. The value of productions of factories, industry, packing houses and smelters was (in 1890) \$68,000,000; 1921, \$506,700,793. At South Omaha are located the famous packing houses and stockyards, where more than \$30,000,000 have been invested. The daily capacity of killing and preparing for market is 15,000 hogs, 5,000 cattle and 4,000 sheep. The livestock receipts at the stockyards were: 1890—hogs, 1,702,723; cattle, 615,337; sheep, 153,873; horses, 5,007; total, 2,477,002; 1921—hogs, 2,665,276; cattle, 1,434,576; sheep, 2,752,952; horses, 6,779; total, 6,859,583.

Trade Territory.—Omaha serves the most productive agricultural producing territory in the United States. Its trade territory, limited only by its transportation facilities, consists of the State of Nebraska, the west half of Iowa, the northwestern part of Missouri, Montana, Wyoming, part of Colorado, and Kansas. Some Omaha institutions include Utah, Washington and California in their trade. Omaha is the second primary livestock market and packing centre of the world, the fourth primary grain market, the greatest butter-producing city in the world, has the largest smelter of fine ores and lead, is the fourth distributing point for agricultural implements and has the largest macaroni factory in the United States.

Trade Activities.—Omaha receives over 6,750,000 head of livestock on its livestock market annually; more than 65,000,000 bushels of corn, wheat, oats and rye; manufactures 30,000,000 pounds of creamery butter; distributes \$18,000,000 of agricultural implements, \$60,000,000 of groceries, \$22,000,000 of smelter products, \$28,000,000 of oils, \$4,000,000 of poultry and eggs, \$19,000,000 of coal and coke, \$27,000,000 dry-goods and notions, \$9,000,000 hardware, \$87,000,000 automobiles and accessories, annually.

Newspapers.—The first paper published in Omaha was *The Omaha Arrow*, its initial number being dated 28 July 1854. There are published at present the *Morning and Evening World-Herald*; the *Morning and Evening Bee*; the *Omaha Daily News*; the *Omaha Daily Hotel Reporter*; *Omaha Excelsior*; *Mercury*; *Western Laborer*; *Bohemian Voice*; *Commercial Exhibit*; *Omaha Tribune*; *Pokrok Zapadu*; *Svenska Posten*; *Swedish Journal Tribune*; *Young Men's Journal*; *Den Danske Pioneer*; *Westliche Presse*; *Examiner*; *Central Farmer*; *Enterprise*; *Fraternal Union Advocate*; *Nebraska Farmer*; *Protector*; *Quill*; *Royal Woodman and Workers Gazette*.

Population.—(1920) 191,601.

O'MAHONY, ò-mă'ò-nĭ, John Francis, Irish politician; b. Kilbeheny, County Cork, Ireland, 1816; d. New York, 7 Feb. 1877. He was educated at Trinity College, Dublin. Fired with zeal for Ireland's cause he entered the ranks of the Young Irelanders in 1845 and took part in the insurrection of Smith O'Brien in 1848, after which he was compelled to seek refuge in France. In 1854 he came to the United States. He was active in founding the organization of the Fenian Brotherhood, acted as its president for several years, and though personally taking no part in any of the insurrectionary movements in Canada or Ireland his advice was never withheld. He devoted his later years to literature, but endured great pov-

erty. At his death his body was taken to Ireland, where he was buried with honors in Glasnevin Cemetery, near Dublin. He published 'History of Ireland by Geoffrey Keating' (1857), which he translated from the Gaelic and annotated copiously. Consult Webb, Alfred, 'Irish Biography' (Dublin 1888).

OMALIUS D'HALLOY, ó-mă'lĕ-ús dăl-wă, Jean Baptiste Julien, BARON D', Belgian geologist and administrator; b. Liège, 16 Feb. 1783; d. Brussels, 15 Jan. 1875. After he had finished his classical education in Belgium, he went to Paris, where he studied with Fourcroy, Lacépède and Cuvier. On returning to Belgium he observed the geologic strata of northern France, and was thus led to undertake a geological map of the empire. This he did, having been exempted from military duty by the government for that purpose. Though much of the task was completed in 1813, the map was not published till 1822. At the same time d'Halloy held many governmental positions. He was mayor of Skeuvre (1807), of Braibant (1811), sous-intendant of the arrondissement of Dimant (1814), general secretary of the province of Liège (1815), governor of the province of Namur (1815), counsellor of state, senator (1848). In 1816 he became a member of the Academy of Brussels, of which he was president from 1850 on. From 1842 on he was a corresponding member of the Paris Academy of Sciences. Besides a vast amount of material in scientific periodicals he published 'Description Géologique des Pays-Bas' (Namur 1828); 'Elements de géologie' (Namur 1831); 'Introduction à la géologie' (Namur 1833); 'Géologie de Belgique' (Brussels 1842); 'Des races humaines' (Paris 1845); 'Code administratif' (Namur 1827); 'Notions de Statistique' (Namur 1840).

O'MALLEY, ò-mă'l'ĭ, Frank Ward, American journalist; b. Pittston, Pa., 30 Nov. 1875. He studied architecture, drawing and painting, taking special courses at the University of Notre Dame, Indiana, and at the Pennsylvania Academy of Fine Arts. He was engaged as an illustrator in New York in 1902-06, also producing light verse, and since 1906 he has been on the New York *Sun* where his humorous and special articles have become widely popular. He collaborated with E. W. Townsend in writing the plays 'The Head of the House' (1909) and 'A Certain Party' (1910).

O'MALLEY, Grace (called also GRAINE NĪ MAILLE, GRANY O'MAYLE, GRAINNE O'MAILLEY, GRANY NE MALE, GRAYN NY VAYLE, GRAINE MHAOL, etc.), Irish chieftainess; b. West Galway, about 1530; d. possibly on Clare Island, about 1600. She came of the O'Malley clan, famous sea-rovers, and was a daughter of Dubhara O'Malley, chieftain of Umhaill Uachtarach Uí Mhaille. She was married twice and had children by both marriages, her first husband being Domhnall-an-chogaidh O'Flaherty and her second Richard MacOileverius Burke. She was famous as a leader in the Elizabethan wars, and in command of a considerable fleet made many forays against British shipping and coast settlements. In 1576 she and her second husband made an alliance with Sir Henry Sidney at Galway, but in 1577 she was captured by the forces of the Earl of Desmond while on one of her forays and was held captive for a

time. She then continued her warring expeditions; was suspected of plotting against the government with the Earl of Thomond, the Burkes, Lord Birmingham and others, and she threatened the life of Theobald Dillon when he came into the country. However, she is afterward recorded as peaceably paying taxes with her husband. In 1586, after the death of her husband, she moved to obtain letters of conduct from Sir Richard Bingham, but was seized and sentenced to be hanged for a plundering expedition against Aran Island. She was released through the efforts of Richard Burke, "The Devil's Hook," said to be her son-in-law. She enjoyed his protection until his rebellion, when she took refuge in Ulster, being unable to return home because of the loss of her ships. She was afterward pardoned by Queen Elizabeth, but is reported to have continued her former course. She petitioned the restoration of one-third of her husband's lands in 1595, but apparently spent her last years in poverty. Innumerable legends grew about her career, few of which can be substantiated. Consult 'Calendar of State Papers, Ireland' (1574-75, 1588-92, 1592-96); O'Flaherty's 'Chorographical Description of the West, or H-Iar Connaught' (ed. by Hardiman, Dublin 1846).

O'MALLEY, Thaddeus, Irish Roman Catholic clergyman: b. Garryowen, near Limerick, 1796; d. Dublin, 2 Jan. 1877. He was ordained in 1819 and came to America, but through his independent ecclesiastical action was suspended in 1827 and returned to Dublin, where he became assistant at the cathedral under Archbishop Daniel Murray and worked indefatigably for the passage of poor-laws for Ireland. He was appointed by the government rector of the Catholic University at Malta, but because of the reforms introduced by him among the students he was dismissed. In 1845 he founded the *Social Economist* and later the *Federalist*, both of which he used in the interest of Ireland and to unite the Old Ireland and Young Ireland parties. He was often under ecclesiastical censure for the freedom with which he attacked the discipline of the Church; was an earnest advocate of the home-rule movement, and published 'A Sketch of the State of Popular Education in Holland, Prussia, Belgium and France' (1840); 'Harmony in Religion' (1870); 'Home Rule the Basis of Federation' (1873), etc. Consult Webb, 'Irish Biography.'

OMAN, ʿo-man, Charles William Chadwick, English historian: b. Mozufferpore, Bengal, India, 12 Jan. 1860. He was educated at Winchester and Oxford, was a Fellow of All Souls' College, Oxford, from 1883; deputy professor of modern history at Oxford 1900 and full professor in 1905. He is the author of 'A History of Greece' (1888); 'Warwick, the King Maker' (1891); 'A Short History of the Byzantine Empire' (1892); 'A History of Europe 476-918' (1893); 'A Short History of England' (1895); 'History of the Art of War in the Middle Ages' (1898); 'History of the Peninsular War' (5 vols., 1902-14); 'Seven Roman Statesmen' (1902); 'The Great Revolt of 1381' (1906); 'A History of England before the Norman Conquest' (1910); 'Welling-ton's Army' (1912).

OMAN, ʿo-mān, Arabia, a sultanate at the southeastern extremity of the peninsula, gen-

erally comprised in the maritime district extending along the Persian Gulf, the Gulf of Oman and the Arabian Sea, from El Hasa to Merbat, near the Hadramut frontier. Area, 82,000 square miles. Although mainly a maritime kingdom, Oman proper is the richest part of the Arabian Peninsula, both in agricultural products and in mineral treasures. The working of gold and silver filigree, with which daggers, belts, cups and pipes are often adorned in Oman, supports great numbers in the larger towns. The inhabitants are tolerant, but superstitious and immoral. The form of government is a monarchy, limited by a powerful aristocracy with hereditary privileges, and the prescription of popular rights. The ruler is called the imam or sultan, and the capital of the state is Muscat (q.v.), a name also given to the sultanate. The present dynasty secured possession of the throne in 1741, and for some time Socotra, Zanzibar and parts of the east coast of Africa were attached to Oman. A British Resident is stationed at Muscat, the sultanate being virtually a British protectorate. Population, consisting of numerous tribes, is estimated at 500,000.

OMAR I, ʿo-mar, 2d caliph after Mohammed; d. Medina, 3 Nov. 644. See CALIPH.

OMAR II, 8th caliph of the Omaides. See CALIPH.

OMAR, ʿo-mār, Mosque of, or KUBBET ES LAKHRA ('THE DOME OF THE ROCK'), a structure in Jerusalem believed to have been erected by Omar, the second of the Mohammedan caliphs. The mosque is built over the rock which the Jews regarded as the place where Isaac was to have been sacrificed; and, in the belief of the Mohammedans, the scene of Mahomet's ascent to heaven. The mosque is octagonal, 66 feet to a side, and the dome is 97 feet high and 65 feet in diameter. There are four porches and numerous pointed windows inlaid with rare Persian tiles and now filled with beautiful 16th century stained glass. The walls are covered with fine Byzantine mosaics. The original Byzantine temple has been much modified by the Mohammedans. The Arabians believe the mosque to have been built by Abd al Malih in the 7th century.

OMAR KHAYYAM, khī-yām', Persian poet and scholar: b. Naishāpūr, province of Khorassan, latter part 11th century; d. (according to tradition) 1123 (517 A.H.). His name is given as Ghjās uddīn Abul Fath Omar ibn Ibrahim al-Khayyām. The epithet Khayyām, signifying "tent-maker," is indicative of his calling previous to the time when he was able to devote himself to science and literature. Nizām ul Mulk, the great vizier of Al Arslan and Malik Shāh, offered him preferment at court, but he requested instead the means of living in retirement and occupying himself with learning. He accordingly received a pension, and pursued researches, especially in mathematics and astronomy. Subsequently he was made astronomer royal at Merv, and in that capacity prepared certain astronomical tables. He was also active in the revision (dating from 15 March 1074) of the ancient Persian calendar, a work comparable to the revision of the Julian calendar by Gregory XIII to which it was similar in principle, and superior to which it has been ranked by some authorities. Among

his mathematical writings are a work on algebra and a study of 'The Difficulties of Euclid's Definitions,' both still preserved. His work on algebra was the most notable contribution of his country and age to the study of mathematics. He was the first to make an attempt to scientifically classify equations of the first degree and to consider cubes from the standpoint of the general equation. But though he did much he left much to be done by future mathematicians; for all his work was more specific than general. In his religious views he was unorthodox, and therefore viewed with suspicion by many of his contemporaries. He is best known to the West in later times as a poet somewhat in the manner of Lucretius, but more in that of Ecclesiastes. This philosophy he set forth in 'Rubāiyāt' (quatrains), of which, according to convention, the first, second and last lines rimed (the rime being in many cases even quintuple), while the third line was for the most part blank, but rarely followed the rime of the other lines. Each Rubāi was distinct, and in extant manuscripts is placed in an alphabetical arrangement dependent upon the letter concluding the rime. About 500 quatrains are assigned to Omar; many are probably not his. Perhaps his heretical views had something to do with the fact that a comparatively small number of manuscripts exists, and none can be made an authority. The manuscripts also vary more or less in the number of quatrains which they include. Edward Fitzgerald made of a selected portion of the quatrains an ingenious mosaic which presents something of unity, but probably gives too consistent a structure to the pessimistic side of Omar. The Persian seems to have been of changeable mood, sometimes humble before Allah, again reproachful or defiant; hopeful and fatalistic; rebellious and acquiescent. He often ridiculed the orthodox, and perhaps he liked to confuse and perplex them. "For this," says Fitzgerald, "he is said to have been especially hated and dreaded by the Sufis." The Sufi poets, however, found it convenient to borrow of Omar, whose material they presented in their own mystic guise. Nevertheless, Omar had training in the Sufi doctrines, and some have detected a symbolic and mystic significance in his work. The generally known rendering into English is that by Fitzgerald (1859; later ed.), whose version was republished (1900) by Batson and Ross with commentary and introduction. There are also translations by Whinfield (2d ed., 1893) in his edition of 500 quatrains, a scholarly work; Payne (1898); and Heron-Allen (1898). There is a volume on the 'Sufi Interpretations of the Quatrains of Omar Khayyam and Fitzgerald' by Bjerregaard (1902). There are numerous versions in other modern languages, and Elihu Vedder published (1884) a series of illustrations which have been much praised.

Consult Bjerregaard, 'Sufi Interpretations of the Quatrains of Omar Khayyam and Fitzgerald' (New York 1902); Batson, H. M., a new edition of Fitz-Gerald's translation with commentary; Browne, E. G., 'A Literary History of Persia' (New York 1906); Dole, N. H., 'Rubayat of Omar Khayyam' (Boston 1896); Jackson, A. V. W., 'From Constantinople to the Home of Omar Khayyam' (New York 1911); Payne, 'The Quatrains of Omar Khay-

yam' (with biographical and critical introduction, London 1898); Thompson, E. F., 'The Quatrains of Omar Khayyam Translated' (Worcester, Mass., 1906); Shirazi, 'Life of Omar al-Khayyāmi' (Chicago 1905).

OMBAY, ōm-bī', or **ALLOR**, Malay Archipelago, one of the Sunda Islands, about 20 miles northwest of Timor, from which the Ombay Pass, in the line of one of the best routes from Europe to China, separates it. It is about 900 square miles in extent, 65 miles long and 15 broad, and presents a bold coast and lofty interior. The mountains are covered to their summits with lofty trees. It is inhabited by semi-savage tribes, and carries on some trade with Timor in birds' nests and provisions, exchanged for iron-work, Chinese wares and linen. Allor on the northwest and Bailoko on the southeast are the chief settlements and ports. It belongs to the Netherlands, and is included in the residency of Timor.

OMBOS, ōm'bōs (mod. **KÔM UMBOO**, or **KOM OMBO**, "the hill of Umboo"), ancient Egyptian town on the east bank of the Nile, about 500 miles above Cairo. The town has long been in ruins and is uninhabited, but the remains of the magnificent temples built in the time of the Ptolomies were cleared of sand and rubbish in 1893. The town itself is still buried in sand. Ombos was an unimportant town, notwithstanding its strategic position on a hill commanding both the Nile and the road from Nubia to the Nile Valley, until the Ptolemaic era. It then became capital of the separate nome of Ombites and it was at this time that the temples were built. The great temple was enclosed within a wall of crude bricks, remains of which still stand, except on the side toward the Nile. The temple is double and was devoted to the worship of Jebek and of Har-oer or Aröeris. There are also remains of a smaller Ptolemaic temple nearer the river and partially washed away. Consult Mariette, A. E., 'Monuments of Upper Egypt' (London 1877); Demorgan, J., 'Kom Ombo' (Vienna 1894).

OMBRE, ōm'bēr, a game of cards originating in Spain. It is usually played by three persons, with 40 cards (the eights, nines and tens having been removed), and each player receives nine cards, three by three. The game is often mentioned in English 18th century literature.

OMBU (ōm'boo) **TREE**, also known as **BELLASOMBRE-TREE**, **UMBRA-TREE** and **POKE-TREE**, a South American shade-tree (*Phytolacca dioica*), widely cultivated as a shade tree in Spain, Malta and other countries on the Mediterranean Sea and in India. The tree attains a height of 25 to 35 feet, is extraordinarily wide at the base of the bole, sometimes reaching a diameter of 12 to 15 feet, and has a wide-spreading top with extremely dense foliage. The leaves are large, and the whitish flowers are borne on spikes, the fruit being similar in appearance and in medicinal qualities to that of the plant or shrub variety of pokeweed.

OMDURMAN, ōm-door'mān, Sudan, a native town on the White Nile, opposite Khartum. It was built as the capital of the Mahdi's successor when Khartum was destroyed in 1885, and extends for several miles along the river

bank. Under the Khalifa Abdallah it had a population of 500,000 inhabitants, living mostly in one-storied mud huts, lining streets laid out on an orderly system, and guarded by a walled enclosure flanked with towers, accommodating 10,000 warriors. When the Khalifa was defeated, 2 Sept. 1898, by the Anglo-Egyptian troops under Lord Kitchener, Omdurman was hastily deserted, but with returning trade and prosperity has an estimated population of 60,000. Omdurman is the great mart of the gum-arabic, ivory and ostrich-feather trade of north-eastern Africa, and representatives of over 30 tribes congregate in its markets.

O'MEARA, ò-mā'ra, **Barry Edward**, English physician: b. Ireland, 1786; d. London, 3 June 1836. He was household physician to the Emperor Napoleon I at Saint Helena and published 'Napoleon in Exile' (1822). Originally a surgeon in the British navy, he was serving on the *Bellerophon* in that capacity, 7 Aug. 1815, when Napoleon went on board. Napoleon noting O'Meara's skill and knowledge of Italian desired the surgeon to accompany him to Saint Helena. Having obtained Admiral Keith's permission, O'Meara remained with the ex-emperor till July 1818. He was then recalled and deprived of his rank for having accused Sir Hudson Lowe before the Admiralty of cruel and arbitrary conduct. He published a very interesting work, 'Napoleon in Exile' (1822).

O'MEARA, **Stephen**, American journalist b. Charlottetown, Prince Edward Island, 26 June 1854; d. 14 Dec. 1918. He settled in Charlestown, Mass., with his parents when 10 years of age and in 1872 was graduated from the Charlestown High School. In 1872-74 he was a reporter on the *Boston Globe*, and in 1874 he joined the staff of the *Boston Journal*, of which he ultimately became editor-in-chief and publisher. He sold the *Journal* in 1902 and retired, but later became police commissioner of Boston.

OMEGA, ò-mē'ga or ò-mē'g'a, the last letter of the Greek alphabet; hence, figuratively speaking, the end or last of anything. See ALPHA.

OMEN, a sign believed to prognosticate a future event, between which and the event foretold there appears no relation of cause and effect, but which is usually received as an intimation from a superior power. Omens have been common among most nations, and are often remembered and mentioned after they have ceased to be credited. Though generally classed among superstitions, they may sometimes be founded on some hidden relation in things, some natural law of sequence the ground of which is unknown. They have been chiefly in vogue in the ruder ages and communities, though under the name of auguries they retained their influence during the whole period of pagan antiquity. Eminent warriors and other popular leaders in moments of extreme doubt and peril have given notable examples of faith in them. Sneezing was deemed ominous in the time of Homer, and Eustathius states that it was lucky or unlucky according as it was directed to the right or the left. Aristotle discusses the problem why sneezing from noon to midnight is good, and from midnight to noon bad. At noon it was propitious. Among the ancient Persians sneezing was es-

teemed fortunate, a sign of contest between the fiery soul and the earthly body, and of the victory of the former. When the emperor of Monomotapa sneezes, says Codignas, it is proclaimed throughout the whole land as a signal for general joy. That this belief in the danger of sneezing was pretty general is seen in the fact that in Germany and the Germanic languages and in the Latin tongues generally it is a custom to use some exclamation when one sneezes. The Spaniard says, "Jesus," that is, "may Jesus protect you!" and the German says, "Gesundheit" (health), that is, "may good health come of it." The itching of the nose implied that a stranger was coming. Burton, in his 'Anatomy of Melancholy,' states that "to bleed three drops at the nose is an ill omen." The spots on the finger nails were all omens; the itching of the palm of the right hand promised a receipt of money; the doubling of the thumb within the hand was believed to have efficacy in avoiding approaching danger, and therefore the thumbs of dead persons were so folded. The way in which fires, candles or lamps burned suggested divers omens. The superstition still prevails in many places that the howling of a dog by night presages a death in the neighborhood because the dog symbolized the spirit that carried the souls of the dead to the future world. Duncan Campbell expresses his faith in this omen, and adds: "Odd and unaccountable as it may seem, those animals scent death, even before it seizes a person." The screeching of the owl and the croaking of the raven have both in ancient and modern times been regarded as omens of some dire calamity. Divers presages concerning the weather have been derived from the habits of birds, bees, wasps and gnats. Pennant states that many of the great families of Scotland received monitions of future events, especially of death, by spectres, wraiths and shrieks. Fishermen and sailors discover omens in echoes, flashes, shadows and other visible appearances. To throw a cat overboard or lose a bucket is believed to be unlucky. Whistling is supposed to stir up the wind, because originally whistles were used in the worship of the different divinities of the air. The same custom prevailed in Mexico and thousands of ceremonial copper bells have been found in ancient tombs in that country and Central America and parts of South America, where they were used for the same purpose. The Plains Indians of the United States use bone whistles in their ceremonial dances, and they were especially in use in those ceremonies devoted to the gods of the air. Stumbling has been the subject of numerous superstitions. Gaius Gracchus stumbled at his threshold on the morning of his death. To stumble on going out, says Bishop Hall, was mischievous; to stumble up stairs, says Grose, was lucky.

At the present day, in many parts of England and the United States, a superstitious belief in omens exists. It is regarded as unlucky to see first one magpie and then more; but two denote marriage or merriment; three, a successful journey; four, an unexpected piece of good news; five, that you will shortly be in a great company. To kill a magpie is to incur some terrible misfortune. When a person goes out on any important business, it is lucky to throw

an old shoe after him. To present a knife, scissors, razor or other sharp or cutting instrument to one's friend is unlucky, as they are apt to divide love and friendship. The falling of salt toward persons at table, the spilling of wine on their clothes, are evil omens. Breaking a looking glass betokens the death of the best friend of the person to whom it belonged. The burning of the cheeks or tingling of the ears, that others were talking of us; if of the left cheek or ear, ill; the right, well. A sow crossing the road before a person going on a journey is believed to indicate a disappointment if not a bodily accident to such person; but if the sow is attended by her litter of pigs, it denotes a successful journey.

From the belief in omens there came to be derived elaborate systems of palmistry and astrology which were simply certain specific omens classified and connected with specific rules, regulations and manner of procedure in divination. Naturally omens came to play a large part in the religions of most of the races of the world. On the other hand, many of the omens had their origin in religious ceremonies, customs and beliefs. Consult Dennefeld, Ludwig, 'Babylonisch—assyrische Geburts—Omina' (Leipzig 1904); Thurston, E., 'Omens and Superstitions of Southern India' (London 1912); Toy, C. H., 'Introduction to the History of Religions' (Boston 1913).

OMER PASHA, ô'mër pash'â, Turkish general: b. in the Austrian village of Plasky, 24 Nov. 1806; d. Constantinople, 18 April 1871. His real name was Michael Lattas, and his parents were Christians. Educated for the Austrian army, for some unrecorded reason he fled, in 1828, to Bosnia, and, embracing Mohammedanism, obtained the post of writing-master to Abd-ul-Medjid, the heir-apparent to the Ottoman throne. In 1842 he was appointed military governor of the Lebanon; in 1843 he suppressed an insurrection at Albania, and in the following years others in Bosnia and Kurdistan. He defeated the Russians in 1853 at Oltenitza, again at Silistria in 1854, and entered Bucharest. On 17 Feb. 1855 he repulsed, with great loss, 40,000 Russians who attacked him at Eupatoria. In October of that year he was sent to relieve Kars, but arrived too late. In 1857 he became governor of Bagdad, but he was dismissed from office in 1859 on a charge of maladministration in office. In September 1861 he was charged with the pacification of Bosnia and Herzegovina, which were again in insurrection. This being accomplished, he attacked the Montenegrins, captured Cetinje and overran the country in 1862. He was made field-marshal in 1864, was sent to suppress the rebellion in Crete in 1867 and was Minister of War from 1869 until his death.

OMMANNEY, ô'm-măn'ē, SIR ERASMUS, British admiral: b. London, England, 1814; d. Portsmouth, England, 21 Dec. 1904. He entered the navy at the age of 12, and three years later was present at the landing of the British army at Lisbon. He was at the battle of Navarino, in 1827, on board the *Albion*, throughout the action, acting as aide-de-camp to the captain, and was the last survivor of that battle, which resulted in the destruction of the Turkish fleet. In 1835 he was promoted to the rank of lieutenant, immediately volunteering to serve with

Capt. James Ross in an expedition to relieve whaling vessels beset in the ice in Baffin's Bay, and was commended for his services. Attaining the rank of captain in 1846, he was placed second in command of the Arctic expedition to search for Sir John Franklin (q.v.), and was first to discover traces of the missing ships. He was knighted for these services. In the Crimean War he commanded the British expedition sent to the White Sea to damage Russian ports. Afterward he served on the coast of Central America, his last active command being as senior officer in charge of the naval establishment at Gibraltar. He was generally known as the 'Father of the British Navy.'

OMMIADS, ô'm-mi'adz, **OMMAYYADS**, or **UMMAYYAS**, a dynasty of Arabian caliphs or "successors" of Mohammed, founded by Moawiya I, general of the Caliphs Umar and Usman (Omar and Osman). After the death of Osman, the grandson of Ummaya, in 644, Moawiya seized his kingdom and became the first caliph of the dynasty. He captured the island of Rhodes, destroyed the Colossus, one of the Seven Wonders of the ancient world, and carried devastation to the walls of Constantinople, which he besieged unsuccessfully for seven years. Moawiya had been an early follower of Mohammed, who made him his secretary, while Omar made him governor of Syria, which he held as a possession for nearly 40 years. He died A.D. 680 and was buried at Damascus, the capital of Moslem government. With him began the great schism in Islam, which is still divided into the two sects of the Shiites and Sunnites (Shiah and Sunni), the former recognizing the only hereditary lineage from Mohammed through his daughter Fatima and her husband, Ali, and the latter accepting the line of the first caliph, Abu Bekr, father-in-law of the Prophet. The Ommiad dynasty produced 13 caliphs after Moawiya, viz., Yezid I, Moawiya II, Marwan I, Abdul Malik, Walid I, Suleiman, Omar, son of Abdul Aziz, Yezid II, Hasham, Walid, Yezid III, Ibrahim and Marwan II, the last of the Ommiads, defeated and crushed by the Abbasides in 750. The Cordova caliphate, founded by the Ommiads in Spain, lasted 281 years longer, till 1031, but was not recognized as the true caliphate, and did not, in fact, assume such title till 170 years after the fall of the Ommiads. Marwan II was the last of the line, the bravest and best of the Ommiads; he was slain and mutilated 5 Aug. 750. See CALIPHATE; HASAN and HUSAIN. Consult Muir, W., 'The Caliphate' (London); Lane-Poole, S., 'Mohammedan Dynasties.'

OMNIBUS, a Latin word signifying "for all," and now applied in several languages to the well-known vehicle used for the conveyance of passengers at a cheap rate. The famous mathematician, Blaise Pascal, is said to have introduced the vehicle in Paris. Pascal was more or less interested in the affairs of practical life. He was the inventor of the push-cart that now perambulates our streets. In 1661 he had large wagons built for regular traffic in the heart of Paris. He allied himself in this undertaking with several influential friends, among whom was the Duke de Roannes. In 1662 Louis XIV granted letters patent to Pascal, in which it was said that these carriages were intended

for the comfort of poor people who had to go to courts of justice, or who were sick and so poor that they could not afford to pay the two pistols exacted by the chairmen and the drivers of coaches. At first the use of the vehicle was not generally permitted. A royal decree forbade its use by soldiers, pages, lackeys and other liveried servants, as well as artisans and porters. Pascal, in spite of the fact that he only lived to be 39, is said to have made no inconsiderable sum out of his invention. After the vehicle had been in use for some 16 years, it was abandoned for various reasons. It was not until 1812 that it was again introduced, this time in Bordeaux, which city was followed in 1821 by Nantes and in 1827 by Paris. A Mr. Shillibur started the first omnibus in London in 1829, and they were introduced into New York in 1830 and Amsterdam in 1839.

OMNIBUS BILL. See **COMPROMISE OF 1850.**

OMOO: A NARRATIVE OF ADVENTURES IN THE SOUTH SEAS, Herman Melville's sequel to his 'Typee' (q.v.), appeared in 1847, and went through five editions the same year. In it he recounts the incidents of his voyage from Nukahiva, on board the barque *Julia*, to the Society Islands, where he took part in a mutiny and was left with several companions on the island of Tahiti for still further cheerful vicissitudes. Unlike 'Typee,' a smiling, languid idyl of life in a tropical valley, 'Omoo' (the word means "rover") is packed with activity and comedy. One cannot be sure how far the narrative is a trustworthy account of Melville's own experience, but there is the look of reality about his racy sailors, his consuls and beachcombers, and his irresponsible natives, hovering between cannibalism and a barely-guessed-at Christianity. The treatment of the missionaries led to much controversy with others of that profession, and Melville was, indeed, often caustic and contemptuous toward them. What should be borne in mind, however, is that the story is dramatic; that the teller has just emerged from a world of Edenic simplicity; and that his recollection of that little world lends a touch of sharpness to his judgments of the figures he finds on the borders of civilization. Undoubtedly, he was something of a partisan of paradise; and yet the book takes its quality, its keen edge, not so much from his prejudice as from his comic force and the happiness with which he hit off the manners and personages of a heterogeneous community.

CARL VAN DOREN.

OMOPHAGIC RITES, or OMOPHAGIA (Greek, *omophagia*, eating raw flesh), religious rites in which uncooked flesh was eaten. In such religious ceremonies cannibalism sometimes formed a part, as in the Orphic rites, in which the passion of Zagreus (q.v.), the infernal Dionysus, was commemorated by the sacrifice of a man, who was dismembered and eaten. These rites were celebrated at Chios and Tenedos, and from them Dionysus obtained the title of eater of raw fish. Dionysus rites were introduced into Italy about the end of the 3d century B.C. and in 189 B.C. the Senate, informed of their nature by a freeman who had been marked out as a victim, issued the decree "Concerning the Bacchanalian Rites," which banished

the Orphic mysteries from Italy. A ram or an ox was afterward substituted for a human victim in the Dionysian celebrations. See **DIONYSUS; BACCHUS; ORPHEUS.**

O'MORE, ò-mòr, Roger, or Rory, Irish revolutionist: flourished 1620-52. He came of the O'More family, descended from the ancient chiefs of Leix, and which after the establishment of Queens County is said to have raised 19 rebellions. Rory O'More was largely responsible for the Ulster uprising in 1641, in which, with Sir Phelim O'Neill and others, he planned the capture of Dublin Castle, and although that enterprise failed he achieved a victory at Juliantown, County Meath. After the failure of the Ulster uprising a price was put on his head, and he is thought to have gone to Flanders. He was later connected with the fortunes of Owen Roe O'Neill; served Antrim in his Scottish expedition in 1644; was in arms against the Kilkenny confederation in 1648; and after fighting in Connaught in the uprising of 1650 he was compelled to flee and died in obscurity.

O'MORE, Rory, or RURY OGE, Irish revolutionist, second son and namesake of a captain of Leix: d. 1578. He was continually engaged in rebellion, but in 1565, or 1566, he received a pardon. In 1572, however, he is recorded as in arms against the queen, and in 1574 he was taken prisoner after aiding in Kildare's plots. He soon obtained his freedom, and in 1575 submitted to the authorities, obtaining a second pardon in 1576. In 1577, in the expectation of help from Spain and under the encouragement of John Burke, he again renewed hostilities, burned Naas and Carlow, but was later captured and killed by the Fitzpatricks, who set his head on Dublin Castle.

OMRI, òm'ri, in the Bible, a king of Israel after the separation of Israel and Judah; his reign is variously placed as 926-915 B.C.; 903-872 B.C.; 900-875 B.C.; 890-879 B.C. He commanded the armies of Elah (1 Kings xvi, 16) and was engaged in the siege of Gibbethon, which was in the possession of the Philistines, when the death of Elah occurred. Omri was proclaimed king by the army and went at once to Tizrah, where he made war against Zimri, the occupant of the throne, and gained possession of the kingdom. His title to the throne was then contested by Tibui, who had been elected by the people who desired a non-military king, and a civil war lasting four years resulted in Omri's complete victory. He then removed his capital to the mountain of Shromron, where he established Samaria, a place of great beauty in a fertile country and possessed of high strategic value. He made unsuccessful war against Assyria, and endeavored to strengthen his position through the marriage of his son to a Phœnician princess. Through this alliance Baal-worship was introduced, causing the downfall of the dynasty after some 50 years. He conquered the Moabites, and appears to have established a considerable degree of power, since his house furnished four kings to Israel, an unusual record at that time. He is mentioned on the Moatile Stone of Mesha, and in the cuneiform inscription the house of Israel is called Bit-Humri, "the house of Omri." He is further mentioned in 1 Kings xvi, 25; 2 Chron. xxii, 2; Cant. vi, 4; 1 Kings xx, 34;

xxii, 3; and Micah vi, 16. Consult Rawlinson, 'Historical Evidences'; Hastings, 'Dictionary of the Bible'; Wellhausen, 'History of Israel.'

OMSK, Asiatic Russia, the former capital of western Siberia, now capital of the general-governorship of the Steppes and of the province of Akmolinsk, on the Irish at the confluence of the Om, and on the Trans-Siberian Railway, 280 miles southeast of Tobolsk, and 1,624 miles from Moscow by rail. It has modern fortifications in the form of the regular polygon, flanked with five bastions, and is the most important military station on the line of the Irish. It has gymnasia, a seminary for teachers, a technical school and the West Siberian section of the Russian Geographical Society. It is an important industrial and commercial centre and is the chief distributing point for western Siberia; and the construction of the Trans-Siberian Railway has added greatly to its commercial importance. Pop. over 130,000.

ON CONCILIATION WITH AMERICA. The speech of Edmund Burke, "On Moving his Resolutions for Conciliation with the Colonies," was delivered before the House of Commons on 22 March 1775. Burke was thoroughly prepared for this great effort, both through his familiarity with the best models of eloquence, 'Demosthenes and Cicero,' and through his study of books describing America and the Americans and of fiscal and commercial statistics, as he himself suggests: "Having no sort of reason to rely on the strength of my natural abilities, . . . I was obliged to take more than common pains to instruct myself in everything which relates to our Colonies." The elaborate, but not obtrusive, structure of the speech is Attic, the amplification Ciceronian, the fervor Hebraic. The grotesque comparisons which occasionally marred the eloquence of Burke are here virtually absent. Analysis shows that the introduction or exordium, aims to secure the good will of the audience by minimizing the influence of the speaker: "I persuaded myself that you would not reject a reasonable proposition because it had nothing but its reason to recommend it." The status is distinct: "The proposition is peace." The statement of facts gives the six causes of the fierce spirit of liberty in the colonists: descent, form of government, religion in the North, manners in the South, education, and remoteness from England. The main argument or proof leads up to and includes the resolutions with which Burke wishes the House of Commons to conciliate this spirit. Then comes the refutation of objections and, finally, the peroration: for the services desired of the colonies, England must rely, not on compulsion, but on their interest in the British Constitution and on the affection arising from kindred blood, similar privileges, and other ties, "which though light as air are as strong as links of iron." The speech as a whole well illustrates Burke's extraordinary powers of assimilation, his subtlety, his directness, his rich and comprehensive imagination, his knowledge of human relations. Many of the sentences take firm hold upon the memory: "Nobody shall persuade me, when a whole people are concerned, that acts of lenity are not means of conciliation"; "A great empire and little wits go ill together"; "I do not know the method of draw-

ing up an indictment against a whole people." Consult Cook's edition of the 'Speech on Conciliation' (New York 1896), and Grierson, H. J. C. (in the 'Cambridge History of English Literature,' Vol. XI).

LANE COOPER.

ON LIBERTY. John Stuart Mill's essay 'On Liberty,' among the most carefully written of his works, was published in 1859 when he was 53 years of age. It was planned in 1854 and revised with great care with the co-operation and helpful criticism of his wife. It is justly one of the most famous of all his writings; it is closely reasoned and contains his most characteristic political doctrines. In political theory, Mill was a modified individualist, believing that every man should be allowed all liberty compatible with the liberty of his fellows. In the introduction to the treatise 'On Liberty' he mentions the danger to which his attention has been called by the course of world events. He shows how the conflict between liberty and authority led to the demand that rulers should become responsible to their subjects. Then in his own generation a new evil appeared—the tyranny of the majority might supplant the tyranny of the rulers; for, when the masses have become conscious of their power, they will probably be as tyrannical in legislation as in public opinion. In this respect he differs from Bentham and James Mill, who assumed that all ends would be secured by making the sovereign the servant of the people. He vigorously pleads the case for complete freedom of thought and discussion and even goes so far as to urge the doubtful point, that contradiction, even when the truth is contradicted, is desirable in itself. He is inclined to regard authority as something logically opposed to reason and to accept the doctrine of the "right of private judgment," although in all the fields of his activity he was more concerned to find truth than to maintain a creed. Mill believed, furthermore, that the law should not interfere with purely personal conduct. He held that "the individual is not accountable to society for his actions in so far as these concern the interests of no person but himself." In other words, his central principle defended liberty of tastes and pursuits and freedom to unite for any purpose not involving harm to others. In fact there should be no legislative interference unless it helped the individuals restrained. Throughout the entire work Mill clings to some extent to the notion that state interference, as such, is an infringement of liberty with an implied prejudice against any interference at all.

Mill thought there was a lack of the true spirit of liberty in the society of his generation and that some legislation might help and some legislation might hinder its growth; he plainly stated that it was not the laws, but the spirit of the people who execute them that preserves or destroys liberty. He does not complain against the state and its organization, but against the stupid and intolerant spirit of its citizens. His ideal demands a state whose members are really proud of their individuality. He believed that utility was the ultimate standard of all value which, in the largest sense, must be "grounded on the permanent interests of man as a progressive

being." He held that there were "certain social utilities which are vastly more important and, therefore, more absolute and imperative than any others are as a class," and the greatest of these, in Mill's opinion, was liberty, which he truly considered the foundation of all human happiness, although it could not be secured and maintained merely through legislation.

To summarize, three distinct propositions regarding the relation of the state to liberty seem to be implied in Mill's treatise, besides the valid principle that compulsion cannot be employed to effect what in its essence is a spiritual end: (1) That an increase in the power of the state is prejudicial to liberty. This presupposes that state action and liberty are directly opposed to each other. He seems to overlook the fact that there might be an alternative between state interference and no interference at all. (2) That a distinction can be drawn between the part of human life "in which it is chiefly the individual that is interested" and the part "which chiefly interests society," and that liberty is infringed if the state interferes with the former. (3) That, as the most valuable element in human life is spontaneous choice, anything which is done through compulsion diminishes the scope of that choice and thus infringes liberty and stifles creative ability.

The keynote of Mill's method is found in the individualism which he inherited from the 18th century—a doctrine of *laissez-faire*, which meant that the sole end of government is to protect each individual in the possession of the product of his labor. Considered in the light of the 20th century Mill's fault was lack of faith in the ability of society to improve itself by political machinery. The liberty he praises is a very positive ideal; in fact, he imagined himself to be doing much more than urging the inestimable value of the spirit of liberty. He professed to discover a principle which should enable future generations to ascertain which type of legislation impairs that spirit—in other words, a just conception of the relation of society to liberty.

Mill's work 'On Liberty' has much more than mere historical importance. It is an eloquent and reasoned appeal on behalf of a principle whose recognition Mill thought to be the most valuable thing in society, and it has, as such, a permanent value and interest. While the trend of modern thought has been so far away from individualistic standards that Mill's renown has been somewhat obscured, his influence on his generation would be difficult to overestimate. Next to Herbert Spencer's 'Social Statics' and 'Man Versus The State,' Mill's essay 'On Liberty' is probably the finest expression of that political individualism which pervaded and dominated mid-Victorian England. Consult Mill, John Stuart, 'On Liberty' (1859, People's ed.); id., 'Autobiography' (1873; new ed., 1908); Stephen, Leslie, 'The Utilitarians' (Vol. III is devoted chiefly to Mill's work, especially pp. 60, 244-281); Ritchie, D. G., 'Principles of State Interference' (1891); Graham, W., 'English Political Philosophy from Hobbes to Maine' (1899); Douglas, Charles, 'John Stuart Mill, A Study of his Philosophy' (1895); Whittaker, Thomas, 'Comte and Mill' (1909); Buckle, H. T.,

'Essays' (pp. 39-161); Davidson, W. L., 'Political Thought in England: the Utilitarians' (Chap. 8-10).

HARRY J. CARMAN.

ON NE BADINE PAS AVEC L'AMOUR

('One must not trifle with love,' 1834) is important in the writings of Alfred de Musset, both because it is the most poignant of his dramas and because it is first to mark a change in the whole character of his literary production. He had met George Sand in August 1833, had gone with her to Italy in October, had returned alone in April 1834. One insignificant poem was the sole fruit of that interval. This play and 'Lorenzaccio,' both written in the later half of 1834, show no longer the freshness of youth and fancied sorrows but the bitter reality of actual suffering, a tormenting self-questioning, sometimes a desperate pessimism. Though the title is proverbial, 'One must not play with love,' is not technically what French dramaturgy calls a *Proverbe*, like Musset's 'Il faut qu' une porte soit ouverte ou fermée' or 'Une caprice.' These were society scenes, eminentlyactable. 'One must not trifle with love,' was the last of Musset's plays to be acted (1861) and is indeed quite unsuited to the stage. A chorus, in old-fashioned French, fills interludes with comments on the action, somewhat after the fashion of the Greeks. A baron, a tutor, a curé and a governess furnish with their complacent self-importance a sedately comic relief to the tragedy of young Perdican's play with the love of his cousin Camille and her foster-sister Rosette. Flitting from one to another with care-free, vagrant fancy, at last he discovers, too late, the inestimable jewel of which he has made a sport; Camille, truly loving and beloved, finds Rosette dead at Perdican's renunciation of her devotion and leaves him as the curtain falls, hopeless, in the consciousness of his unattonable guilt, herself not guiltless, yet with a broken heart.

BENJAMIN W. WELLS.

ON THE SUBLIME (Περὶ Ὑψους), "the

most striking single piece of literary criticism produced by any Greek writer posterior to Aristotle," and a work whose popularity is attested by the fact that it has been translated into at least 12 languages, including Dutch, Swedish, Polish and Russian, is a treatise addressed to one Terentianus by a certain Dionysius or Longinus or anonymous writer (according to different manuscripts) and for a long time was commonly ascribed to Cassius Longinus, the Greek rhetorician of the 3d century. But the equivocal testimony of the manuscripts, the absence of direct references in ancient authors, the names included in the treatise or absent from it, the writer's affinities in style, in thought and in general standpoint—such considerations when taken singly cause hesitation and when taken together raise the most serious doubts as to the truth of the traditional view. In the light of recent research it has come to be recognized that the external evidence in favor of attribution to the historical Longinus is of a highly dubious character, and that the internal evidence seems to point to the 1st century rather than the 3d as the period within which the treatise was prob-

ably written. Gaps exist in the manuscripts amounting to about one-third of the work and this fact is the source of hope for the future solution of the problem by the discovery of a more complete manuscript. The object of the author is to indicate broadly the essentials of a noble and impressive style. He defines sublimity as a certain distinction and excellence in expression and remarks that innate elevation of tone can be regulated by acquired art. After a brief account of defects of style opposed to sublimity, such as tumidity, puerility, misplaced passion and frigidity, the following five sources of the sublime are enumerated: (1) grandeur of thought, founded on nobility of character; (2) vehement and inspired passion; (3) figures of speech, such as adjuration, rhetorical questions, asyndeton and hyperbaton; (4) noble phrasing or diction, into which enter such elements as choice of proper and striking words, metaphors, similes and hyperboles; (5) elevation in arrangement of words. By way of conclusion, the author in a notable passage endeavors to trace the causes of the dearth of great literature in his own day and decides that it is traceable to decay of liberty or spread of wealth and luxury. The treatise may be considered as a disquisition not only on the formation of style, but on literary criticism in general. It is a veritable storehouse of quotations, from at least 50 Greek writers, illustrating the excellencies and defects of matter and form. Such familiar topics of modern criticism as correctness, standard of taste and comparative method are not neglected by the author. There is a good English translation (with the Greek text *en regard*) by W. Rhys Roberts (Cambridge 1899). The introduction and the appendices of his work give a good survey of the problems involved and of the bibliography to that date.

HERBERT F. WRIGHT.

ON THE SUBLIME AND BEAUTIFUL. Edmund Burke's 'A Philosophical Enquiry into the Origin of Our Ideas of the Sublime and the Beautiful' appeared in 1756. In later editions it was much enlarged and provided with an introductory discourse on 'Taste.' Though but remotely connected with the major interests of his career, this work of his early manhood exhibits the characteristic marks of his comprehensive and penetratingly reflective mind, and it occupies an interesting place in the history of aesthetics. Previous critics, Burke complains—he might have mentioned Addison—make existing works of art the measures of new artistic creations; and this practice leads to an unfruitful imitation of models and to traditional judgments. He is inspired by an acceptance of the philosophy of Locke to discover by direct investigation of human nature the physical causes of the various qualities of emotion experienced in the presence of works of imagination. He finds that ideas capable of powerfully impressing the mind are related either to self-preservation or to society. Those which are related to self-preservation turn mainly on pain or danger, as ideas of terror, obscurity, power, privation, vastness, infinity, difficulty, etc.; and these contribute to the effect of sublimity. Those ideas which are related to society turn mainly on gratification and pleasure, and excite affection, tenderness, and the objects which thus

affect us we call beautiful. Burke distinguishes a pure æsthetic emotion for beauty in general from the passion excited by the beauty of woman, in which lust mingles; but his analysis of beauty is distinctly from a masculine point of view. "We submit," he says, "to what we admire, but we love what submits to us." Having examined and dismissed the more or less current notions that beauty is determined by proportion, by utility or by virtue, he finds the properties of a beautiful object in relative smallness, smoothness, gradual variation, delicacy and clear mild color. Taking issue with Shaftesbury who in the 'Characteristics' had represented morality as essentially a province of fine art, he remarks that those whom most people choose as companions of their softer hours are never persons of shining morality or strong virtues—"it is rather the soft green of the soul on which we rest our eyes." Beauty, he contends, is in general relaxing; and to speak of virtue as beautiful "has a strong tendency to confound our ideas of things, and has given rise to an infinite deal of whimsical theory." His distrust of æsthetic morality is manifestly related to his study, in which he anticipates a main line of modern psychology, of the physiological bases of emotion. Discussing in his section on Words the means by which painting and poetry gain their respective effects, he anticipates also some of the central distinctions of Lessing's 'Laokoon' (q.v.). His relation to Lessing is discussed by W. G. Howard in 'Publications' of the Modern Language Association (Vol. XXII, 1907).

STUART P. SHERMAN.

ONA, ὄνα, or **AONIH**, ὀνί, a group of South American Indian tribes living in the district surrounding the Strait of Magellan and in Tierra del Fuego. They constitute one of the three distinct Fuegian races, each of which appears to be of different stock and to possess an individual language. They are a low type of savage although physically well developed. Their family ties are of very slight order, they have no chiefs, build only the flimsiest of huts and despite a rigorous climate go almost naked. They live chiefly by hunting and fishing; and are skilful in the construction and use of bark canoes and in basketry. Consult Martial, L. F., 'Mission scientifique du Cap-Horn' (1838).

ONA, Pedro de, pā'drō dā ὀñā, Chilean poet: b. Confines, Chile, about 1571; d. in battle about 1620. He was educated at Lima (then Los Reyes del Peru), and there wrote his great epic poem, 'Arauco Domado' ('Chile Conquered,' 1596; re-edited 1849), which is reckoned a Spanish classic, being included in the Spanish Academy's 'Catalogo de Autoridades de la Lengua,' as well as various sonnets and the descriptive poem, 'Temblor de Lima el Año de 1607' ('The Lima Earthquake of 1607,' 1609). So popular was his work in his day that it had many imitators, some 40 of whom were well-known poets. His work had more influence upon the Spanish literature than had that of any other Spanish colonial writer with the probably one exception of the Mexican poetess, Sor Juana Inés de la Cruz.

ONAGER. See **ORDNANCE**.

ONAGRACEÆ. See **EVENING PRIMROSE**.

OÑATE, Juan de, hoo-än' dā ö-nä'tā, Spanish explorer: b. Guadalajara, Mexico, about 1555; d. about 1615. He was a man of position and influence in the colony, a son of the founder of Guadalajara, and he married a granddaughter of Cortés. In 1595 permission was granted him by the viceroy, Velasco, to colonize the district north of the Rio Grande, but Monterey, Velasco's successor, withheld full powers as governor until 1598, when Oñate set out on his expedition from Zacatecas with 400 soldiers, 130 of whom had families, and many wagons and cattle. He crossed the Rio Grande, founded San Juan, the first capital of New Mexico, and, notwithstanding conflicts with the Indians, the colony flourished. In 1599 and 1604 Oñate explored Arizona, probably part of Kansas, and though records show that he was not governor of the colony after 1608, there is nothing by which to accurately determine the date of his death. Gaspar de Villagrā, a captain who accompanied Oñate, has left a long epic poem in which Oñate is made the hero of the narration; and from this the chief events of Oñate's life have been gathered, in so far as they are known.

ONAWA, ön'a-wa, Iowa, town, county-seat of Monona County, within five miles of the Missouri River, on the Illinois Central and Chicago and Northwestern railways, 37 miles southeast of Sioux City. It is the centre of an excellent agricultural and stock-raising region and has a considerable local trade. It has public schools and a public library (founded in 1867). Pop. 2,256.

ONAWAY, ön'a-wa, Mich., village in Presque Isle County, 130 miles north of Saginaw, on the Detroit and Mackinaw Railroad. It is situated in a region devoted to fruit and stock-raising and has a lumber trade and manufacturing. Pop. 2,789.

ONCORHYNCHUS, the genus of the andromous *América* and Asiatic *Salmonidae* which includes the salmon of the north Pacific. It is so called from the hooked jaws of the spent males. It is also the King salmon. These salmon are of great importance on account of their large size and excellent qualities. See SALMON.

ONE HUNDRED COMMITTEE, the name given an organized body of New York citizens, who during the occupation of Manhattan by Lord Howe were intent upon maintaining their independence. Governor Tryon, the British commander, was so intimidated by the committee he feared for his personal safety and took refuge on board a British sloop-of-war. The committee gave courage to the Sons of Liberty who removed the cannon from the royal battery at the foot of Broadway to a place of safety for the use of the people.

ONEGA, ö-nyé'gä, (1) a lake in Russia, near the centre of the government of Olonetz, after Ladoga the largest lake in Europe, covering an area of about 3,700 square miles. It is of irregular shape, has generally rocky shores, and numerous creeks, bays and islands, and is well supplied with fish. Numerous shoals and sand-banks interrupt its navigation. It is fed chiefly by the Migra, Shuia or Shuisk, Vodla and Vytegra, and discharges itself into Lake Ladoga by the Svir. A canal between the Vyte-

gra and the Kayla, an affluent of Lake Bielo, gives it an opening into the basin of the Volga. (2) A river to the east of Lake Onega, which, issuing from Lake Lacha, government of Olonetz, flows first northeast, then northwest, and after a course of about 270 miles, so much broken by falls and rapids that it cannot be considered as navigable, enters the White Sea at the southeast extremity of the Gulf of Onega.

ONEIDA, ö-ni'da, N. Y., city in Madison County, on the New York Central and Hudson River, the West Shore and the New York, Ontario and Western railroads, about 110 miles in direct line west by north of Albany, the State capital. The place was settled in 1839, at the opening of the Utica and Syracuse Railroad, now the New York Central and Hudson River Railroad, and was incorporated as a village 20 June 1848. It was granted a city charter 28 March 1901. It is the commercial centre of a fertile agricultural region and has considerable manufacturing interests. The chief manufacturing establishments are chair factories, push cart works, casket and carriage factories, knitting mills, steel pulley works, cigar factories, canneries, iron works, milking machines and milk bottle caps. There are about 1,800 employees in the manufactories. It has a large trade in its own manufactures and in farm and dairy products and fruit. It has a city hospital, a private hospital, an old ladies' home, an excellent high school, many fine churches, athletic field of 11 acres, also playground of two acres.

Oneida Lake (q.v.), five miles north by west, is a popular outing place. The Oneida Community (q.v.) is located two miles to the south, and Oneida Castle, the site of the ancient headquarters of the Oneida Indians, adjoins Oneida. The three banks have a combined capital of \$235,000, and the annual amount of the business is about \$30,000,000. The government is vested in a mayor and six aldermen. The city owns and operates the waterworks. Pop. 10,541. Consult Durant, 'History of Oneida County.'

ONEIDA, a lake in New York, on the boundaries of Oneida, Oswego, Madison and Onondaga counties, about 18 miles south of the eastern part of Lake Ontario. It is 25 miles long and about 5½ miles wide. Several small streams flow into the lake and the head-waters of those from Oneida County are near the source of the Mohawk River, and the outlet of which is Oneida River whose waters enter Lake Ontario through Oswego River. Sylvan Beach, on the east bank, is a favorite resort and a number of small villages are along the shore. The lake has a few islands.

ONEIDA COMMUNITY, a settlement of Communists (see COMMUNISM) at Oneida, Madison County, N. Y., sometimes called Perfectionists. The community was founded in 1847 by John Humphrey Noyes (q.v.). He had originally formed a small settlement of his fellow-men at Putney, Vt., in 1838. During the first 10 years the settlement at Oneida made slow progress, but eventually became very successful, as a result of numerous industries and manufactures. The community followed a complex marriage system, there being no ceremony nor permanent ties between couples, and the community assumed all responsibility in the sup-

port and education of children. According to the Oneida doctrine on marriage, love does not consist with selfish claims "and no more permits exclusive appropriation of persons than of things." Marriage, therefore, was "complex" and not "simple." Men and women in the community were free to cohabit at pleasure; but the propagation of children was theoretically under the control of the society and conducted professedly on scientific principles. Outside opposition, principally from the Protestant churches, arose, and the marriage system was abolished in 1879. The community reorganized and constituted itself a joint-stock company in 1881, and the co-operative plan was followed in financial and domestic matters, but the community of property and the distinctively social life were given up. A common dining-room, laundry, library and assembly hall are features still retained of the old community life. Each member has now a separate individual interest represented by shares of stock in place of the former undivided interest in the common property. A guarantee of support was given to all elderly and infirm persons in lieu of stock and also for the support and education of the children of the community, in 1882, until they should be 16 years of age. Co-operative privileges were limited to the members of the Oneida Company and their children and could be extended to others only with the unanimous consent of the subscribers to the original agreement. In 1882 the community had property valued at \$600,000. Since the reorganization branch manufactures have been established at Niagara Falls, Sherrill and Kenwood, N. Y., and in 1903 the total valuation of community property was said to exceed \$2,000,000. There were then upward of 300 persons in the community which has since grown very considerably. Consult Hinds, 'American Communities' (1902).

ONEIDA INDIANS (Oneyotka-ona, "people of the stone" or from the Iroquois "tiionen-iote"—"where the rock is"), a tribe of the Iroquois confederacy of Indians formerly living on the shores of Oneida Lake, N. Y., from which their territory extended through central New York southward to the Susquehanna. They were friendly to the French and the Jesuits, but they took sides with the Americans in the Revolutionary War. Subsequently they were attacked by the hostile Iroquois under Brant who burned their villages and forced them to take refuge in the American settlements. A considerable number of them settled on the Thames River, Ontario, Canada, where about 800 survivors lived in 1903. Others reside in Wisconsin, New York and on the Grand River, Canada. About 300 Oneidas are still in New York State; over 2,000 in Wisconsin; about 800 on the Canadian Thames reservation in the province of Ontario; while others form part of the Grand River (Ontario) reservation or of the several Catholic Iroquois colonies. See also SIX NATIONS.

O'NEILL, ð-nēl', Owen Roe ("RED OWEN"), Irish warrior: d. 6 Nov. 1649. He was the nephew of Hugh O'Neill, Lord of Tyrone, and was educated at Louvain and in France; and subsequently distinguished himself as the commander of the Irish troops in the service of Spain. The wholesale confiscation in the north

of Ireland known as the "Plantation of Ulster" caused a general uprising of the Irish of which O'Neill assumed the command and of the Irish forces in the wars against the English in the first half of the 17th century. On 5 June 1646, with 5,000 men he routed Monroe's army of 7,000, killing one-half of the enemy. Turning rapidly around, he defeated two other armies of 2,500 each. For two years he continued to be victorious in battles in which he was generally largely outnumbered; and only his sudden death ended his victorious career.

O'NEILL, SIR Phelim, Irish rebel: b. about 1603; d. Dublin, 10 March 1653. He was a kinsman of the Earl of Tyrone and was active in the rebellion of 1641. He was a member of the Irish Parliament at Dungan-non in 1641 and joined forces with the Earl of Antrim to support the cause of Charles I in Ireland. He was leader of the band which captured Charlemont Castle and he later became commander-in-chief of the forces of the north. Failing to gain support from the Scottish settlers in the north he ravaged a goodly portion of Ulster on a pretended necessity for reducing their opposition to the king's forces. He was unsuccessful in his siege of Drogheda Castle in 1642 and losing the confidence of his followers he was succeeded by his kinsman, Owen Roe O'Neill. His fortunes never rallied after this although he had expected to be restored to his old command, particularly after his kinsman's death in 1649. He took part in the battle of Scariffhollis and played a notable part in the defense of Charlemont Castle against the forces of Parliament but was compelled to capitulate in 1650. He remained in hiding for a time but was captured, tried for treason and executed.

O'NEILL, SIR Turlough Luineach, EARL OF TYRONE, Irish chieftain: b. County Ulster, about 1530; d. September 1595. He was a cousin of Shane O'Neill, and after vain endeavors to supplant him in the clan succeeded him on his death in 1567. He then pledged loyalty to Queen Elizabeth but without any apparent intention of supporting the government or abandoning the practices of his predecessor in his leagues with the Scots and defiance of authority. An expedition was sent against him in 1574, under the command of the Earl of Essex, but met no success and ended in the extension of O'Neill's land grants and other privileges, including the maintenance of 300 Scottish mercenaries. He further gained royal approbation in 1578 in his creation as Baron of Clogher and Earl of Clanconnell for life. Subsequently, however, he again entered into conspiracy against the government, meantime ravaging the lands of neighboring clans. The government then took up the claims of his cousin Hugh for the chieftainship of the clan Tyrone and after many changes in fortune he was forced to yield in 1593. Two years later he attempted to regain control of the clan but was repulsed, his castle of Strabane was razed by his cousin and Turlough took refuge in some nearby ruins, where he died.

ONEIROTECHNICS, also called **DREAM ANALYSIS**, an ancient and at various times reputable or disreputable pastime which has in modern times been entirely revised and recast and constitutes in modern psychological thought

an earnest and intense field for scientific investigation. The dream is thus considered a definite product of the body's activity. Behind its apparent meaninglessness it has much serious meaning. Although frequently expressed in unintelligible phrases, it is only nonunderstandable to those who are without comprehension; as a foreign language, Chinese or Choctaw for example, have meaning for those who understand. As Lanier puts it:

"Then sight and sound: Then space and time, then language, mete and bound, and all familiar forms, that firmly keep man's reason in the road. Change faces, peep betwixt the legs, and mock the daily round."

Behind this mocking, however, the unconscious peeps through, and in that modern psychotherapeutic method, psychoanalysis, the dream is used as a royal road into the unconscious. By means of the careful analysis of the dream the unconscious motives of the dreamer are made known to him to better his mental adaptations to reality. Consult Jelliffe, 'Technic of Psychoanalysis.'

ONEONTA, ō-nē-ōn'ta, N. Y., third class city in Otsego County, on the Susquehanna River, and on the Delaware and Hudson Railroad, is the terminus of the Ulster and Delaware Railroad, which connects with the West Shore at Kingston, and of the Southern New York Railways Company, formerly the Otsego and Herkimer Railroad, which connects with the New York Central lines at Herkimer and Utica. The town of Oneonta was settled prior to the Revolution, but the first settlement within what is now the city limits was made in 1790 by Frederick Brown. It was incorporated as a village in 1848. It is in an agricultural region which is a most productive dairy country, more milk being produced within a 25-mile radius of Oneonta than in any other section of New York State. The chief manufacturing establishments are the Delaware and Hudson shops, which have approximately 1,000 employees (aside from 750 trainmen who live here); cigar factories, 75 employees; knitting mill, 100 employees; flour and feed mills, 100; shirt factory, 100; silk mill, 100; only American plant making Sanatogen, 20; overall factory, 125; novelty works, 14; miscellaneous, including two wholesale grocery houses, 60. It is the seat of the Oneonta State Normal and Training School which had enrolled in 1915 nearly 1,100 non-resident students. It has the Aurelia Fox Memorial Hospital, a State armory, a public library, a new government building and post office, a new municipal building, country club with a nine-hole golf course, three city club houses, a chamber of commerce having 250 members and a paid secretary, and 12 churches. The government is vested in a mayor and council with subordinate boards employing paid officials. Pop. 10,500.

ONIAS, a Jewish high priest, the son of Simon. About 188 B.C. he fled to Egypt, where he built the temple of Leontopolis, or rather he remodeled an old pagan temple given to him by the Egyptians. This Leontopolis was located near Heliopolis, 180 stadia from Memphis, and must not be confounded with the Leontopolis of the Delta. There is more or less obscurity regarding Onias, and from various accounts there appears to have been three of this name. Josephus declares that the builder

of the Leontopolis was a son of Onias who fled to Egypt in the time of Antiochus V, about 164 B.C. Another account says that Onias III was murdered by Andronicus in a sanctuary near Antioch. In Isaiah (xix, 18-25) reference is made to five cities in Egypt, occupied by the Hebrews, one of them called Leontopolis (the city of the Lion); and also to an altar and sacred tower at the border of Egypt where the Egyptians are expected to offer sacrifices to Yahweh. Consult Duncan, J. G., 'Exploration of Egypt and the Old Testament' (New York 1909); Herzfeld, L., 'Geschichte des Volkes Israel' (Vol. II, Leipzig 1863); Naville, E., in 'Egyptian Exploration Fund Memoir' (London 1888); Petrie, 'Hyksos and Israelite Cities' (London 1906).

ONION, a river in Vermont. See WINOOSKI.

ONIONS, ūn'yūnz, Oliver, English novelist: b. about 1876. His earlier work was that of a designer and commercial artist and he subsequently wrote for *Le Quartier Latin* in Paris and contributed war drawings to London periodicals. Turning his attention to fiction he achieved a considerable success. He wrote 'Little Devil Doubt' (1909); 'In Accordance with the Evidence' (1912); 'The Debit Account' (1913); 'The Story of Louie' (1913); 'Gray Youth' (1914); 'Mushroom Town' (1915); 'The New Moon' (1918), etc.

ONIONS AND ONION CULTURE, various species of *Allium*, a genus of the lily family; specifically, *A. cepa*, a bulbous-rooted biennial herb with hollow radical leaves and a leafless, hollow, usually swelling stem, which bears an umbel of small six-segmented bell-shaped white or pinkish flowers, replaced in some cases by bulblets. It has been so long in cultivation that its original form is not definitely known. Probably it is a native of western Asia and adjacent parts of Africa, since it is mentioned in old Egyptian writings, the Pentateuch, etc. It has spread to all countries occupied by civilized man, by whom its bulbs (and to some extent its leaves) are used as a vegetable and for flavoring various culinary preparations. The annual onion crop of the United States amounts to more than 6,000,000 bushels.

Being very hardy, the onion may be planted as soon as the ground can be worked in early spring, or it may be cultivated during the winter where the temperature does not fall to the freezing point. In the Southern States it is generally cultivated as a winter crop. The essentials of its cultivation are a well-drained, light, friable soil, rich in all plant food and humus and, above all else, free from weeds. Onions, especially while little, cannot compete with weeds. Reclaimed marshes, such as are used for celery, are highly valued also as onion fields. Every effort having been made to make the soil as loose as possible, the seed is sown in drills about 12 inches apart, machines being used for the purpose. Since the plants are somewhat slow in making their appearance, and are very inconspicuous, planters often mix a few radish or turnip seeds with the onion seed, the young radishes being quick to appear, conspicuous, easy to remove and serving to indicate the positions of the rows until the onion plants can be seen. Throughout the growing

season the onions are kept free from weeds, thinned to distances about three inches apart, and the soil between the rows is kept loose and open by frequent cultivation. When the necks of most of the bulbs have turned yellow in the autumn the bulbs are pulled, four or five rows being combined in one windrow, and the "scullions," or thick-necked, immature bulbs, discarded. After drying in the field for a few days the bulbs are gathered in crates, which are piled under cover for further drying before sorting and shipping them to market. Dryness, coolness (just above freezing) and soundness are essentials in storing onions during the winter.

Onion cultivation has several modifications of importance. Improved methods of culture consist in starting the plants in hotbeds or cold-frames and transplanting them to the field when four or six inches tall, and thereafter cultivating them as above described. The advantages claimed for this method are that the plantlets are under complete control while small—the precarious time; that they are readily transplanted under ordinary conditions; that the cost of transplanting is not greatly in excess of that of weeding in the other method; and that not only is there a more even stand in the field, but that the bulbs are larger and of more uniform grade. Another frequent practice is the sowing of seed in the autumn where the plants are to remain; and a still more common one is the planting of "sets,"—little onions which have been specially grown for this purpose, the seed being sown very thickly the year previous. These sets are especially valued for the production of "bunch onions," which appear in the markets during the early spring and summer months.

Some varieties of the onion are remarkable for their method of propagation. The potato or multiplier onion has two or more "cores" or "hearts," each of which will send up leaves when the bulb is planted. If separated from its fellow hearts, each core will produce a new compound bulb and sometimes send up a flower-stalk. This variety is, therefore, a perennial which resembles garlic in its method of propagation and is intermediate in flavor between garlic and the common onion. Another botanical variety is the "top" or "tree" onion, which develops bulblets instead of flowers, or both, at the top of the flower-stems.

Of the varieties of the common onion grown in America, the red ones are usually of strongest flavor, the yellow ones next and the white ones mildest. But still milder and better flavored are the foreign varieties known as Bermuda, Spanish, etc., which are less hardy than the common kinds and are little grown in the North. They are largely cultivated in the South and in California, whence the markets derive their chief supply.

The Welsh onion or "cibol" (*Allium fistulosum*) is a native of Siberia. It resembles the leek in the absence of a distinct bulb, but differs from the leek in its hollow, onion-like leaves, which are cut like those of the shallot and used for flavoring. It is of dwarfer growth than the common onion and has more clustered leaves. It may be propagated by division of the bulbs or by seeds. In the United States it has not become very popular.

Onions are occasionally seriously attacked

by parasitic plants, which may devastate whole fields and which are not of easy control by any devised method. Bordeaux mixture has been recommended, but rotation, the crop being planted upon smut-free land, is perhaps most satisfactory.

Among the insects which prove destructive to the onion are several species of cut-worms, especially *Agrotis messoria*. All of these may be held in check by poisoned baits, such as sweetened bran or clover, or by trapping in early spring when the insects revive after passing the winter in the larval stage. The onion thrips (*Thrips tritici*), a tiny sucking insect, sometimes devastates whole fields by appearing in great numbers, puncturing the leaves, which turn yellow wherever pierced. It is especially troublesome in Bermuda. Kerosene emulsion has been most frequently recommended as a remedy. The most serious pest, however, is perhaps the onion maggot, the larva of a fly (*Phorbia ceparum*) which lays its eggs close to the young onions in early spring. The larvæ burrow into the young bulb, causing the plant to wilt and decay, a result which follows even slight injury. In late spring the maggots pupate and in about two weeks appear as adults, which lay eggs for a second brood. This brood winters partly as adults and partly as pupæ. The best remedy is probably ground tobacco-stems liberally applied to the young plants in early spring. This acts as a repellent, an insecticide and as a fertilizer, and may be applied without fear of its injuring the plants. Another good plan is to pull and burn the plants of the early sowing when found to be wilting, which will lessen the number of flies able to lay eggs for the second brood. Nitrate of soda and kainit are recommended to be sown broadcast after the removal of the wilted plants; these are thought to act as insecticides and fertilizers. Consult Bailey, 'Cyclopedia of American Horticulture' (1900-02) and the special literature therein mentioned under the article *Onion*.

ONKELOS (Aramaic for the Greek name Akylos or the Latin Aquila), author of the Targum or Chaldee paraphrase of the Pentateuch which bears his name. According to the Babylonian Talmud he lived in the time of Gamaliel, but not earlier than the 2d and not later than the 3d century. He was a disciple of Gamaliel and at his funeral is said to have revived an ancient custom by burning costly material to the value of 70 minæ. His Chaldee is purer than that used in Palestine, and he may have been a Babylonian. His version is good, and continued until the beginning of the 16th century to be chanted in the synagogues alternately with the Hebrew. It has often been printed with or without the Hebrew text. It is supposed to have received its definite form in Babylonia in the 3d century A.D. The Samaritan Targum of the same date is evidently based upon the same authority. Another Targum on the law, known as the pseudo Jonathan, edited in Palestine in the 7th century A.D., while based on the same interpretation, is fuller and closer. See TARGUM.

ONNES, òn'nès, Heike Kamerlingh, Dutch physicist: b. Gröningen, 21 Sept. 1853. He was educated at the University of Gröningen, and after acting as assistant at the Delft Polytech-

nic he was called to Leyden where he became professor of physics and director of the physical laboratory. He is noted for his researches in low temperatures, his study of helium and his discovery of the possibility of perpetual electric current through metals at certain temperatures. He was awarded the Nobel prize in physics in 1913, and is a member of the Royal Institute of Great Britain. He is author of numerous works on physics, among them 'Over het Aereiken van temperaturen belangrijk beneden het kookpunt van helium' (1910); 'Experiments at the Cryogenic Laboratory at Leyden' (Vienna 1910; Eng. ed., 1911), etc.

ONODI, ō'nō-dē, Adolf, Hungarian physician: b. Budapest 1857. He was graduated at the University of Budapest in 1881, and in 1886 became lecturer in anatomy there. He later specialized in laryngology, became lecturer in that branch in 1894 and since 1896 has been professor. Author of 'Die nasenhöhle und ihre Nebenhöhlen' (1893; Eng. trans., 1895); 'Die Anatomie und die Physiologie der Kehlkopf-nerven' (1902); 'Die Nebenhöhlen der nase beim kinde' (1912), etc.

ONOFRITE. An ore of mercury consisting of the sulphose lenide, Hg(S,Se), containing about 81 per cent of the metal. An ore formerly mined at Lucky Boy mine, six miles southwest of Maryvale, Utah.

ONOMACRITOS, ōn-ō-māk'ri-tūs, Greek soothsayer and poet, who lived in the time of the Pisistratidæ, 6th century B.C. At Athens he was the head of an Orphic sect and expounded the mysticism, poetry and theology of Musæus, while his pupils arranged the Homeric poems in connected series in accordance with the suggestion of Pisistratus. Having been detected making an interpolation in one of these oracles, he was banished from Athens by Hipparchus about 516 B.C. He withdrew to Persia, where the Pisistratids employed him to encourage Xerxes to invade Greece by repeating to the king such oracles as seemed to promise success. Consult Ritschl, F. W., 'Onamakritos von Athen' in his 'Opuscula' (1866).

ONOMASTICON, a Greek term properly meaning a list of names or words, denotes particularly a dictionary or encyclopedia of proper names. More specifically, the work of Pollux, executed in the 2d century B.C., in the Greek tongue.

ONOMICHI, ō'nō-mē'chē, Japan, seaport in the prefecture of Hiroshima, on the main island of Japan, 190 miles southwest of Kioto on the Inland Sea. There are numerous temples and the streets are narrow and picturesque. The town has a thriving trade and an increasing population. Pop. 30,367.

ONONDAGA, ōn-ōn-dā'ga, a lake in New York, near Syracuse. The outlet is Seneca River. Onondaga Castle, the headquarters of the Onondaga Indians (q.v.), was near this lake.

ONONDAGA ("on the top of the mountain") **INDIANS**, an American tribe of the Iroquois confederacy residing in central New York, on the shores of Onondaga Lake and on the mountain of the same name, in the terri-

tory now occupied by Onondaga County. Their territory also extended northward to Lake Ontario and southward indefinitely, some say, as far as the Susquehanna. Among the Iroquois they were called the "Name Bearers"; but their chief village was Onondaga. Previous to 1681 it was situated on a hill, which now forms part of the town of Pompey. It was afterward removed several times but was always placed on high ground where it could be the more easily defended. Hence the name "Onondaga" given to these people by their enemies, and later by Europeans. Their present Indian reserve is in the region of their later tribal home. About one-half of the original Onondaga people followed Brant to Canada and settled on the Grand River in the province of Ontario where they still reside and are divided into nine clans. In the federal councils of the Six Nations, the Onondagas acted as a sort of presiding judge to settle questions upon which the other tribes could not agree. In 1682 the Onondagas, then considered the chief of the Iroquois tribes, made a treaty of peace in Albany, in behalf of the Mohawk, the Oneida and the Cayuga, with representatives of the colony of Maryland and of the Piscataway Indians. In the negotiations that took place, for a number of years, with a view to promoting peace between the tribes of the north and those of the south of the Saint Lawrence and the Great Lakes, the Onondagas took a prominent part. At first they were opposed to the confederacy which was finally made up of the "six nations." The Onondagas early showed a liking for the Christian colonies formed by the Catholic missionaries on the Saint Lawrence (among the Iroquois) and gradually members of the tribe went over to them singly or in small bodies until, by the middle of the 18th century, about half the Onondagas had emigrated to Canada; but this did not prevent them from keeping on friendly terms with neighboring tribes, until the Revolution broke out in 1775 when they and the Iroquois joined issue with the British. This is why at the close of the Revolutionary War the Onondagas removed, for the most part, to their present reservation on the Grand River, Canada. The rest of the Onondagas are all on several reservations in New York State. The Onondagas at one time numbered probably over 3,000; but in 1851 Morgan, who knew them well, estimated their population at 500 in the United States and 400 in Canada. In 1906 the Onondagas in New York State numbered 553 and those in Canada about the same figure. Consult Bruce, D. H., 'Onondagas' Centennial' (Boston 1896); Clark, J. V., 'Onondaga' (Syracuse 1849); Hale, Horatio, 'The Iroquois Book of Rites' (ed. 1883); Hodge, 'Handbook of American Indian Tribes of North America' (Washington 1910); Jarvis, S. F., 'Religion of the Indian Tribes of North America' (New York 1820); Le Mercier, F. J., 'First Settlement at Onondaga' (1654-58); Millet, Pierre, 'De la mission de Saint Jean Baptiste' (Quebec 1858); O'Callaghan, E. B., 'De Frontenac's Expedition against the Onondagoes' (1696).

ONOSANDER, more correctly **ONESANDER**, a writer on military tactics who lived at Rome in the middle of the 1st century after Christ, and composed in Greek, under the title

of *Strategitikos*, an excellent work on the art of war.

ONOSPIN, in chemistry, $\text{C}_{60}\text{H}_{88}\text{O}_{26}$. Produced, together with formic acid, by boiling ononin with baryta water. On passing carbonic acid gas into the solution, and digesting the precipitate in boiling water, onospin deposits on cooling, as a white, interlaced crystalline mass, insoluble in ether, but soluble in alcohol and the alkalis. It is colored crimson-red by sulphuric acid and binoxide of manganese and melts at 162° .

ONOTO, ò-nō-tō, a tribe of South American Indians. They inhabited the eastern shore of Lake Maracaibo, lived chiefly by fishing, and built their houses on platforms over the water, supported by piles driven into the lake bottom. Ojeda found them living thus in 1499, and from the analogy fancifully named the country Venezuela (namely Little Venice). Similar dwellings are found in this region though the tribe as an entity, chiefly through slavery, long ago became extinct. Onoto is also the vulgar name in Venezuela of a plant of the Bixaceae family known as Bixa Orellana. It is also the name of a municipality in the district of Cajigal, Venezuela, which contains over 5,000 inhabitants.

ONTSLOW, George, French composer: b. in Clermont-Ferrand, France, 27 July 1784; d. there, 3 Oct. 1853. He was a grandson of the 1st Lord Onslow, and was sent to London to finish his education. After studying there with Cramer, Dussek and Hüllmandel, he completed his musical education under Reicha in Paris. He was elected to succeed Cherubini in the French Academy in 1824. He attempted to write for the theatre but his operas were only a moderate success. He composed many beautiful quartets, sonatas, symphonies and other instrumental pieces that are still popular. His operas include 'L'Acalde de la Vega' (1824); 'Le Colporteur' (1827); and 'Le Duc de Guise' (1831).

ONTARIO, Cal., city in San Bernardino County, on the Southern Pacific, Santa Fe, Salt Lake and Pacific Electric Line, 40 miles east of Los Angeles. Citrus fruits, grapes, peaches and apricots are grown extensively in the locality and the city has a large trade in these products. The dairy business and alfalfa growing are extensive interests in the immediate vicinity. There are also three canneries, nurseries, packing-houses, and a large electrical supply manufactory. The city has a public library and a splendid high school plant. The Chaffey Agricultural College is an institution in the city recently established and is of great importance to the city and this portion of the State. The Chaffey Library belonging to these two educational institutions has an endowment of \$80,000, which gives it a high educational value. The water supply system is the property of the municipality as well as the Ontario Power Company. The three local banks have a combined resource amounting to \$2,000,000. The actual valuation of real property is \$7,613,550, with a tax rate of \$1.86 per \$100. Pop. 7,280.

ONTARIO, Canada, formerly called UPPER CANADA, the first in population and wealth and the second in area of the province of the Dominion. It is bounded on the north by Hud-

son Bay and on the south by the Great International Boundary lakes, on the east by the province of Quebec and west and northwest by Manitoba. It is 1,000 miles in extent from north to south and about the same distance from east to west. Its area, 407,262 square miles, of which 41,382 are water, is three and a half times that of the British Isles. For administrative purposes the province is divided into 38 counties, subdivided into townships and electoral districts. The capital is Toronto (q.v.) and Ontario also contains the Dominion capital, Ottawa (q.v.), situated in the eastern part of the province. Other important cities are Hamilton, London, Fort William, Windsor, Kingston, Brantford, Peterborough, Guelph and Saint Catharine's (qq.v.).

Topography and Physical Features.—The surface generally is an undulating plateau land with no considerable elevations. The Laurentian Hills, with a maximum altitude of 2,120 feet, extend westward from the Thousand Islands near Kingston to north of Lake Simcoe and constitute the watershed separating the rivers flowing into the Great Lakes from those entering Hudson's Bay and the Ottawa and Saint Lawrence rivers. The rocks underlying the superficial deposits may be broadly classed as follows: (1) Paleozoic rocks, embracing 30 per cent of the area of the province, including limestones, shales and sandstones; and (2) pre-Cambrian rocks, including granites, volcanic rocks, quartzites and other sediments. The chief rivers are those already mentioned, with the Attawapiscat, Severn, Moose and Albany, entering James Bay, and in the Saint Lawrence Basin the Moira, Trent, Grand, French, Thames and the Niagara, the celebrated falls and gorge of the latter belonging partly to the province and partly to the United States. Besides portions of the Great Lakes, thousands of smaller lakes including Nipissing, Nipigon, Abitibi, Saint Joseph, Scugog, Simcoe and Muskoka belong to the province.

Natural Resources.—A great part of the province is covered with timber, chiefly pine, spruce, tamarack, oak and hickory, with water facilities making lumbering one of the principal industries. It is reckoned that there are 100,000,000 square miles of forest areas, exclusive of the district of Patricia; and there are 21,934 square miles of forest preserves. A great pulp and paper industry has been established, the principal works having been established at Iroquois Falls. The value of the forest products is \$40,000,000 annually. Fur-bearing animals, the mink, otter, skunk, beaver, are obtained in considerable numbers in northern Ontario, which is also a popular hunting-ground for moose, caribou and other large game. Fisheries are important, the catch consisting of trout, whitefish, herring, pickerel, etc., in 1916 being valued at \$3,341,182. The province is exceedingly rich in minerals, which include the entire list of metallics and non-metallics, except coal. The principal metals are nickel, copper, silver, gold and iron, in addition to lead, zinc, cobalt and platinum. The non-metallics include petroleum, natural gas, salt, gypsum, lime, clays, stone and marble, arsenic, corundum, feldspar, mica, graphite, talc, pyrite, etc. In 1883 nickel was discovered at Sudbury, the deposit since proving to be the richest in the

world, the district holding with New Caledonia a world's monopoly of the metal, and Sudbury leading with 75 per cent of the whole. The province is rich in petroleum, the wells in the southwest, especially in Lambton County yielding immense and apparently inexhaustible supplies, over 30,000,000 gallons annually, while the same may be said of the salt wells on the shores of Lake Huron. Natural gas fields in the east near Niagara and in the west, near Detroit, supplying Buffalo and Detroit, respectively, have been exploited to the value of about \$300,000 annually. Ontario's mining production in 1917 constituted a record, totalling \$71,060,942, of which metallic production was \$56,845,788 and non-metallic \$14,218,269. The values included gold, \$8,698,831; silver, \$16,193,293; copper in matte, \$7,842,890; nickel in matte, \$20,943,500; pig iron, \$1,016,699; cement, \$2,934,271; iron pyrites, \$1,066,575; natural gas, \$3,182,154; salt, \$1,095,866. Nearly one-half of the mining wealth of Canada is produced in Ontario.

Climate.—The climate is inclined to the extremes of heat and cold during summer and winter respectively, but owing to the dryness of the atmosphere it is always healthful and bracing. Extreme cold is felt only in the northern part, the vicinity of the Great Lakes in the south greatly modifying the extremes of temperature. The average temperature for January in the south is 21°, minimum 10° below zero; the average for July is 68°, maximum 90°, but rare, the ordinary maximum being 80°.

Agriculture.—Farming is an important occupation, especially in the south, where soils of black loam with clay and sandy varieties are of excellent quality and highly productive. The richest, most thickly settled and most highly cultivated portion of the province is the peninsula between the Ottawa River and Lakes Ontario, Erie and Huron. Until within a few years northern Ontario or "New Ontario" as it is sometimes called, comprising the part of the province lying north of the French River, Lake Nipissing and the Mathawan River was considered unsuited for farming and left to the lumberman, the trapper and later to the seekers after its great mineral wealth. However, it has been demonstrated that in addition to its forests and its mines, this great section, embracing 141,000 square miles, possesses thousands of acres of farm land as fertile as any in the province. The "Great Clay Belt," extending 350 miles from Lake Abitibi to Lake Nipigon, contains 20,000,000 acres admirably adapted for wheat-growing and is tapped by the Temiskaming and Northern Ontario, the Algoma and Hudson Bay, the Canadian Northern and the Transcontinental railways. Other fertile sections are the Rainy River Valley in the west, with 750,000 acres, an important area at the head of Lake Temiskaming, with more than a million acres, and the valley of the Wabigoon River, with 384,000 acres. The crops raised are chiefly wheat, barley, oats, Indian corn, potatoes and some tobacco and the fruit-growing farms of some districts yield a plentiful crop of apples, plums, pears, peaches and grapes. In 1916 there were 1,466,000 bushels of spring wheat raised and 16,465,000 of fall wheat; 7,498,000 bushels of barley, 50,771,000 bushels of oats and 18,113,000 bushels

of potatoes. The total value of field crops was \$190,646,000. Stock-raising, dairy farming and bee culture are among comparatively recent industries of the province which have been attended with encouraging results, largely due to the easy accessibility of markets by rail, supplemented by the lake, river and canal navigation. Ontario has 4,666,753 livestock; horses, 887,246; milch cows, 1,082,119; other cattle, 865,847; sheep, 595,477; swine, 1,236,954. Average value of occupied farm land (1916) was \$52.59 per acre. The southwestern peninsula of the province, lying between Lake Erie and Georgian Bay, rivals the Annapolis Valley in Nova Scotia in the production of apples, while peaches, pears, plums and the finest varieties of grapes grow to perfection in the southern counties. Peaches and grapes are most extensively grown in the district between Niagara and Hamilton. The problems affecting agricultural life in Ontario as elsewhere are not few. The loneliness of farm life, the scarcity of labor, the decreasing population of rural districts owing to the lure of the West are obvious problems, although they do not seem to impoverish the individual farmer or prevent increased production and rising profits. In the 10 years (1901-10) the rural population fell from 1,246,969 to 1,194,785 and the urban increased from 935,798 to 1,328,489. In New Ontario the problems were forest fires, inevitable transportation needs, the pioneer difficulties of clearing the land, etc. But these are trivial considerations in the general growth of the province and they are met by the encouragement of immigration and the sympathetic treatment by the government of questions as they developed.

Manufactures and Commerce.—The manufactures are numerous, chiefly owing to the favorable position which the province occupies with regard to water power, although steam power has been introduced to a large extent, coal being obtained without difficulty by means of the lakes from Pennsylvania and in smaller quantities from Nova Scotia. Chief among the supplies of water power are the falls on the Ottawa River and rapids of the Saint Lawrence, while the works on the Ontario side of the Niagara Falls by the Ontario Hydro-Electric Power Commission and others will give the province the most extensive water power works in the world. Up to date 100 municipalities derive electrical power from the water systems of the Commission, their high and low tension lines extending in the province for 1,400 miles. The principal manufactures are lumber and its by-products, agricultural implements, iron and woodware, wagons and carriages, railway rolling-stock (including locomotives), cottons and woollens, leather, furniture, flax, ordinary iron and hardware, paper, soap, etc. The value of the export in 1916 of manufactured goods, agricultural products, animals and their products, timber, minerals, etc., was \$482,000,000 and of imports \$499,606,959. The fisheries were valued at \$3,341,182.

Railways, Canals and Shipping.—Ontario has a perfect network of railways, nearly 12,000 miles, which has proved of great advantage in the development of the manufacturing and agricultural industries. In summer it is supplemented by the means of transport provided



C.S. HANNOND & CO., N.Y.

88° 82° Longitude West 81° from Greenwich 80°

ONTARIO

SCALE OF MILES
0 10 20 30 40 50 60 70 80
SCALE OF KILOMETERS
0 10 20 30 40 50 60 70 80

ONTARIO DISTRICTS: HALIFURTON, PETERBOROUGH, NORTH BERKELEY, PRINCE EDWARD, CARLETON, LANARK, DUNDAS, GRENVILLE, LEEDS, KINGSTON, NEW YORK, UNITED STATES.

LAKE SUPERIOR DISTRICTS: MANITOBA, THUNDER BAY, ALGOMA, KESWICK, JAMES BAY, UNGAVA.

WESTERN PART OF ONTARIO

SCALE OF MILES
0 20 40 60 80 100 120 140

Longitude 90° West 88° from 86° Greenwich 84°

SCALE OF MILES

SCALE OF MILES

by the lakes and by a magnificent system of canals. The principal canals are the Sault Sainte Marie Canal and the Welland Canal now under reconstruction, the latter 27 miles long, east of and parallel to the Niagara River, connecting Lakes Erie and Ontario.

Government.—The provincial government is administered by a lieutenant-governor appointed by the governor-general-in-council for five years, assisted by a responsible ministry. There is only one chamber, the legislative assembly, elected by ballot for four years, with 111 members, by the apportionment of 1914. By the redistribution of 1914 the province has 24 Senators and 82 Representatives in the Dominion Parliament. The government's policy is to encourage the development of provincial resources, and this may be said to be also the opposition party's policy. The revenue of Ontario is made up of subsidies and contributions from the Dominion treasury and from parol land and lumber sales, licenses, stamps, etc. The government receipts total nearly \$14,000,000. The municipal system is one of the most perfect in the world and affords a pattern followed in many other countries. Liquor prohibition is enforced.

Population.—The total population in 1911 was 2,523,294, as compared with 2,182,947 in 1901, showing an increase of 15.58 per cent. The majority of the population is of English descent, Scotch, however, predominating in Bruce, Grey and Glengary counties; Irish, German and other nationalities are found around Toronto. There are about 26,000 Indians.

Education.—The school system of Ontario is admirable and is under the control of a minister of education, who is always a member of the provincial cabinet. The schools are supported by a tax on property, with state grants, and are free to all. They include kindergartens, public schools and high schools or collegiate institutions. Roman Catholics may, and do, establish separate schools and are then exempted from supporting the public schools and receive a separate grant from the government. There are schools for Indian children, normal schools, normal colleges, country model schools, art schools and 395 free libraries under the care of the board of education and there are a number of traveling libraries. Ontario has 6,660 elementary and secondary schools, employing 120,801 teachers and having an enrolment of 508,522 pupils. There are in addition 161 high schools and 132 continuation schools. Ontario has 539 Roman Catholic and 5 Protestant separate public schools. For public and separate schools the province now spends over \$13,000,000 annually. At the head of the educational systems stands Toronto University (q.v.) at Kingston and Victoria, Trinity, etc.; affiliated with Toronto University.

Religion.—There is no state religion. The Methodist, Presbyterian, Church of England, Roman Catholic and Baptist are the strongest numerically of the religious denominations.

History.—Ontario as part of Quebec was hunted over by the French after its exploration by Champlain in 1615 and was visited by Jesuit missionaries to the Indians. The French occupation was not a source of much settlement but was marked by wars with the Iroquois Indians or Five Nations, in which the Huron

allies of the French were almost totally annihilated. In 1763, with Quebec and the Atlantic provinces, Ontario, passed into the hands of Great Britain, which organized the province of Ontario in 1774 and in 1791 divided it into Upper and Lower Canada. At the close of the American Revolution in 1783 Ontario received a notable immigration of United Empire Loyalists from the United States who were the actual founders of the province. Upper and Lower Canada were reunited in 1841 and again separated when the Dominion of Canada was organized in 1867, the western province becoming the province of Ontario. Besides these, the chief incidents of its history were several battles and invasions of the War of 1812, notably those of the Thames, Lundy's Lane and Queenston Heights; the evolution of full responsible government and British institutions; the unsuccessful uprising of 1837 directed against certain local causes of complaint and rule and not against Great Britain; the Fenian Raids of 1866 from the United States; the great prosperity of the Crimean War and reciprocity period of 1854-66; the industrial and agricultural growth of 1880-1918.

D. S. DOUGLAS,

Editorial Staff of The Americana, Toronto.

ONTARIO, Lake, North America, the smallest and easternmost of the five Great Lakes in the Saint Lawrence Basin, forming a portion of the boundary between and partly belonging to the United States and partly to the Dominion of Canada. It is of elongated, oval shape, 193 miles long, with a maximum central breadth of 60 miles, a circumference of about 480 miles, an area of 7,260 square miles and a drainage area of 28,840 square miles. Its surface level is 326 feet below that of Lake Erie (see article NIAGARA FRONTIER) and 246 feet above the tide level of the Saint Lawrence. Its depth is said to average 490 feet; the greatest depth is 738 feet and it is navigable throughout its whole extent for vessels of the largest size. It receives the waters of Lake Erie through the Niagara River (q.v.) with its phenomenal falls and gorge on the southwest and discharges at its northeast extremity through the Lake of a Thousand Isles, by the Saint Lawrence (q.v.). It also receives numerous rivers, including the Trent and Humber on its north and the Black, Genesee and Oswego from its southern shores. Lake Ontario has many good harbors; and as it never freezes, except at the sides, where the water is shallow, its navigation is not so much interrupted like that of Lake Erie. It is, however, subject to violent storms and heavy swells. It communicates by the Genesee River and Oswego Canal with the Erie Canal, and, consequently, with the Hudson River and New York City; the Niagara River and the Welland Canal, in the southwest, unite it with Lake Erie and the Rideau Canal connects it with the Ottawa at Ottawa city. Toronto, Kingston, Port Hope, Cobourg and Hamilton are the principal towns on the British side; and Oswego, Genesee, Sackett Harbor and Charlotte on the American bank. It was discovered by Etienne Brûlé in 1611 and was first explored by Champlain in 1615.

ONTARIO AGRICULTURAL COLLEGE, The. This institution, located at Guelph, Canada, was founded in the year 1874

with a staff of six officers and it was opened in the same year with an attendance of 28 students. For four years the school struggled on, first under one principal and then under another, until in 1879 Dr. James Mills was appointed to the presidency and a period of ever-increasing popularity and usefulness for the institution set in. From that time the college has grown steadily in equipment, attendance and popularity and it now embraces a plant worth nearly \$2,000,000, with well-equipped departments of animal and field husbandry, veterinary science, horticulture, dairying, domestic science and nature study, a full set of large and substantial farm buildings, a farm of 550 acres, residences for both male and female students and first-class laboratories for chemistry, physics, biology and bacteriology, provided with apparatus for student instruction and for scientific research work and an efficient staff of 75 instructors and officers. The institution provides courses in all departments of agriculture, in nature study and domestic science. The enrollment which has been adversely affected by the Great War was 1,184 in 1914-15.

ONTOGENY, in biology, the individual development of an organized being, as distinguished from phylogeny or race evolution. These terms were first introduced as divisions of "biogenesis," but are now in common use in biology. The most interesting phase of ontogeny is the sort of parallel between the development of an individual, especially in the embryonic stages and the steps of development taken by the race to which it belongs.

ONTOLOGICAL ARGUMENT, the argument, due to Saint Anselm, to the effect that God exists, because the idea of God is that of an absolutely perfect being, which must therefore have the crowning perfection of existence. Modified forms of the ontological argument were used by Descartes and by Leibnitz. One form of the argument which is used by Descartes reads as follows: the result must have more reality than the cause and so our idea of the most perfect being can only result from this being itself, as the only thing in the universe that is more real. See METAPHYSICS; ONTOLOGY.

ONTOLOGY (Greek *ὄντο* being; and *λογία* account, science), the science of being, that is, metaphysics. Aristotle did not employ the word, but called this branch of science the "First Philosophy," defining it as the science of being, of that which exists, as far as it may be said to exist (*ἐπιστήμη τοῦ ὄντος*), that is in fact, the science of the essence of things; of things, not with regard to their accidents, qualities, physical or mathematical, but merely as being; the world being including not only whatever actually is, but whatever can be. The word ontology was first introduced into philosophy by Christian Freiherr von Wolff. He divided metaphysics into four parts; ontology, psychology, rational cosmology and theology. Kant denied that one can have any knowledge of existences, but only of appearances or phenomena. He believed that there was a rational science of principles and causes of the principles of being and knowing, and his system of metaphysics was merely an exposition of this rational ontology. Rational ontol-

ogy may be treated in two different ways according as we postulate one existence or many. If there is one existence, all phenomena are but modifications of this. This reduces metaphysics to the science of the one substance or existence, the Absolute. If many existences or causes be postulated, several co-ordinate branches of inquiry are opened up. See METAPHYSICS; PHILOSOPHY; TELEOLOGY.

ONYX (Greek, "finger-nail," "veined gem"), a hard variety of agate, and hence a sub-variety of chalcidonic quartz, with layers, usually curvilinear, of white, alternating with red (sardonyx), gray (chalcedony), black (onico), or green or brown. Mexican onyx is actually calcite or aragonite (q.v.) and is softer than the real onyx. The true ancient onyx was much prized as a gem and particularly in making cameos. Most modern onyx, so-called, is artificially colored; Algerian onyx, for instance, being only a variety of calcite. Apart from its use in jewelry, onyx has long been used in architecture, for table-tops, columns, and, in part or entire, stair-cases, being often used with white marble. Many onyx pillars quarried in Roman times are now used in Arab mosques; and in more distinctly Occidental buildings it is sometimes used, as in the stairway of the Opéra at Paris.

ONYX MARBLE, a banded variety of marble of translucent, whitish and sometimes iridescent appearance, resembling onyx. It is a variety of carbonate of lime, its coloring being due to deposits of iron or manganese. The Romans called it *alabastrites* and it is frequently termed "Oriental alabaster," although it is a carbonate instead of a sulphate of lime. It is of both travertine and stalagmitic formation, the former being finer and handsomer. The Egyptian quarries were lost for many centuries but were rediscovered about 1850 and furnish a fine quality of the stone. The chief source of supply is Algeria, where the output is of great beauty and the deposits of large extent. A considerable supply comes from Mexico and is known as Mexican onyx or Tecalli marble. There are other deposits reported in southwestern United States but these have not as yet been developed. The stone is largely used for making vases, table tops, clocks and similar articles, while in ancient times it was highly prized for making receptacles for precious ointments.

OOLACHAN, ōo'la-kān, **EULACHON** or **OULACHON**. See CANDLE-FISH.

OOLITE ō'ō-lēt (Greek, "egg-stone," so called from its resemblance in size and shape to the roe of a fish), in geology, any minute concretionary grain or spherule, usually formed about a bit of sand or the body of a minute foraminifer. These concretions are often calcareous, and make up thick beds of limestone. Silicious oolites, or oolitic cherts, are also abundant, and much of the iron ore of the Clinton Epoch of the Silurian is oolitic. This oolitic iron ore is known in Wisconsin, New York and the Birmingham district of Alabama. Oolites, both calcareous and ferruginous, are known to form on the bottoms of modern lakes, at various localities. They are said to be in process of formation on the Florida banks. What may be called the Oolitic Period was marked by

frequent precipitations of muddy sediment (calcareous or ferruginous) which killed and enclosed many minute organisms. This period is the later part of the Jurassic; and in England oolitic limestones are so frequent and so typical of the Upper Jurassic that the Jurassic is often divided by English geologists into the Liassic Group and the Oolitic Group, and the latter subdivided into the Lower or Bath Oolite, the Middle or Oxford Oolite, and the Upper or Portland Oolite.

OOLOGY, ō-ōl'ō-jī, the collecting of birds' eggs has always possessed a peculiar fascination for some men, and in the attempt to claim for their pursuit a legitimate place in scientific work they have coined for it the term Oology. A famous naturalist once said that when the oologist prepared his specimens he blew all the science out through the hole in the shell, and there is much truth in the statement. The benefit that ornithology gains from the study of a cabinet full of empty egg-shells is so slight that it is not worth the sacrifice of bird-life that the collecting entails. While the relationship between certain groups of birds is indicated in the character of their eggs, as, for instance, between the shore-birds and the gulls and terns, nevertheless the variability, in size, shape and color is so great, within many groups, that it is impossible to form any systematic arrangement from a study of eggs alone, and it is only now and then in connection with other characters that they prove of assistance in defining a natural arrangement of birds. The significance of their shape, colors, etc., is discussed under Egg.

In collecting eggs for scientific purposes the greatest care should be exercised in positively identifying the bird to which they belong, without which data they are absolutely worthless. The nest, which is quite as important as the eggs, should also be preserved with great care, keeping it *in situ*, if possible, and all details of its location, the date of the collecting, etc., should be recorded. The method of preparing egg-shells for the cabinet is explained in many books, and many instruments have been devised for the purpose. Suffice it to say that a round hole should be drilled with an egg-drill on one side of the egg, the size depending upon the degree of advance in incubation, and the contents should be removed by the use of a fine-pointed blow-pipe. Jets of water may be used effectively to aid in emptying the shell, and should be used in washing it out, while various chemical solvents may be of assistance in dissolving well-formed embryos. Every egg-shell should bear a number corresponding to its record. Directions for the collection, preservation and care of birds' eggs are published by the Smithsonian Institution.

Probably the finest illustrated work on the oology of any region is Bendire, 'Life Histories of the Birds of North America' (1892; unfinished). Other works are Bädcker, 'Die Eier der Europäischen Vögel' (1863); Des Murs, 'Traité général d'Oologie Ornithologique' (1860); Davie, 'Nests and Eggs of North American Birds' (5th ed., Columbus 1898); Gentry, G., 'Nests and Eggs of the Birds of the United States' (Philadelphia 1885); Hewitson, 'Eggs of British Birds' (1856); Lefevre, 'Atlas des Œufs des Oiseaux d'Europe' (1845);

Newton, 'Dictionary of Birds' (New York 1893-96).

OOMS, ōmz, Karel, Belgian painter: b. Desschel, province of Antwerp, 27 Jan. 1845; d. 20 March 1900. He was educated at the Antwerp Academy and under Nicaise de Keyser, later traveling in England, Germany and Italy. He chose historical subjects in the main. Among his works are 'Philip II Paying Last Honors to Don Juan of Austria' (Antwerp Museum); 'The Death of the Duke of Alba'; and many others, some of which are in the Palais de Justice and in the Brussels Museum.

OORIAL, oo'ri-ēl, **URIAL**, or **SHA**, a large wild sheep (*ovis vignei*) inhabiting the high Himalayas and Tibetan plateaus and eastward to Persia, the chase of which calls for the greatest endurance, skill and resolution on the part of the hunters. The rams have immense, rounded, coiling horns; and while both sexes vary much in color, they agree in the habit of wandering widely. Consult Blanford, W. T., 'Fauna of British India' (London 1889).

OOTACAMUND, ūt'a-ka-münd', or **UTAKAMAND**, British India, hilltown resort and headquarters of the Nilgiris district in Madras, and summer headquarters of the Madras government, 55 miles northeast of Calicut, reached by a rack railway from the Mettapolliem station on the Madras Railway. The town is situated on a plateau 7,230 feet above sea-level and is surrounded by hills. The principal sanatorium of Southern India is located here and there are government botanical gardens and a government cinchona plant. The mean annual temperature is 58° and the rainfall 49 inches. The place is notable for its beautiful private gardens and its fine drives. There are extensive plantations of coffee, tea, cinchona and eucalyptus, two dairy farms, and manufactories of beer and soda water. There are excellent churches, the Lawrence Asylum for the children of European soldiers, the Brecks Memorial and Basel Mission high schools, a public library and fine athletic grounds. Pop. 18,829.

OOZE, fine sticky mud, almost entirely of organic origin, covering great parts of the sea-floor, and constituting one of the most important of the ocean deposits. The various oozes are made up mostly of the remains of various foraminifers, and hence furnish a valuable means for the study of deep-sea microorganisms, even apart from their rôle in the building up of ocean beds. According as one variety or another of organic remains predominates or occurs characteristically, the oozes are usually classified as Globigerina ooze, Pteropod ooze, Diatom ooze and Radiolarian ooze. But it must be borne in mind that no one ooze consists entirely of any one sort of the foraminifers mentioned. The division mentioned is, moreover, logically a secondary division, since we may speak of the calcareous oozes (including the Globigerina and the Pteropod) and the silicious (including the Radiolarian and Diatom oozes), a more suggestive classification, though still one that is based only on predominant characteristics, since the Globigerina ooze, for example, is never free from silicious organisms. Murray says that the silicious element even here varies from "traces" to 20 per cent. But the Globigerina ooze usually averages 40

per cent of carbonate of lime, sometimes reaching 95 per cent, and its most characteristic component is the foraminifer *Globigerina*, besides which it contains other pelagic *Foraminifera*, as *Pulvinulina*, *Orbulina*, etc. The predominant color is pale gray, with occasional red and brown tints due to the peroxides of iron or manganese. The *Globigerina* ooze occurs near the equator both in the Atlantic and Pacific and in the western and southern Pacific; a special variety of it marked by the presence of comparatively fewer rhizopods and more pteropods and heteropods, though these latter shells never predominate, is found in tropic depths of less than 2,000 fathoms, near the Fiji Islands and elsewhere in the western Pacific, and is called pteropod ooze. *Radiolaria* occur both in the *Globigerina* ooze and in the Diatom ooze, but where they predominate the ooze is named from them; a great strip of this silicious mud spreads between 15° N. and 10° S. to 140° E. and 150° W. in the Pacific. The color is reddish and brownish because of the presence of manganese and iron; the composition otherwise is mainly silicious, though as much as 20 per cent of carbonate of lime may occur. The other silicious variety is marked by the presence and predominance of Diatoms, with occasionally 25 per cent of *Globigerina* shells and other calcareous matter. Its color is that of pale straw and, when dried, dirty white. These various classes merge into each other on the ocean bottom, and there is no hard and fast line between them. Their deposit has been slow and continuous and apparently not such as to affect continental areas, or even, markedly sea depths. Consult Murray, 'Challenger Reports—Deep Sea Deposits' (1891). See *GLOBIGERINA*.

OPACITE, in mineralogy, black opaque grains or scales, usually of minute size, found most commonly with magnetite. They are incapable of microscopic identification and seem to vary in composition, some being graphitic, and others metallic oxides or silicates.

OPAH, KING-FISH, or SUN-FISH, a large and beautiful sea-fish (*Lampris luna*), a native of the Eastern seas, but found in the Atlantic and Arctic oceans, and, rarely, on the North American coasts. It is about four and one-half to six feet long and weighs 140 to 500 pounds. Its colors are very rich, the upper part of the back and sides being green, reflecting both purple and gold, and passing into yellowish-green below, the fins bright vermillion. The body is oval and laterally compressed, and the scales are small. It has a single dorsal fin and a forked tail. It is believed to feed on cuttlefish and similar animals. The flesh is highly esteemed.

OPAL, hydrated amorphous silica, used as a gem-stone even in ancient times, when it was supposed to have magical virtues, as of making its possessor invisible if he carried it wrapped in a bay leaf, or of making him generally beloved so long as he trusts in its virtues. From the point of view of the mineralogist the opal is remarkable as never occurring in crystal form and as differing from quartz only in having 3 to 13 per cent of water in its composition. Its fracture is conchoidal, and occasionally very perfect; its lustre vitreous, pearly or sometimes resinous; its color variable, white, red, yellow, green, gray and blue

occurring; its density 1.9 to 2.3 and its hardness 5.5, that is, less than quartz; it is perfectly soluble in hot caustic potash, another dissimilarity between it and quartz; and it is infusible by the blow-pipe. The principal varieties of the opal are: the *precious opal*, with splendid coloration due to fine fissures, varying from translucent to transparent, and occurring, especially, near Czarwenitz, Hungary, and in Australia, in conglomerate, basalt or porphyry. Its color varies with climate and temperature and sometimes disappears permanently, the opal then being called "dead." The stone is not cut, being too brittle, but is set *en cabochon*. The variety usually called Mexican is actually a sub-variety of the precious opal, occurs in Guatemala, the Faroe Islands and in southern Australia, and should not be confused with the *fire opal*, which is the commonest opal of Mexican provenance, occurring there at Zunapan, and in Washington County, Ga., as well as in the Faroe Islands. It is a hyacinth red. The *girasol* is a Mexican and Central American variety with bluish tinge and red reflections. The *common opal* is widely distributed, has a great range of colors like the more valuable varieties and differs from them in having neither reflections nor color-play; it is found at Leisnig, Saxony, at Kosemitz, Silesia, at Dubnik, Hungary, in the Faroe Islands, in Iceland, and in America at Cornwall, Pa., Idaho Springs, Colo., and Calaveras, Cal. *Semi-opal* is more opaque than common opal, with which it often occurs, as well as in company with chalcedony; it sometimes is considered to include *wood-opal*, which resembles petrified wood in its origin, but has the peculiar marking of the opal. A forest of opal ized wood was discovered in Montana in 1903. Inferior varieties are *hydrophane*, which is transparent only in water; *mother-of-pearl opal*, used, especially when found with chalcedony, for cameos; *glass-opal* or *hyalite*, made up of glassy concretions; and *melinite*, a gray, tuberosous or reniform mass.

OPATA (ō'pā-tā) INDIANS, a tribe of American Indians living in the centre and east of the Mexican state of Sonora. They have long been Christianized, are a quiet and industrious people, and are devoted to agriculture. They are domiciled in villages. This mode of life has given them a fairer complexion than that of the Indians who dwell entirely in the open air. They are the only Indians who have successfully contended with the savage Apaches. On many occasions they have aided the Mexican government in fighting other tribes. Shortly after the Spanish conquest of the domains of the Montezumas, the Opatas were found well clothed and living in prosperous villages. Their headquarters were along the banks of the Sonora and Oposura rivers and especially in the vicinity of Arispe and Nacarsara mining regions. In early days they occupied the whole western slope of the sierra from the headquarters of the Sonora River to Muri, near the Yaqui towns. They built of wood, adobe and loose stones, in the colder regions, and of reeds and palm leaves in the lower, better, larger and more comfortable houses than most of the neighboring tribes. They carried on an extensive trade in placer gold, pearls, turquoises, coral, emeralds and

other valuable stones and they were good agriculturists. After the coming of the Spaniards they became herdsmen and possessed large flocks of cattle, goats, sheep and horses. They are excellent workers, make good soldiers, and take readily to the ways of civilization.

OPDYCKE, ɔp'dik, **Emerson**, American soldier: b. Hubbard, Ohio, 7 Jan. 1830; d. New York, 25 April 1884. He enlisted in the Federal army in July 1861 and was commissioned first lieutenant in the 41st Ohio regiment. He participated in the battle of Shiloh, and in 1863 was commissioned colonel. He lost more than a third of his regiment, the 125th Ohio, at Chickamauga, and later saw service at Missionary Ridge, Rocky-face Ridge and Resaca. He was in command of a brigade from August 1864, and in 1865 became brigadier-general of volunteers. He rendered important service at the battle of Franklin and at Nashville. He commanded a brigade in Texas at the time of his resignation in 1866, when he was brevetted major-general of volunteers, the commission dating from the battle of Franklin. He was subsequently engaged in business in New York.

OPECHANCANO, ɔ-pěch-an-kā'nō, an American Indian chief of the Powhatan confederacy of Virginia: b. about 1545; d. 1644. He was a brother of the famous Indian leader Powhatan, father of Pocahontas. He it was who captured Captain John Smith and turned him over to Powhatan. After the latter's death he became the head of the Powhatan confederacy in 1618, though his elder brother Opitchapan was then nominal head chief. Under cover of being friendly to the English he united all the tidewater tribes in Virginia, and 22 March 1622 an attack was made on the colonists (at Jamestown). Over 400 men, women and children were massacred. After a long term of intermittent peace, Opechancano again attacked the English in 1644 and 300 persons were put to death. The chief was afterward captured and was shot at Jamestown by a sentry appointed to guard him.

OPELIKA, ɔp-ē-lī'ka, Ala., city, county-seat of Lee County, on the Central of Georgia and Western of Alabama railways, about 60 miles in direct line west by north of Montgomery. It was settled in 1839 or 1840. It is in an agricultural region in which cotton is one of the chief products. The principal manufactures are cotton products, brick, fertilizers, flour and lumber. It has considerable trade in its manufactures and the farm products of the surrounding region. Pop. about 5,000.

OPELOUSAS, ɔp-ē-loo'sas, La., town, county-seat of Saint Landry County, on the Bayou Teche, and on the New Orleans, Texas and Mexico, Morgan's Louisiana and Texas and Texas and Pacific railroads, 55 miles west of Baton Rouge. It is the trade centre of a cotton, rice and livestock raising district, and contains a cotton compress and a cottonseed-oil mill. It has a high school and the Academy of the Immaculate Conception (Roman Catholic). Pop. (1920) 4,437.

OPEN-BILL, an African bird (*Anastomus lamelligerus*) of the stork family, so named from the odd formation of the beak, which at the anterior end exhibits a gap between the

mandibles. Another species (*A. oscitans*) inhabits the East Indies. The beak is yellow, and the general plumage black with dashes or suggestions of green and purple throughout. The open-bills are also called shell-storks or shell-ibises on account of their ordinary food, which consists of mollusks.

OPEN DOOR, The, a term of diplomatic significance applied to the unrestricted maintenance of international commercial relations. It came into general use in the 19th century in regard to conditions in Eastern Asia and indicates an arrangement binding by general consent rather than by treaty, whereby all nations are allowed to trade in China and its dependencies upon equal terms. The European Powers controlling spheres of influence in the Chinese Republic tacitly admit foreign traders into their spheres on the same conditions as traders of their own country. This agreement, so far as the United States and other Powers are concerned, places China, commercially, in the same relation to the rest of the world that she had before the spheres of influence were recognized. Her tariff rates are to be uniform to all nations with which she enjoys trade treaties. The Powers, on their side, agree to respect existing treaties, a condition of considerable importance to the expansion of commerce in that of the United States in particular. See articles on TREATY PORTS; FREE TRADE; TRADE; TARIFF.

OPEQUON, ɔ-pěk'an, **Battle of the** (also called the Battle of Winchester), where General Sheridan, 19 Sept. 1864 defeated the Confederates under General Early. On the night of 18 Sept. 1864 General Early had Ramseur's division and Nelson's artillery in position about one and one-half miles east of Winchester, Va., across the Berryville road, along an elevated plateau between Abraham's Creek on the south and Red Bud Run on the north. Rodes' and Wharton's divisions, with Braxton's and King's batteries were at Stephenson's Depot and Gordon's division at Bunker Hill, under orders to join Rodes and Wharton by sunrise next morning. Cavalry picketed the Opequon and the roads northward and westward on the left and on the right along the Millwood and Front Royal roads to the Shenandoah. Early had about 15,000 men. General Sheridan, with about 38,000 cavalry and infantry, was at Berryville, east of the Opequon. He had ordered a movement south of Winchester to Newtown, but when he heard that parts of Early's army were at Bunker Hill and Stephenson's Depot ordered a direct attack on Winchester. Wilson's cavalry division, followed by the Sixth and Nineteenth corps, was to move on the Berryville road, while Torbert, with Merritt's cavalry division, moved to Stephenson's Depot, to join Averell's cavalry division, which was to move up from Darksville. Crook's Eighth corps was to be in reserve at the crossing of the Opequon. Early on the morning of 19 September Wilson was on the road, crossed the Opequon and cleared the way for the infantry. The Sixth corps came up and, under a heavy artillery fire, formed a line in front of Ramseur, its batteries replying to those of the Confederates. Wilson formed on the left of the Sixth corps. It was nearly noon before Grover's division of the Nineteenth corps was

formed on the right of the Sixth, with Dwight's division in reserve. Meanwhile Early had concentrated his army. When Wilson drove in his cavalry pickets on the Opequon at daylight and the Union movement developed itself, he ordered Gordon and Rodes from Stephenson's Depot and both arrived before the Union lines were formed and took position on Ramseur's left, under cover of a piece of woods, Gordon being on the left of Rodes, who had three brigades. At near noon the Union line moved forward; Nelson's artillery on the Confederate right and Braxton's on the left opened a destructive fire; Early ordered Rodes and Gordon to advance from the woods and attack the Union right; and the two lines met in a deadly struggle. Ramseur and Rodes were driven steadily back by the Sixth corps and Grover's division of the Nineteenth struck Gordon's left, held by Evans' brigade and drove it back in disorder through the woods from behind which it had advanced. Grover followed to the very rear of the woods and to within musket-range of Braxton's artillery, which was without support; but Braxton's guns stood to their ground and opened with canister, which checked Grover's advance. At this moment Battle's brigade of Rodes' division came up, moved forward through the woods and striking a weak point in the Union line, where the right of the Sixth corps joined the left of the Nineteenth and joined by the rallied brigades of Rodes' and Gordon's divisions, drove back Ricketts' division of the Sixth corps and Grover's of the Nineteenth and caused the remainder of the deployed line of the Sixth corps to fall back to the ravine from which it had advanced. But while the Confederates were pursuing Grover, Russell's division of the Sixth corps, which was in second line, charged forward to fill the gap made by the withdrawal of Ricketts and struck the Confederates in flank, driving them back with heavy loss. The Union line was re-established and there was a comparative lull in the engagement, which had been very bloody. General Rodes, one of Early's best division commanders, and General Russell, one of Sheridan's best, had been killed. Crook's Eighth corps, which had been intended to be used on the left to seize the Valley pike south of Winchester, was now brought to the right and its two divisions, forming on the right of the Nineteenth corps, charged and broke Gordon's division. Meanwhile Wilson's cavalry on the left had driven Lomax's cavalry back toward the Valley pike. On the right Merritt's cavalry division, after severe skirmishing, had crossed the Opequon at three fords near the railroad crossing, but was quickly held in check by Wharton's division of infantry and King's battery, which had advanced from Stephenson's Depot to meet it. A severe contest ensued, lasting some hours, both sides gaining and losing ground; but Averell, moving up the pike from Darksville to Stephenson's, driving two cavalry brigades before him, came into the rear of Wharton, while he was engaging Merritt, causing him to abandon his position and fall back at 2 p.m. to Winchester, where two of his brigades were put in reserve, in rear of Rodes' division, one remaining to support the cavalry north of the town. Merritt now advanced and joined Averell and both moved down on Early's left, driving back

the Confederate cavalry, until Merritt joined the right of Crook's troops. Averell and Merritt swung around to the rear of Early's left, driving his cavalry through the infantry lines and compelling him to send two of Wharton's brigades to check them. Crook, who had driven Gordon, now advanced on Wharton's flank and was himself struck by a flank fire. Early was now obliged to yield ground. The Sixth and Nineteenth corps were steadily driving Ramseur's and Rodes' divisions back to Winchester. Averell's and Merritt's cavalry divisions were charging around his left flank, forcing back his cavalry in some confusion and attacking his infantry. Many prisoners were taken from both. Finally, after an unsuccessful effort to hold an intrenched position covering the town, his road to Newtown being threatened, the whole line gave way and retreated, near sundown, some of it in confusion and disorder, some of it in an orderly manner, followed by Sheridan's cavalry to Kernstown, where Ramseur, who was rear-guard, checked pursuit at dark. Early halted at Newtown at midnight and next morning continued his retreat through Strasburg to Fisher's Hill, Sheridan following to Cedar Creek. The Union loss at the battle of the Opequon was 697 killed, 3,983 wounded and 338 missing, an aggregate of 5,018. The Confederates lost 276 killed, 1,827 wounded and 1,818 missing, an aggregate of 3,921. They lost also five guns and nine colors. Consult 'Official Records' (Vol. XLIII); Pond, 'The Shenandoah Valley in 1864'; Sheridan, 'Personal Memoirs' (Vol. II); Early, 'A Memoir of the Last Year of the War for Independence'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. IV).

E. A. CARMAN.

OPERA. A drama set to music and sung with orchestral accompaniment. For all practical purposes, the history of opera begins at the close of the 16th century, with the activities of a small group of dilettanti, men of letters and musicians, who met at Florence under the influence of the Renaissance movement and attempted to revive the lost art of musical declamation as practised by the Greeks. Up to this time musical art had concerned itself almost exclusively with ecclesiastical music and under the wing of the Church it had led a cloistered existence, aloof from the daily life of the people. The brilliant and aristocratic coterie who met at the palace of Count Bardi were not interested in the democratization of the art of music, but they were nevertheless largely influential in bringing it about. Their eyes were turned to the past, not to the future. Their attempt to restore what was forever gone was foredoomed; but the failure was not an inglorious one, since it gave the impetus to a great forward movement, the development of the entire range of secular music, of which the opera formed a part. Turning their back on existing musical theories and devices, these Florentines experimented with a declamation which was designed to follow the vocal inflections of speech under emotional stress. The result was monotonous and halting and interesting only to the historian; but it contained the germs of modern dramatic music and revealed, for the first time, the possibilities of instrumental music distinct from and inde-

pendent of vocal music, to which it had heretofore always been the handmaid.

It would be erroneous to assume, as it frequently is, that opera sprang fully grown from the heads of this Florentine group. Recent research has shown that the true beginnings are found in the "Sacre Rappresentazioni," scenic representations of religious themes (not unlike the English mystery plays), which dated back to the first part of the 14th century and in which the music was closely associated with dramatic action. But the conscious application of musical declamation to the drama seemed to give to the latter a new outlook and impulse. So that if the Florentine group are to be denied the glory of having really created a new art form (and their sincere belief in the originality of their efforts is unquestioned) they are entitled at least to the credit of being the most effective instruments in turning the course of musical development in an entirely new, significant and fruitful direction.

The work which is generally accorded the distinction of being the first opera in 'Euridic.' produced at Florence in the year 1600, of which the poem was written by Ottavio Rinuccini and the music by Giacompo Peri, both members of the group referred to; and before the close of the same year another setting of the same poem by another of the group, Giulio Caccini, also saw the light. It is a striking coincidence that the year 1600 witnessed the birth of oratorio as well. See ORATORIO.

It was only a short time before the attention of the trained professional musicians was attracted to the "new music" as it was called. The first of these was Monteverde (1567-1643) who, thoroughly grounded in the traditions of the ecclesiastical school, had, to a marked degree, the vision of a creative genius combined with the spirit of a true explorer. His first opera, the poem by Rinuccini, was 'Arianna,' produced in 1607. Only a fragment is extant, but it contains signs of the revolution which musical art was undergoing. His next work, given the same year, was 'Orfeo' (based on the same story as Peri's opera), and this has fortunately been preserved in its entirety. It established Monteverde as the foremost dramatic composer of his day, a position which the judgment of posterity has unhesitatingly confirmed. In daring and imagination he ranks with the greatest musical geniuses. As an innovator he is entitled to be classed with Gluck and Wagner. With them he shared the condemnation of the more conservative musicians of the time, who objected to what they called his gross breaches of the strict rules of counterpoint and balked at his novel instrumental effects. He invented the use of Pizzicato passages and the tremolo for string instruments, which have become effective devices for dramatic expression. Under his imperious guidance, music took a step in the direction of uncompromising dramatic expression, which it has never retraced. Before the close of his life and not a little due to the success of his efforts in the new field, the first public opera-house was opened—in 1637—and soon they had spread all over Italy and beyond. Monteverde's mantle fell upon his pupil Cavalli (1599-1676), whose taste suggested the development of a more flowing melody as a contrast to the

continuing recitative, thus foreshadowing the aria form. Passing over an intermediate period, marked by brilliant names, the next significant stage was reached toward the end of the 17th century, the period of Alessandro Scarlatti (1659-1725). By this time the opera which had at first employed music simply as an added emphasis to dramatic emotional expression, had become primarily a musical form with dramatic accompaniment. The librettist was the servant of the composer. Even so great a poet as Metastasio (1698-1782), the most famous and successful of librettists, whose dramatic poems were set to music by every well-known dramatic composer of his own and the succeeding generation, was bound by musical, rather than dramatic conventions. And in that never-ceasing struggle for supremacy between the arts which has marked the course of operatic history the composer was, in his turn, becoming more and more the servant of the singer. In Scarlatti's day the art of tune-making was fully realized and for a long time the history of opera became the history of the aria and of the famous singers such as Caffarelli, Faustina, Cuzzoni, Farinelli, etc. Scarlatti combined learning with imagination and applied a big talent to the development of opera, which, at his hands, came to have a truly modern stamp. He used with discrimination three distinct forms of dramatic expression, the simple and primitive form of "dry recitative" (*recitativo secco*), the accompanied recitative (*recitativo stromento*) and the aria. He also developed into definite design the instrumental prelude or overture.

The first great name in French opera is that of Giovanni Battista Lulli (1633-87), a Florentine by birth, who was brought to France as a mere boy and soon forced his way to the very front, founding and dominating a school, the influence of which is still felt. In Germany, the leader among the early opera writers was Reinhard Keiser (1674-1739), who, though but a name to-day, forged an important link in the development of German dramatic music.

The reaction of opera on church music was by this time complete and the horizon of the composer in every field of music had become greatly extended by the almost universal interest in the lyric drama. Bach (1685-1750) is the one notable exception of a great composer not tempted to try his hand at opera, his sturdy, serenely balanced mind, keeping its attention entirely to the development of absolute and ecclesiastical music. There is no space for even brief mention of the long list of operatic composers of the 18th century, but the names of Handel (1685-1759) in Germany and England and Rameau (1683-1764) in France cannot be omitted. Handel's operas were genuine additions to the literature of stage music. Following Italian models, his genius contrived to give them an international quality. 'Rinaldo,' written and first produced in England in 1711, is now but a name, yet it was the greatest opera the world had, up to that time, seen.

Gluck's (1714-1787) career as an operatic power was coincident roughly with the third quarter of the 18th century. He bent his great talents to the task of bringing opera back to the straight path of artistic verity, from which it had strayed, and to restoring the balance

between the drama and the music. His greatest success was made in France, where his appearance caused a sensation unique in operatic annals. His principal operas, 'Alceste,' 'Orfeo' and 'Iphigénie en Tauride,' embodied the finest qualities of the Italian, French and German models and are lasting monuments to a great genius who was also an intellectual giant.

From Gluck to Mozart (1756-91) is not a long step chronologically, but artistically it is a transition from one period into an entirely different period, an age of symphonic development with its marked reaction on dramatic music. Gluck was an iconoclast and a reformer by instinct. Mozart, writing apparently without preconceived theories and along conventional lines, transfigured everything with his golden touch. His treatment of the ensembles which had become an important feature of the opera, highly organized and developed and of the orchestra as a flexible and responsive instrument for dramatic expression was far in advance of anything that had gone before. His three greatest operas, 'Don Giovanni,' 'Figaro' and 'Magic Flute' are still in the current repertoires in the leading opera houses of the world. Each is a masterpiece and they had a profound influence on all the musical stage works that have followed. Beethoven's (1770-1827) solitary opera, 'Fidelio,' fills a niche all its own, though it has been without much effect on the subsequent development of the lyric drama.

The 19th century saw the greatest extension of operatic activities. Weber (1786-1826), Wagner (1813-83) and Verdi (1813-1901) are the three highest mountain peaks in a long and imposing range. With Weber at the beginning of the century was developed the romantic opera, without which Wagner would not have been possible. 'Der Freischütz,' 'Euryanthe' and 'Oberon' are the earliest and the greatest works of this genre which has had a prolific progeny. Weber still employed the stereotyped form of operatic arias, but the horizon of dramatic expression had widened visibly. Orchestral effects designed purely to heighten the stage pictures are innumerable in his works. Weber discovered the unlimited possibilities of flexible musical speech which Wagner utilized so thoroughly. Wagner's announced intention was to create a new art form through the combination and organic union of music, poetry and the related arts of the theatre and in applying this theory to his own works he not only composed the music, but wrote the librettos and even designed the stage decorations. This fusion of the arts and the greatly enlarged mechanism of the operatic structure are Wagner's chief contributions to the opera as an art form. Verdi was no pathfinder, but he is the richest contributor to the 19th century literature of Italian opera, the history of which is in fact best summed up in his stage works from 'Oberto' to 'Falstaff,' his crowning gift to the operatic repertoire. The younger Italians, of whom Puccini is the leader, have added materially to operatic expression though little to operatic form.

In the introduction into Western European opera houses at the close of the 19th century of Russian works, notably those of Moussorgsky and Rimsky-Korsakov, with their racial

elemental qualities and barbaric stage pictures, new elements of progress and change are being realized. They, as well as Debussy's 'Pelléas et Mélisande' (1902), Strauss' 'Salome' (1905) and Stravinsky's pantomime ballets 'Petrouchka' and 'L'Oiseau de Feu'—a by-way of opera—show that the lyric stage drama has not yet reached its furthest development.

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OPERA, NATIONAL DEVELOPMENTS, THEIR INFLUENCE AND TREND. From the year 1600 to about the middle of the 18th century, with the advent of Gluck, opera bears prominently the ineradicable mark of the land of its nativity—Italy. From Italy the new art early found its way to France, Germany and England, conveyed by Italian producers, sung by Italian artists, the music set to Italian libretti. So conditioned, it was but natural that it should flourish for a time on every foreign soil, almost untouched by local influences, and that native works should be produced in close imitation of Italian models. The years 1600 to 1750 are of great significance in music, a period of experimentation, of tremendous activity; but so far as the opera is concerned, it was only the seed-time of preparation for the harvest to come. By a natural process of evolution, the transplanted variety of opera gradually acquired individuality, but time was required to develop and perfect it. In fact, another hundred years passed before it reached the point where the new species could be said to be true to form, though not of the Italian type.

While national schools of opera are relatively a recent development in the history of the art, it is interesting to note the early indications of differentiation seen first in the adaptation to local producing conditions, and, in the use of local social conventions. With the popularization of opera went the natural reckoning with the taste and comprehension of the masses; and the first indications of local variants naturally occurred in the drama, rather than in the music, which retained its foreign character even when local stage traditions and costumes and the conventions of acting and scenery began to be employed.

When the Italian Lulli came to France and by force of his personality and genius dominated the field of opera, so that he is generally looked upon as the true founder of French opera, the ballet was in high favor in court circles and he saw at once the value of making artistic capital out of it. The emphasis which he laid upon the ballet in all of his lyric stage works gave them a certain stamp which has come to be associated with French grand opera

down to the present day and has deeply influenced its trend.

Similarly, in England, the nationalistic impulses seemed destined to have their say in the development of the masque-opera, of which Purcell was the originator. The introduction of incidental music in the stage play was familiar to the audiences of Shakespeare's day and so was its use in connection with the masque. This incidental music could scarcely be classed as dramatic; but it pointed the way to the development of a true English variation from the Italian type, which Purcell's genius was quick to realize. The circumstances of Purcell's early death, the absence of important successors, the Puritan opposition to all English stage works and Handel's advent in England soon after Purcell's death combined to stunt the growth of the masque-opera, which became entirely submerged in the foreign elements then introduced.

While these nationalistic traits were showing themselves in other lands, in Italy a local variant, opera buffa, began to develop, representing in fact a natural reaction against the remoteness from the life of the people of classical opera, or opera seria as it was called. Opera buffa began in the interludes which were presented between the acts of the opera seria. This lighter form of opera found a quick response from the public and developed a vigorous growth of its own. Characteristic of it was the use of folk song and melody akin to it, and, as might be expected, since the folk song is the most convincing expression of nationalism in music, opera buffa began to show nationalistic influences more plainly than the more serious lyric stage works. Many of the composers worked in both fields, but some of them stand out from the rest as excelling in the lighter and freer form of work. Pergolesi, for example, is much better known for his 'La Serva Padrona' (first produced in 1733) than for any of his grand operas; and this opera buffa, which still receives an occasional revival, is more typically Italian and more modern in spirit than the more serious works of the composer or his contemporaries.

The production of 'La Serva Padrona' in Paris in 1752 started a veritable conflagration, the famous *Guerre des Buffons*, in the course of which Rousseau wrote his letter to prove that French music did not exist. As though to answer him, a number of native composers began to enter the field of light opera and created the French opera comique, which substituted pictures of everyday life for the artificial classical scenes of the Lullian opera and dialogue for the stilted recitative and, above all, utilized music of the chanson type, thus giving an added touch of racial vigor and spontaneity to the genre. The opposition of opera comique to grand opera had a healthy reaction on each; and when Gluck was called to France to defend the stronghold of the conventional classical type against the onslaughts of the new radicals, he brought with him an ideal of dramatic truth and directness which breathed new life into the old stage puppets of the classical grand opera. The reactionary advocates of the conventional Italian opera seria were soon put to rout and from Gluck's day of triumph dates modern living opera.

The development of the lighter form of opera on the continent of Europe found its analogue in England in the ballad opera, of which Gay's 'Beggar's Opera' was the prototype, a work of little intrinsic merit, enlivened by popular street tunes and yet historically significant, as the forerunner of the modern high-class Gilbert and Sullivan operas.

In Germany, Mozart was more strongly influenced by the opera buffa of Italy and the opera comique of France than by the more formal classical type, and his operas, though for the most part Italian in design, were strongly German in spirit and feeling and the direct progenitors of Weber's and Wagner's works. By Mozart's time, German instrumental music had found its own particular mode of expression and a national flavor had become plainly recognizable.

Weber's works, although of a higher musical type, were still the true embodiment of German folk song. Tunes that sprang from the soil of Italy and were nurtured under its sunny skies gave natural impulse to the exaltation of vocal melody in Rossini's works and the familiar genre represented by his school. Culminating in the works of Verdi, who regenerated it by bringing it into line with the dramatic aspirations of modern music, Italian opera has, in the operas of Puccini and others of the present day school, shown that it is susceptible of all the freedom of dramatic expression that the works of Germany and France display. Yet, thanks to the persistence of native folk elements, it retains its individual national character.

The 19th century development of opera comique in France culminated in Gounod's 'Faust' and Bizet's 'Carmen.' A significant off-shoot was the opera bouffe of the second empire, notably that of Offenbach, which so perfectly reflected the foibles and vices of that period, that it attained a vogue, which threatened for a time to extinguish all serious artistic competition. French grand opera in the 19th century developed through foreign sources, yet true to type. Just as in the 18th century the German Gluck was responsible for its highest and most characteristic examples, so in the 19th century the German Meyerbeer and the Italian Rossini (with his 'William Tell'), contributed the principal operas of the distinctively French school with its continued emphasis on the ballet and the pomp and circumstance and trappings of pageantry. In the 20th century, for the first time since Rameau, Frenchmen have given the stamp to the character of French opera. The impressionism of contemporary French opera composers as emphasized in Debussy's 'Pelleas et Melisande' is in line with the direction which French instrumental music has taken and in spite of a certain melodic monotony is characteristic of modern French art impulses.

In Russia the first operas known to the Western world were those of Glinka, whose 'A Life for the Tsar' (first produced in 1836) may be said to be the foundation stone of Russian opera. Even to the present day, only a few Russian operas have come to have a general hearing. Moussorgsky's 'Boris Godounov,' Borodine's 'Prince Igor' and Rimsky-Korsakov's 'Coq d'Or' are striking examples of an independent development based upon the robust folk melody and folk tale of

Russia; while Stravinsky's essays in the field of pantomime ballet seem to be the most important and significant contribution to present day dramatic music. Spanish opera has never been a very virile plant, though the end of the 19th century witnessed a little flowering in the works of Albeniz and Granados. Spanish dance rhythms predominate in them, giving them a characteristic flavor. The only Bohemian composer whose stage works are known outside the borders of his own land is Smetana, whose 'Bartered Bride' is intensely nationalistic and a brilliant example of folk inspiration. In the Scandinavian and other European countries, as well as in America, there has been practically no operatic development of international importance. The opportunities, at least in America, have been few. However, with the modern impetus in the direction of national artistic development, it is fair to assume that in the course of time American soil will be productive of a true native growth which shall take a prominent place in the field of opera. Among the earliest attempts at real American opera were those of William H. Fry, whose 'Leonora,' produced in 1845, was his most successful work, and George F. Britton, who wrote an opera on the 'Rip Van Winkle' story. Of recent works may be mentioned Walter Damrosch's 'The Scarlet Letter,' produced in 1894, and 'Cyrano' in 1913; Arthur Nevin's 'Poia,' produced in Berlin under Muck in 1910; the prize operas 'Mona' (1911) and 'Fairyland' (1913), by Horatio Parker; 'Natoma' (1911) and 'Madeleine' (1913), by Victor Herbert; and 'Shanewis' (1918), by Charles W. Cadman. The modern native productions of operetta are of the most trifling character, with some exceptions in the works of Reginald DeKoven, Victor Herbert, Julian Edwards and John Philip Sousa. Distinctively American in character is the newer 'ragtime' music of Irving Berlin, Jerome Kern and others, which has a fascination all its own.

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OPERA-GLASS (Fr. *lorgnette*), a double telescope, used for looking at objects that require to be clearly seen rather than greatly magnified, such as adjoining scenery and buildings, the performers at a theatre or opera, etc. The opera-glass is short and light, and can be easily managed with one hand. Its small magnifying power (from two to three at the most), and the large amount of light admitted by the ample object-glass, enable it to present a bright and pleasant picture, so that the eye is not strained to make out details, as in telescopes of

greater power, which generally show a highly magnified but faint picture. It allows the use of both eyes, which gives to the spectator the double advantage, not possessed by single telescopes, of not requiring to keep one eye shut (a somewhat unnatural way of looking), and of seeing things stand out stereoscopically as in ordinary vision.

The opera-glass is the same in principle as the telescope invented by Galileo. It consists of two lenses, an object-lens and an eye-lens. The object-lens is convex, and the eye-lens concave. They are placed nearly at the distance of the difference of their focal lengths from one another (see TELESCOPE). The opera-glass need not be set to a precise point, as is necessary with ordinary terrestrial telescopes, for the lengthening or shortening of the instrument does not produce so decided an effect on the divergence of the light. The change of divergence caused by screwing the opera-glass out or in is so slight as not much to overstep the power of adjustment of the eye, so that an object does not lose all its distinctness at any point within the range of the instrument. There is, however, a particular length at which an object at a certain distance is most easily looked at. The two telescopes of the opera-glass are identical in construction, and are placed parallel to each other. The blending of the two images is easily effected by the eyes, as in ordinary vision. The cheapest opera-glasses consist of single lenses; those of the better class have compound achromatic lenses. A very ordinary construction for a medium price is to have an achromatic object-glass, consisting of two lenses, and a single eye-lens. In the finest class of opera-glasses, which are called field-glasses, both eye-lenses and object-lenses are achromatic. Plössl's celebrated field-glasses (Ger. *Feldstecher*) have 12 lenses, each object-lens and eye-lens being composed of three separate lenses. See LENS; TELESCOPE.

OPERATIONS, Surgical: Measures other than medical for the relief of conditions resulting from disease or accident, and generally involving the use of cutting instruments or of apparatus. Surgical operations include those mentioned below.

Reduction of Fractures.—This process consists in so manipulating the fragments of bone as to bring them into proper position and free them from the intervening tissue, and then, by immovable apparatus, retaining them in position till union takes place from the growth of new bone or of ligament. Flat or round splints of wood, of sole-leather, of prepared felt or of pasteboard are used, or bandages impregnated with silicate of soda (water-glass), or with plaster of Paris.

Reduction of Dislocations.—The displaced bone is manipulated by the surgeon in such a way as to force it to re-enter its socket through the tear made in its capsular ligament in its exit. Leverage is used, with hand or foot or opposing muscles as a fulcrum, and retaining apparatus is applied to secure rest till swelling and other inflammatory symptoms cease.

Amputations and Disarticulations.—Amputations consist in the removal with the knife of some part of the body, as an arm, a breast, etc. In the amputation of a limb, the soft parts, after being cut through, are retracted so as to

allow the bone to be sawed off as far back in the flesh as possible. This procedure provides, after tying all bleeding arteries and cleansing the surfaces, for covering in the bone deeply with muscle and skin flaps. Before beginning the amputation of a limb, a tight rubber band is applied about it, so as to prevent hemorrhage when the arteries are severed. After these are tied, the band is removed. Disarticulation is an amputation through a joint. Skin and flesh flaps are provided, and the bone's end is well covered. In all amputations of limbs the cutting is so done that the scars resulting shall not be located so as to prevent the adjustment of an artificial limb. Many ingenious amputations of special parts of the body have been devised, as of the foot. In one of these, parts of two bones are removed, and the remnants are brought into apposition so that they unite. This is termed osteoplasty.

Ligation of Arteries.—This is an important and very frequent procedure in surgical operations. An artery may be tied in continuity in cases of hemorrhage or aneurism, etc. In such cases the artery is exposed and a blunt-end needle, with an eye near its tip, is loaded with the chosen ligature and hooked under the vessel. The ligature is caught by the surgeon with a forceps and pulled through while the needle is withdrawn. The ends of the ligature are then tied above the artery. An artery may be tied when bleeding in the stump of an amputation. Catgut, silk, kangaroo tendon and silk-worm gut are the chief varieties of ligature used. An artery is sometimes held with pins thrust through the adjacent flesh, so as to compress the vessel (acupressure), or it may be closed by being twisted at its extremity (torsion).

Excision and Resection.—Excision is the removal of a portion of the body by cutting it from the surrounding tissues. If a portion of bone or a joint be removed, the operation is termed a resection. Excision may be desirable in the case of a tubercular joint or a necrotic bone, or in hip-joint disease, for example.

Plastic Operations Upon the Face.—In these, skin from forehead or cheeks is taken to repair, for example, a nose or a lip which has been lost or excised because of disease. In some cases a finger, or the skin of the arm, may be used for this repair, the hand being fastened to the head for a few days before the transplanted part is entirely severed from its original site.

Tracheotomy.—This is the operation of opening into the trachea or windpipe through the neck, in order to insert a tube through which the patient may breathe during closure of the throat from diphtheria, or swallowing a foreign body, or other cause. A modification of this is laryngotomy, in which the opening is made through the larynx, below the vocal cords.

Paracentesis.—Puncture into the pericardial or pleural cavity to draw off fluid thence.

Operations on the Kidney.—These include that of cutting the kidney open to remove a stone, or a new growth, or to drain off fluid (nephrotomy); suturing it to the abdominal wall to prevent floating; incising and stripping off the capsule in case of Bright's disease (nephropexy); and removal of a kidney (nephrectomy).

Appendectomy.—This is removal of the vermiform appendix, a procedure necessary in many cases while the acute inflammatory process of appendicitis is in progress. In some cases where perforation has not occurred, an "internal operation" is done after the subsidence of the acute attack and before the incidence of another one. An incision is made a few inches above the groin, in the right side of the abdomen; all adhesions between coils of the intestine are divided; the appendix is found, and is cut off close to the point of emergency from the cæcum, and its stump is inverted into the intestine and fastened with sutures of catgut. The peritoneal cavity is then washed out and the abdominal wound is closed around a drainage tube. It is now advised that operation be done very early and the possibility of fatal peritonitis be averted.

Operations on the Nerves.—These may be necessary to suture divided nerves together, to resect parts of nerves or to remove ganglia in severe neuralgic affections.

Trephining.—This is opening the skull by means of the trephine, an instrument which removes a button of bone. Resort is had to it in order to explore the brain with needles or canulæ in search of abscess, hæmatoma or cyst; to elevate depressed portions of a fractured skull, and to pick out fragments of bone; to expose a sinus because of thrombosis or supuration; or for intracranial hemorrhage. The operation is also performed for the purpose of exposing various arteries and nerves. The "mastoid operation," which is frequently undertaken for middle-ear suppuration, is substantially as follows: An incision is made through the soft parts down to the bone back of the auricle of the affected side, from the tip of the mastoid process to a point opposite the upper limit of the auricle. Bleeding vessels are secured, and the periosteum is separated from the bone as far forward as the meatus. A bony projection which is thus uncovered is cut away with a chisel or gouge, and some of the cortical layer of the bone over the antrum is removed. The mastoid cells are easily reached, softened bone is scraped away and exudate is removed from the tympanum. In some cases two of the small bones of the ear, the incus and malleus, must be removed. (See EAR). Proper drainage is arranged through the wound and the meatus and sutures are put in. Consult Park, 'Surgery by American Authors' (1901); Kocher, 'Text-book of Operative Surgery' (1903).

OPERCULUM, ò-pér'kū-lūm, in conchology, the horny or limy plate developed upon the "foot" of many gasteropods, serving to close the aperture of the shell when the animal has withdrawn into its abode. The operculum is a cuticular development on the dorsal side of the foot, behind the shell. It is present in nearly all land, fresh-water and marine *Prosobranchiata*, is absent in all *Opisthobranchiata* in the adult state, except *Actæon*, and in all *Pulmonata* except *Amphibola*, and has been lost in several familiar families, as the cones, mitres and cowries. As a rule the operculum exactly fits the aperture, and hence it varies in outline in different groups; but in some cases where the aperture is very large it closes it only in part. Other abnormalities exist; and

in general the operculum is a variable character of little if any value in classification. The theory formerly held that this excrescence was homologous with a second valve, or with the byssus of bivalves, is not now considered justified by facts. Use has been found for certain round, thick and concentric opercula to represent the eyes in rude human figures made by South-Sea islanders; and as eyestones,—small lenticular and smooth ones, as of small turban-shells, which may be slipped easily around the ball of the eye beneath the eyelid, and bring out intruding and painful objects caught there.

OPERTI, ô-pâr'tê, **Albert** (JASPER LUDWIG ROCCABIGLIERA), Italian artist: b. Turin, Italy, 17 March 1852. He entered the British navy as midshipman, but resigned in 1868. He then elected the career of a painter; was illustrator, caricaturist and scenic artist in New York, and accompanied Lieut. R. E. Peary on two Arctic expeditions, during which he acted as New York *Herald* special correspondent (1896-97). From the studies made during his northern voyages he executed his well known 'Rescue of the Greely Party' and 'Farthest North' (for the Army and Navy Departments, Washington); 'The Schwatka Search'; 'Finding De Long in the Lena Delta'; and 'Dr. Kane.' He was selected as artist by the United States government to the World's Columbian Exposition.

OPHELIA, ô-fê'li-ä, in Shakespeare's play of 'Hamlet,' the daughter of Polonius. Hamlet, with whom she is in love, having unintentionally killed her father in his madness, turns away from Ophelia, whose reason is now overthrown; and in the various phases of her derangement the drama presents its tenderest scenes of pathos. While gathering flowers, Ophelia is drowned.

OPHICLEIDE, ôf'î-klîd, a brass wind-instrument of music invented about 1790 to supersede the serpent. It generally consists of a wide conical tube bent double with a bell-mouth and has 11 keys and a cup-shaped mouth-piece. Its compass ranges a little over three octaves (or 38 semitones), namely from the B flat one semitone below the lowest note of the violoncello to C in the treble staff, and it is capable of very accurate intonation. It is used in orchestras, and is capable of very pleasing effects as a solo instrument, but is all but superseded by the saxhorn.

OPHIDIA, ô-fîd'ya, an order of reptiles containing the serpents,—saurians in which the right and left halves of the lower jaw are connected by an elastic band. (See LIZARDS). The appendages and shoulder-girdles are typically absent, although in certain families rudiments of the posterior appendages and pelvis still persist. The quadrate is not fixed, and, acting as the suspensor of the lower jaw, gives a surprising capacity for swallowing. The number of vertebræ is great. The skin is covered with horny scutes, which are periodically shed with the cuticle. The eyes are without lids. The sense of smell is acute. The left lung is smaller than the right and may be quite rudimentary. A few snakes are viviparous. The *Ophidia* seem to have arisen from lizard-like ancestors

in Tertiary times. They are now nearly cosmopolitan, only the coldest countries and certain large islands (New Zealand, Ireland) being devoid of them. See SERPENTS.

OPHIOGLOSSALES, the grape fern. See FERNS AND FERN ALLIES.

OPHIR, ô'fêr, a place mentioned in the Old Testament scriptures from which the ships of Solomon brought large quantities of gold, sandal-wood and ivory wherewith to adorn the king's house, then building at Jerusalem. There are different opinions about its exact situation. Some scholars place it in northern Asia, others in India, and even America has been mentioned as comprising Ophir. Later it has been located in the East Coast of Africa. Baer identifies Ophir with Malacca. Lassen's view is that Ophir is the Semitic name for the "Abhira," a pastoral people in northern India, and that the land of Ophir is the territory they inhabit. Biblical tradition placed Ophir in southern Arabia, hence Glaser places Ophir on the east coast of Arabia. This Ophir has no connection with the same word occurring in Genesis x, 29.

OPHITE, ôf-it, in mineralogy, formerly a synonym for serpentine (q.v.); now a basic rock of greenish color and eruptive origin, with an exterior resemblance to serpentine, occurring especially in the Pyrenees. Its texture is intermediate between granite and porphyry, and its structure is characterized by the incomplete crystallization of its parts, some being completely crystallized and others entirely amorphous, a phenomenon called ophitic structure.

OPHITES, ôf-its (Gr. *ophis*, a serpent), a Gnostic sect of the 2d century who worshipped a living serpent. They considered that the serpent in Eden by misleading Eve was the liberator of man from the power of Jehovah, whom they regarded with abhorrence. It is more than probable that we have not a proper conception of the aims and beliefs of the Ophites, since their history, which has come down to us, has been written either by their enemies or by those who did not in any way sympathize with them or attempt to understand them. They seem to have been protestors against the superstitions of their age. They looked upon all the deities which assumed a position of superior power tending to monotheism as but an exaggeration of the superstitions before which the people had fallen down. They have been accused of worshipping a serpent, but this seems to have been simply symbolical, since they paid special deference to the deceiver of Eve in the Garden of Eden as the symbol of liberty from priestly deception. See SERPENT-WORSHIPPERS.

OPHIUCHUS, of-i-û'kûs, in astronomy, a large constellation, representing a man holding a serpent; called Serpentarius, the Serpent-bearer. It has about 80 stars visible to the naked eye, none of which are very bright. It has some fine globular clusters and a number of double stars.

OPHIUROIDEA, a class of the phylum *Echinodermata* (q.v.), embracing the slender-armed sand-stars. It is divisible into three orders: (1) *Streptophiura*, in which the central skeletal supports of the arms are but loosely articulated, so that coiling is possible in both a

vertical and a horizontal plane; (2) *Zygophiuræ*, where the articulations prevent coiling in a vertical plane; (3) *Cladophiuræ*, in which the arms, which are generally much branched, have saddle-shaped articulations. For the detailed anatomy of the *Ophiuroidea*, see BRITTLE STARS. See also BASKET-FISH.

OPHTHALMIA, inflammation of the eye; a general term used by the older writers, but at the present day either not employed by oculists or applied by them only to conjunctivitis (inflammation of the conjunctiva) or to conjunctivitis and inflammation of the eyelids. There are various grades and types of conjunctivitis, all of which have to a greater or less extent the following symptoms in common: photophobia—aversion to or intolerance of light; an increased and usually altered secretion; and injection of the blood-vessels, accompanied sometimes with a slight velvety opacity, or special products, a false membrane, granulations, etc. In all forms of conjunctivitis there is need of cleanliness, antiseptic washes, poultices, protection from excess of light and injuries, dust, etc. In most forms the case should be under the care of a physician.

Simple Conjunctivitis.—This is catarrhal conjunctivitis, characterized by congestion, a feeling as of the presence of a foreign body, lessened transparency of the conjunctiva of the lids, and a discharge, at first watery, then acrid, excoriating the cheeks, may become mucous or mucopurulent, gluing the eyelids together. Usually the vision is clear, but it may be hazy if the secretion is more than watery. Micro-organisms, neglect of treatment, filth and the scrofulous diathesis may convert a simple conjunctivitis into a purulent and more or less communicable or infectious disease. Usually the prognosis is good, recovery occurring in a few days.

Varieties of Simple Conjunctivitis.—Associated conjunctivitis occurs sometimes with eczema, facial erysipelas, bronchitis and other disorders; exanthematous conjunctivitis (ophthalmia morbillous, ophthalmia scarlatinous, etc.) may accompany or follow exanthematous diseases such as measles or scarlet fever; mechanical conjunctivitis is caused by wind, tobacco-smoke, dust or injuries; toxic conjunctivitis by exposure to the influence of certain chemicals, aniline dyes, chrysophanic acid, etc., or by the prolonged use of atropine, eserine, cocaine, etc.; and symptomatic conjunctivitis from the strain of the eyes in defective vision. For treatment, remove the cause if possible and alleviate associated conditions. Wash the eye frequently with cold or hot water, as agreeable, but do not rub it. As a wash or spray, 10 grains of boric acid to an ounce of water will be of service. When the discharge is mucopurulent, stronger applications are necessary.

Acute Contagious Conjunctivitis.—Known also as acute mucopurulent conjunctivitis, epidemic conjunctival catarrh and pink-eye, this was formerly classified as a severe form of simple conjunctivitis. It is distinctively contagious, attacks persons of all ages, is believed to be due to specific bacilli, resembles at first simple conjunctivitis, then the discharge is mucopus or purulent, the conjunctiva is much swollen, and even chemotic, and the lids may

be œdematous and glued together. Prognosis is good, but relapses are common, recovery taking place usually in about two weeks. Treatment is similar to that of simple conjunctivitis. The affection being contagious, all sources of such contagion as is due to towels, sponges, etc., must be discarded.

Purulent Conjunctivitis.—This acute blennorrhea of the conjunctiva is of two forms, that of the new-born (ophthalmia neonatorum), and the gonorrheal conjunctivitis of adults. Conjunctivitis neonatorum, characterized by severe pain, great swelling of the eyelids, serious infiltration of the conjunctiva, and a copious discharge of contagious pus, is caused by the introduction into the eye of infecting material (sometimes gonorrheal), usually from some portion of the genito-urinary tract of the mother, at the time of or shortly after the child's birth, or from soiled towels, etc. The chief risks are cohesion of the eyelid and eyeball, opacity, ulceration of the cornea, and sometimes perforation. Prognosis is grave, but treatment is generally successful if a competent physician has charge while the cornea is still clear. Cold compresses at first, then hot fomentations, constant gentle removal of the discharge, at first a mild eyewash, as before indicated, later the introduction of a solution of nitrate of silver (Crede's plan) or other substances, absolute cleanliness, and the destruction of lint, cotton or any infected substance, comprise the measures of relief.

Gonorrheal Conjunctivitis.—This affection (purulent ophthalmia, acute blennorrhea in adults) is usually caused by contagion from an acute gonorrhea or a gleet, or from a similarly affected eye, through fingers, linen, towels, etc., though it may arise from a vaginal leucorrhea, diphtheria and other causes. The symptoms are similar to those which appear in the purulent conjunctivitis of the new-born but more severe, and the treatment should be entirely in the hands of the physician. The vitality of the cornea is in constant danger: ulceration and matting together of the iris and cornea, inflammation of the choroid, iris, etc., and even destruction of the eye may occur. The disease may become chronic and one of the forms of chronic conjunctivitis.

Croupous or Pseudomembranous Conjunctivitis.—Of this, which is plastic membranous conjunctivitis, there are two forms, one quite mild, usually attended by a soft, painless swelling of the lids, a membranous exudation upon the conjunctiva, and generally a scanty seropurulent discharge occurring before the seventh year. The cause is not known. The second form is rapid in development, is attended with much swelling and discharge and may quickly destroy the cornea. Frequent removal of the discharge with a solution of common salt, cold compresses and the use of nitrate of silver, etc., are the measures employed for relief. The affection occurs with measles, scarlet fever, influenza and non-febrile disorders.

Diphtheritic Conjunctivitis.—This form usually occurs in young children, either mildly with pseudomembranous formation, or in a deep-seated character, necrotic, with a very painful board-like exudative swelling of the lids and a scanty seropurulent or bloody discharge. Sloughing of the cornea may occur. Prognosis

is grave. Cleanliness, antiseptic washes and building up the tone of the body are necessary.

Phlyctenular Conjunctivitis.—Also called phlyctenular ophthalmia, scrofulous ophthalmia, eczema of the conjunctiva, characterized by one or more grayish, sometimes purulent elevations, generally on the eyeball portion of the conjunctiva. It occurs in strumous and badly nourished children, and tends to a disease of the cornea (phlyctenular keratitis) and to its opacity. Attention to hygienic measures, good food, etc., tonics, mild eye-washes, followed by the application of an ointment of the yellow oxide of mercury, are requisites of treatment.

Spring Conjunctivitis.—Considered by some writers as a distinct disease, by others as a form of chronic conjunctivitis. This occurs mainly among children in the spring and summer, and is always bilateral. There is stinging pain, considerable mucous secretion and the formation of gray semi-transparent nodules, which swell and overlap the edge of the cornea. Prognosis favorable except for relapses. Treatment requires protection of the eyes with dark glasses, weak astringent and antiseptic lotions, and perhaps destruction of the granulations and hypertrophic masses.

Follicular Conjunctivitis.—Follicular ophthalmia, characterized by small pinkish prominences mainly in the conjunctiva of the lids, usually in rows. It is the result of bad hygienic surroundings, as in crowded tenements and pauper schools, where it may be epidemic. It is allied to granular lids. The prognosis is good, but the disease is troublesome, and often lasts for months. The treatment consists in general hygienic measures, and certain stimulating and antiseptic applications.

Granular Conjunctivitis.—Granular ophthalmia, Egyptian ophthalmia, military ophthalmia, known as trachoma, and, popularly, as granular lids. It occurs in acute and chronic forms, is infectious and sometimes widespread, and although affecting mainly persons of poor health and in bad hygienic surroundings, it may attack those in good health. The symptoms of the acute form are: swollen lids; reddened conjunctiva; hypertrophied papillæ, between which are non-vascular, roundish granulations; scalding tears; intense photophobia; pain in the brow and temple; and mucopurulent or purulent discharge. In the chronic form, there is less pain, redness and other results of inflammation; the conjunctiva is roughened; the granulations degenerate and soften. In both forms there is danger of cloudiness and ulceration of the cornea, and of scars with consequent deformities of the lid and its border. The sufferers should shut out the light and keep the eyes most of the time partly closed. The treatment in earlier stages calls for soothing remedies; in chronic or severe cases, caustics and astringents, operative procedures and general medication.

So prevalent is trachoma in cities, especially in the crowded tenement districts, that the health authorities now treat affected children at the schools and in their homes, thereby greatly limiting the spread of the disease and checking defects in vision. The work done on these lines in the city of New York since 1902 has been particularly noteworthy. Trachoma, mainly brought here by Russian Jews and other

immigrants from unclean environments, and which rapidly spreads by contagion, was making inroads among the more exposed children of the public schools, and threatening not only the health of New York, but, more remotely, that of the country at large. The board of health took vigorous measures for its suppression. Every child in the public schools was subjected to medical examination by experts appointed by the board, and in cases of slight affection parents were notified and instructed in the necessary precautions of cleanliness, etc.; in more advanced cases the children were taken out of school, isolated at home and there treated; and in extreme cases still more rigorous methods were adopted. At the same time all teachers in the public schools were required to observe and report upon the slightest appearance of the disease, in order that affected children might be promptly excluded. Within two years the most remarkable results were attained; trachoma was almost eradicated from the city, and it has been demonstrated that the disease, under vigilant administration of public health officials, can be brought and kept under control.

Subacute Conjunctivitis.—Sometimes chronic, this appears in association with a diplobacillus, is insidious, runs a course of six weeks to six months, is characterized by redness of the edges of the eyelid, congestion and hypersecretion of the conjunctiva. Treatment is the same as in simple conjunctivitis, with the addition of zinc-sulphate solution.

Pavinaud's Conjunctivitis.—This form, usually unilateral, is rare. It was first described by Pavinaud and believed to be due to infection of animal origin. The symptoms are swelling of the lids, mucopurulent discharge, large polypoid granulations, with ulceration between them, and lymphatic involvement. It usually lasts from one to several months. Treatment includes antiseptic washes—nitrate of silver or sulphate of copper—and surgical removal of granulations.

Chronic Conjunctivitis.—Chronic ophthalmia: it may be either an independent affection or the result of an acute blennorrhœa. As an independent disorder, it occurs mainly in elderly people. The symptoms are hyperæmia, soreness and thickening of the edge of the tarsal conjunctiva, swelling of the caruncle and slight mucopurulent discharge. Treatment: antiseptic lotions, astringents, attention to the tear-ducts and refractive errors and cleanliness. Lacrimal conjunctivitis is a form of the above, depending upon obstruction of the lacrimal passages.

Egyptian and Military Conjunctivitis.—These are terms loosely used for all forms of conjunctivitis occurring in barracks and crowded assemblies, more or less epidemic and chronic, and attended by a mucopurulent or purulent discharge.

OPHTHALMOMETER, an optical instrument devised by Helmholtz (q.v.), to measure with accuracy the dimensions of reflected images, and to determine the axis and degree of corneal astigmatism. It consists of a small telescope enclosing a combination of convex lenses with a refracting prism, attached to a graduated arc. The arc is crossed by an arm bearing two wires; one fixed, the other movable; one quadrilateral in shape, the other cut into

five steps. Fixed upon the patient's face in a frame, the oculist looking through the telescope focuses upon the patient's cornea the images of the mires, brings them into alignment, and by measurement of the original positions of the mires on the arm, ascertains the amount of strabismus present.

OPHTHALMOSCOPE, *ōf-thāl'mō-skōp*, an instrument for examining the interior of the living eye, invented in 1851 by Prof. Helmholtz, who showed that by illuminating and examining an eye in the same direction, its deeper parts become visible. The form now generally in use consists of a section, usually oblong, of a concave spherical mirror of about 10 inches focus with a small hole in the centre; and certain lenses to use with it. These lenses are mounted around the outer zone of a disc which is so pivoted that it may be revolved so as to bring the lenses successively in front of the observation aperture of the mirror. Examination is facilitated by dilating the pupil of the observed eye with atropine or homatropine; and for a complete examination this is indispensable. The person whose eye is to be examined is seated in a dark room, with a bright light on a level with his eye by the side of his head. The observer sits opposite him, and placing the mirror close to his own eye, and about 18 inches from the eye to be examined, reflects the light upon the latter, while he looks at it through the hole. The pupil in a healthy eye appears bright red or orange; opacities in the lens or vitreous humor appear black. The details of the retina, choroid, etc. (or *fundus*), can be seen in two different ways. In the *indirect method* the observer, seated as above described, holds the two and one-half-inch convex lens about three inches from the eye under examination, between it and his own, when a clear image of part of the fundus, inverted and magnified about four diameters, appears in the red light of the pupil. In the *direct method*, the observing eye must be placed as close to the observed as the intervention of the mirror will allow, when an image of a smaller part of the fundus is seen but erect and magnified about 14 diameters and a correspondingly small field of view. The fundus appears orange or red, varying in different individuals. The blood-vessels of the retina are seen as darker red lines coursing over it. The entrance of the optic nerve, commonly called the disc, from which these vessels diverge, appears as a round disc of a much paler color. A variation of this instrument has an attachment resembling a microscope by which the image entering the lens at the observation aperture is magnified up to 40 diameters. This attachment may be for use with a binocular form of the observing microscope; or, again, it may be so fitted with reflecting prisms that two observers may make the examination simultaneously. The latter form is of peculiar value in consultations, and also in coaching students in ophthalmology (q.v.).

OPIE, *ō'pī*, **Amelia Alderson**, English novelist: b. Norwich, England, 12 Nov. 1769; d. 2 Dec. 1853. She was married to John Opie, the portrait painter, in 1798. In 1801 she published 'Father and Daughter,' a novel which at once attracted attention. After the death of her husband in 1807 she returned to her father's

home, in Norwich, where she occupied a high position in society and subsequently joined the Society of Friends. She published 'Adeline Mowbray' (1804); 'The Warrior's Return and Other Poems' (1808); 'Madeline' (1822); 'Lays for the Dead' (1833), etc. Consult the 'Life' by C. L. Brightwell.

OPIE, **Eugene Lindsay**, American pathologist: b. Staunton, Va., 5 July 1873. He was graduated at Johns Hopkins University in 1893 and took his M.D. there in 1897. He was connected with the staff at Johns Hopkins Hospital in 1897-98, and with the faculty of the university in 1898-1904, serving also as pathologist to Bay View Asylum in 1898-1904. He was a member of the Rockefeller Institute for Medical Research in 1904-10; and visiting pathologist to the Presbyterian Hospital, New York, in 1907-10. In 1910 he was appointed to the chair of pathology at Washington University, Saint Louis, and in 1912-15 he was dean of the medical faculty there. He was commissioned captain in the Medical Reserve Corps in 1917 and served with unit one (Washington University) in France. He published investigations of malarial parasites (1898); of the anatomy and pathology of the pancreas, and the relation of pancreas to diabetes (1899-1902); of inflammation, tuberculosis and diseases of the liver (1902-13); effects of diet (1914-15). He was co-editor of the *Journal of Experimental Medicine* in 1904-10. Author of 'Diseases of the Pancreas' (1902).

OPIE, **John**, English painter: b. Saint Agnes, Truro, Cornwall, May 1761; d. 9 April 1807. When about 19 he was taken to London by Dr. Wolcott ('PETER PINDAR'), who befriended him in various ways. Through the influence of his patron he acquired great fame as a portrait painter, became known as the 'Cornish Wonder,' and while this season of favor lasted, realized a moderate fortune. He made illustrations for Boydell's Shakespeare and Macklin's Poets. His portraits were, for the most part, of poets and authors and are, therefore, also valuable from an historical point of view. He then turned to historical painting, and produced his 'Murder of James I of Scotland'; 'Slaughter of Rizzio'; 'Jephtha's Vow,' etc. His 'Slaughter of Rizzio' was exhibited in 1787, and secured his election to the rank of associate to the Royal Academy. In 1788 he was appointed a Royal Academician. In 1805 he was elected professor of painting in the Royal Academy, but only delivered four lectures before his death, and these with a memoir by his wife were published in 1809. He is also the author of the biography of Sir Joshua Reynolds in Wolcott's edition of Pilkington's 'Dictionary of Painters' and of 'An inquiry into the Requisite Cultivation of the Arts in England,' which among other influences led to the formation of the National gallery. His work is characterized by great originality, though it frequently lacks harmonious coloring and refined elegance. His second wife was Amelia Alderson Opie (q.v.).

OPISTHOGLYPHA, *ō'pīs-thōg'li-fā*, a group of colubrine serpents having comparatively weak powers of poisoning their prey, and so securing immobility by paralysis. In these snakes one or a few of the posterior maxillary teeth have a groove on the front side,

down which poison may flow from glands in the lips. The supply is rarely enough to affect a man or large animal much although some of the species are of rather large size. The group includes the long tree-snakes of the Eastern and American tropics, several familiar terrestrial snakes of the Mediterranean region, and some East Indian genera. An interesting fact is that the group connects the non-poisonous Colubridæ with the highly venomous vipers, whose poison apparatus seems to have been evolved from an opisthoglyphous type.

OPITZ, o'pits, **Martin**, German poet and critic, the "Father of modern German poetry": b. Bunzlau, Silesia, 23 Dec. 1597; d. 1639. Educated at Heidelberg, he became the centre of a circle of young poets. He fled to Holland in 1620 to escape the plague but returned to Silesia in 1622 and taught for a time. In 1625 he was ennobled and crowned with laurel for his poetic fame by the emperor. From 1628 to 1632 he was secretary of Dohna, the persecutor of Silesia, and then became the client of Ulrich of Holstein, as ardent a Protestant as Dohna was a Catholic. But the story of his life, with its changing of sides and its petty flatteries is less important than his literary work. When scarcely 21 he wrote 'Aristarchus, seu de Contemptu Linguae Teutonicæ,' urging the infusion of classical imitation into German poetry; and in 1624 this German Boileau published 'Das Buch von der deutschen Poeterey,' which insisted on accent in place of mere numbered syllables and in many other respects made possible the revival of German poetry in the 17th century. Three years later he wrote the verses of 'Dafne,' said to be the oldest German opera, to the music of Heinrich Schütz. His poetical work was correct, unoriginal, and various, including manifold versions and imitations. The antiquarian epic 'Zlatna' (1623); the 'Trostgedichte in Widerwärtigkeiten des Krieges' (1633), the best of his metrical attempts; 'Deutsche Poemata,' a book of selections; and a pastoral 'Die Nimfe Hercine' (1630). Consult the German biographies by Strehlke (1856), Palm (1862), and Hoffmann von Fallersleben (1858), and Perry, 'From Opitz to Lessing' (1884).

OPIUM, the dried milky juice of the unripe capsules of a poppy (*Papaver somniferum*), which for this product has been cultivated through many centuries. Every species of poppy is capable of yielding it to a greater or less extent. Opium is procured by making incisions in the poppy-head or capsule, taking care not to penetrate its cavity; the juice then exudes in drops, and after being allowed to remain for a day upon the edges of the incisions, it is scraped off—a brownish, jelly-like material. As the soft opium accumulates it is molded into roundish lumps or irregular flattened cakes, of various sizes, and put aside to dry. When of proper consistency it is generally wrapped in leaves and sent to market. When fresh the lumps and cakes are plastic, becoming harder on the exterior, are of a chestnut or darker brown, and have a disagreeable, even sickening odor, and a bitter nauseous taste. Sometimes opium of commerce is mixed with pebbles, shot, ashes, clay, sand, and with resinous, saccharine and mucilaginous substances, and has an excess of moisture. Adulteration in the United States

has been reduced to a minimum under the operation of the Food and Drugs Act of 30 June 1906. Opium is a complex substance. "It ordinarily contains an odorous principle, glucose, gum pectin, a compound resembling caoutchouc, wax, fat, resin, coloring matter and plant-tissue," also the neutral principles meconin and meconiosin, and meconic acid and thebolactic acid, similar to lactic acid. The most important of the derivatives obtained from opium are its alkaloids, 19 in number. In all probability the poppy was originally brought from Asia Minor. It is now grown extensively there, and in Egypt, India, Persia, China and Japan, less extensively in several parts of Europe, especially France and Germany, and in the United States. As an ornamental flower it is cultivated in nearly all temperate countries.

The principal varieties of the opium of commerce include Turkey opium, used principally in Europe and America; Persian, of variable quality, seldom used in this country; East Indian, rather a poor variety, used at home and exported to China and other Asiatic countries; Chinese, consumed in the East, largely for smoking.

Alkaloids of Opium.—Those at present recognized are morphine, which crystallizes in white needles, and which was discovered in 1816 by Sertürner; narcotine (shining prisms or long needles, tasteless, odorless), discovered in 1803 by Derosme, although its basic nature was first shown by Robiquet in 1817; codeine (nearly colorless octahedra), discovered in 1832 by Robiquet and described by Grimaux in 1881; prepared from morphine by heating it with methyl iodide and soda, it is methylmorphine; narceine or narceia (long quadrangular prisms or white silky needles, odorless), discovered in 1832 by Pelletier; pseudomorphine (fine crystalline powder, derived from morphine), also called phormine and oxydimorphine, discovered in 1835 by Pelletier and Thibournevy; thebaine or para-morphine (silve scales or prisms with styptic taste), discovered in 1835 by Thibournevy; paparenine (colorless needles or prisms), discovered by Merck in 1848; rheadine (white tasteless prisms), discovered in 1865 by O. Hesse; cryptopine (minute prisms), discovered in 1867 by T. and H. Smith; oxynarcotine (isolated from the mother liquor of narceine), discovered in 1876 by Wright and Beckett; gnoscopine (woolly needles, obtained from narceine), discovered in 1878 by T. and H. Smith. In 1870-78 O. Hesse announced the discovery of lanthopine (finely crystallized), meconidine (amorphous, not stable), laudanine (large crystals), codamine (crystalline), deuteropine, laudanoline (crystallizable), and protopine (crystallizable). The discovery of hydro-catarnine (crystallizable) was announced in 1869 by Mathieson and Wright. Apomorphine or apomorphia, derived from morphine or codeia, although a depressant, is a prompt and valuable emetic.

Of the alkaloids of opium, morphine, codeine, narceine and thebaine are of most importance. Morphine in its action on the body very nearly represents that of the crude drug. Morphine occurs in different kinds and grades of opium in amounts varying from a fraction of 1 per cent up to nearly 25 per cent. The United States Pharmacopœia prescribes a mini-

num of 9 per cent morphine for opium. The average dose of opium for an adult is one grain; of morphine, one-eighth to one-fourth grain. Codeine acts like morphine, but is weaker, and is less likely to be followed by headache, constipation and other unpleasant symptoms. It is used principally to allay pain and coughs. "Codeine, paparenine, cryptopine and narceine have a certain soporific action, but the remainder of the alkaloids are almost devoid of it." Thebaine is antagonistic to morphine; is a powerful and poisonous irritant of the spinal centres, producing convulsions. Therapeutical uses for it have not been developed.

Official Preparations of Opium.—The principal preparations (including the alkaloids) are the acetate, hydrochlorate and sulphate of morphia, sulphate of codeia, powdered opium, pills of opium (opium and soap), Dover's powder (opium, ipecac and sugar of milk), troches of licorice and opium, tincture of opium (laudanum), deodorized tincture (McMunn's elixir), camphorated tincture (paregoric), tincture of ipecac and opium (liquor Dover's powder), vinegar and wine of opium and opium liniment. The use by the physician of one or other of these preparations is to a certain extent a matter of personal habit. The alkaloids are generally considered to act more promptly than opium itself and its solid and liquid preparations, and to be less constipating. Solutions of opium are more prompt in action than solid preparations and salts of morphine than morphine itself.

Properties and Use of Opium.—Opium is a stimulant narcotic; in small doses, stimulant; in larger, a sedative; and in still larger, a narcotic poison. It is readily absorbed from the stomach, less quickly from the rectum and vagina and very little from the skin, if it is not abraded. When injected under the skin (subcutaneous, hypodermic or hypodermatic use), its action, as a rule, is rapid. Opium is used by many nations for its exhilarating and anodyne influences, being either eaten, smoked or used as a substitute for alcoholic drinks. Medically, it is used to relieve pain, to produce sleep in certain low conditions, to allay nervous irritation, as in coughs, to check excessive secretion, as in diarrhoea, dysentery and diabetes and to support the system when sufficient food cannot be retained. The action of opium is not always uniform. With some individuals, due to age, race temperament, condition of health, personal idiosyncrasies, etc., opium produces effects different from the ordinary results, such as delirium, cramps, vomiting, severe headache and itching of the skin. Young children, old people and persons of a nervous temperament are particularly susceptible to the influence of opium; small doses sometimes producing in these coma and even death. On the other hand, severe pain, flooding, etc., sometimes requires three to four times the ordinary dose. Many of the soothing syrups and carminatives contain opium. It is believed by many physicians that morphine should never be given to a child under 10, nor a hypodermic injection to a child under 15. In frogs small doses of opium produce tetanus; in mice, convulsions; they stupefy dogs and rabbits; while it requires large doses to poison ducks, chickens and pigeons. In small doses, opium usually excites or stimulates, increasing the fullness, force and frequency of the

pulse, the temperature of the skin, the power of the muscles, arousing mental action and affording bodily and mental calm. In a variable time, usually within an hour after the opiate has been taken, there is a disposition to sleep or repose. On arousing from sleep there is frequently headache, with nausea, tremors, etc., until the body recovers its energy. Most of the secretions are diminished by opium, the peristaltic action of the bowels lessened, pain and muscular contractions or spasms allayed and nervous irritation relieved, but always with the risk of repetitions of the dose and the formation of the opium habit.

Opium-Poisoning.—This is quite frequent, due to the overuse of the drug to relieve pain or produce sleep, or as an indulgence, it being unfortunately too easy to procure opiates. Poisoning is principally from the salts of morphine, either used alone or in patented compounds. The primary or stimulant effects may be loquacity, restlessness and hallucinations, although the period of exaltation may be short, if present at all, the symptoms of the second or intermediate period rapidly appearing. These are similar to those of congestion of the brain, weariness, dullness, drowsiness, a sense of weight in the extremities; the face is pale, suffused or cyanotic; the pupils are slightly contracted, the breath is slow and may be deep and stertorous; the skin may be dry and warm or cool and wet; the pulse is generally normal; the patient is unconscious, but may be roused by shaking, by the infliction of pain or by loud talking, and when aroused, his breathing becomes more rapid. In the third period, that of narcosis or coma, the patient cannot be aroused; the face is pale and cyanotic (bluish, especially the lips); the pupils are insensible to light, usually contracted to the size of a pinhead, sometimes dilated toward the end of life; the pulse is rapid and feeble; breathing is slow and shallow, with increasing intervals and some times is stertorous; the skin is bathed at first in warm perspiration, then becomes cold and clammy. Convulsions are rare. Recovery may even now take place, or death occurs from failure of respiration and arrest of the heart's action. A post-mortem examination may reveal nothing abnormal; or the brain may be congested, the vessels of the cerebrospinal axis gorged with dark blood, the lungs, heart, liver and spleen distended with dark fluid blood, and serum may fill the ventricles and be beneath the arachnoid.

Treatment of Opium-Poisoning.—Produce emesis, with copious drafts of warm water, with a tablespoonful of salt or a teaspoonful of mustard well stirred in; by tickling the throat with a feather; or by use of a stomach-pump. Wash the stomach continually since excretion of the poison may be expected from the circulation thither. For the washing use a one-tenth per cent solution of potassium permanganate, which may perform a most valuable service in oxidizing the poison. Apply cold affusions to the head and spine, and flagellation to the palms, soles and calves, and with a damp towel to the back; keep the patient walking briskly, though he begs for rest; give strong coffee and aromatic spirits of ammonia; frequently use the Faradaic current upon the limbs, and resort to artificial respiration if

necessary. The bladder should be kept empty. Atropine aids respiration, but must be used with the greatest caution.

The Opium-Habit.—Indispensable as opium is in certain affections, in the hands of the thoughtless and weak it is too often a curse. It is the most seductive of all the narcotics. "By its soothing and exhilarating influences it gains such a hold on the moral and physical nature that the strongest will is unable to emancipate the victim from its enchantment, and moral degradation results." With children its frequent use in cough-mixtures, carminatives, etc., interferes with the assimilation of food, enervates the system and prepares the way for depraved appetites. The opium-habit seems to be a disease of comparatively recent times, dating, as some believe, from the invention of the hypodermic syringe in 1848. Undoubtedly the consumption of opium has increased steadily within the last 70 years. This is due largely to the fact that neuroses have increased, owing partly to a more and more hurried and intense mode of living, and in part to the ease with which opiates are obtained and the attractive forms in which they are presented—granules, triturations, etc. The habit is often induced by the frequent use of opium to relieve pain or produce sleep, or is contracted simply through yielding to sensuous enjoyment, as in opium-smoking. It may also be due to defective will-power, transmitted sometimes in a neurotic taint from opium-taking parents and grandparents.

Victims of the opium-habit frequently become so demoralized as to need care in an asylum. They lie, steal, lose self-respect and ambition, are forgetful, may be subject to delusion, fear and superstition, and are careless as to clothing and necessary habits, while still thinking highly of themselves. The great nerve-centres tolerate stimulation to a certain point. When the limit is reached, the time varying in different persons, the action of the various organs and tracts is disordered. The victim of opium suffers from imperfect digestion, faulty appetite and assimilation and consequent malnutrition. The red blood corpuscles diminish, he is pale, has nausea, muscles are flabby and endurance weakens. The kidneys become affected, the skin is congested, and when the disease is advanced, purpura appears. There is often a malaria-like fever. The functions of the testicles in the man and of the ovaries in the woman are suspended. Primarily there is functional derangement of the brain, then permanent deterioration. He becomes a slave to his depraved appetite. When the time draws near for his allotted dose he is nervous, yawns, may have neuralgia, is weak, breaks out into a perspiration and is miserable. He takes his dose and is himself again; but after a time the dose has to be increased, and if relief from his cravings is not obtained he sinks lower and lower and dies a wretched death. Two methods of cure are employed; one is the gradual reduction of opiates, the other is their sudden withdrawal—in either case giving in their stead bitter tonics, stimulant carminatives, such as ginger and certain stimulants and medicines. The law holds opium habitués, as it does drunkards, responsible for crimes which they commit. It is estimated that the vicious use of opium is about 50 times as great as its medicinal use,

in connection with which it is well to remember that probably more than half of that usually classed as medicinal is in reality vicious. Consult 'United States Dispensary and Reference Handbook of the Medical Sciences'; Potter, 'Handbook of Materia Medica, Pharmacy and Therapeutics' (1901); 'Reference Handbook of the Medical Sciences' (Vol. VI, New York 1916).

OPIUM, Wild, an American wild lettuce (*Lactuca canadensis*), noted for its tallness, reaching a height in some plants of 10 feet.

OPIUM TRAFFIC, The. Opium as an article of commerce begins to be mentioned in history in the 9th century when it was brought into China by traveling Arabs. In the 12th century opium was being brought from India to China in the native junks. At that period its use was purely medicinal. In the second half of the 18th century the importations into China began to assume large proportions through the activities of the Portuguese traders. The first edict against it had been issued by the Chinese Government in 1729, but no attempt was made to enforce it. In 1757 the East India Company acquired a monopoly of the opium trade of India, where, since 1793, the drug has been a government monopoly, the cultivators, in Behar, Benares and Malwa being paid at a fixed rate for their crops for exportation to China. The trade was contraband, the Chinese government having in 1796 prohibited the importation of opium. Through the connivance of the Chinese local officials, the importation about trebled in the 20 years between 1816 and 1836. In 1729 the imports had totaled 29,866 pounds. By 1775 they had risen to 149,000 pounds. In 1790 they were 754,700 pounds; and in 1830, 2,520,300 pounds. In March 1839 the Chinese authorities forbade all foreigners to quit Canton and ordered them to deliver up the opium in their possession and seized that on board of British ships in the harbor, 20,291 chests in all, amounting to 3,030,125 pounds, valued at \$10,000,000. This the Chinese officials destroyed. War with Great Britain resulted, which ended in the defeat of the Chinese, who were obliged to cede Hongkong as well as pay a large indemnity for the opium. The treaty of Nanking under which the war was settled was signed in 1842. It provided that five ports of China should be freely open to foreign trade. The Chinese Government still held to the prohibition of the importation of opium but no further attempt was made to enforce it. By 1850 the annual importations of opium from India and other British territories had risen to 7,056,700 pounds. In 1858, under great pressure, internal as well as external, China placed opium on the list of lawful imports. Opium smoking had then become prevalent all over China. In 1880 the imports amounted to 12,911,800 pounds and the Chinese themselves were raising large quantities of it, the profits being much larger than for wheat and other farm crops. In 1900 the Chinese raised 45,000,000 pounds of opium and consumed it all but 660,000 pounds which was exported. In addition to this prodigious quantity they consumed also 7,230,000 pounds imported from India. By 1906 China had 15,000,000 opium smokers and it was estimated that nearly or quite half of her 400,000,000 population used the drug in some

form. The annual income of the Chinese government in customs and licenses in the opium traffic amounted to \$30,000,000. In that year, however, the Empress Dowager issued a decree ordering the opium habit to be extirpated in China within the space of the next 10 years. Appeals made to the British government to co-operate by checking the export traffic from India received the backing of the British public and of some of the officials and it was agreed that if China actually carried out her program of wiping out one-tenth of her internal opium traffic annually for the next three years, the British government would undertake to shut off the India exports in the same proportion. The closing of opium dens began at once and was carried on relentlessly. The poppy farms were decimated by law and many of the farmers ceased voluntarily to raise the drug plant, so that by 1909 fully one-half of the former poppy-growing acreage was in other crops and 2,000,000 opium dens had been closed. By 1912 five of the 18 provinces of China had been entirely closed to the opium trade and in 1913 five more were freed. In 1914 the freed provinces numbered 15. The remainder of the country would have been quickly cleared up but for the treaty of 1911 with the British government under which the Shanghai opium combine was operating. Through this treaty the three provinces, Kwangtung, Kiangsu and Kiangsi were held open to the traffic until March 1917, when the last ounce of smoking opium was (legally) imported into China. The combine made a strong fight to continue the trade, offering the Chinese government \$16,000,000 for an extension of time to 1 Jan. 1918. But though China was in serious financial straits at the time, the offer was refused. The last opium farm in China had been closed down in November 1916 and on 30 June 1917 absolute prohibition of opium smoking in China went into effect.

While the opium plague was thus being stamped out in China, it was spreading in India. In the fiscal year 1901-02 the consumption of opium in India was 847,332 pounds. Ten years later it was 1,028,892 pounds. In some sections of India the annual consumption of the drug amounted to 18.7 pounds per 1,000 of the population. In Calcutta about one-tenth of the people were opium eaters and in the Assam section the proportion of opium smokers and eaters was at least 20 per cent and was estimated by some officials as 25 per cent.

Recent reports of travelers in the Dutch East Indies, particularly in Java, have voiced severe criticism of the government of the Netherlands for promoting the spread of opium consumption in those islands. The Netherlands government controls the opium trade in those islands as a monopoly and maintains retail shops where so small a quantity as five cents worth can be freely purchased. It is charged that the opium traffic brought into the treasury of the Dutch government in 1902 the sum of \$5,500,000 and that in 1914, while China was rigorously cutting out the traffic on her soil, the Dutch collected \$8,400,000 from the Dutch East Indies opium trade. To this the government replied that though the revenue had indeed increased, the traffic had been cut down by 55 per cent between 1890 and 1911; and at any

rate the consumption of opium was not by Dutch subjects but was confined to the 300,000 Chinese immigrants residing in the islands.

The Japanese government has always steadfastly opposed opium and the law forbids its importation, possession or use except as a medicine. With the occupation of Formosa in 1895, the Japanese government found nearly 7 per cent of the 3,000,000 inhabitants to be opium smokers. The government took over the opium traffic as a monopoly and licensed the opium users, at the same time preventing the spread of the habit and administering a cure to the younger habitues. In 1900 there were 169,000 opium users on the register. In 1903 the number was 143,500. During the years following a large number of additions were made, due to the immigration of Chinese devotees. The number is steadily diminishing, however, and the traffic will eventually wear itself out.

With the occupation of the Philippines the United States succeeded to an extensive opium traffic. A government measure proposed for its regulation was suppressed in consequence of a vigorous outcry raised in the States against the legalization of the traffic in the drug and against any form of governmental participation in the profits realized from its sale. Under the law of Spain in force in the Philippine Islands for years before the American occupancy, the Filipinos were forbidden to smoke or use opium and all dealers in opium were forbidden to sell the drug to the Filipinos or to permit it to be used on their premises by Filipinos. The Spanish system provided for the sale of the privilege of selling opium to Chinamen in each province to an opium farmer or contractor. It provided that opium should only be used or smoked in certain places, which were under the surveillance of the police and if a Filipino was found in such resorts he was arrested and the owner of the resort was subjected to punishment. This was the system at the time of the American occupation, but it was found that there were at least 10,000 Filipino addicts to opium in some form, although few smokers. The Spanish regulations were not continued by the American authorities, and for nearly five years the only checks upon the sale and use of the drug was a duty imposed in the custom-house and a provision in the municipal code requiring municipal councils to pass ordinances punishing the keepers of dives in their respective towns. In 1903 a commission was sent to visit the opium-consuming countries near the Philippines and to report on a plan to control the traffic. The commission commended the Japanese method in Formosa but it was not put into effect. In 1907 the Philippine commission passed an opium law prohibiting the use of the drug except under the direction of a registered physician and made the mere possession of the drug a crime punishable with fine and imprisonment. In 1903 the imports of opium were 254,547 pounds, in 1909 they were 93,053 pounds. The weight of the opium imported in 1915 is not given but its value is stated at \$4,600—about 1,500 pounds.

In the United States there are said to be about 200,000 persons who are habitual users of drugs and a few more than half use opium. Since the passage of the Harrison Law in 1915, the annual opium importations have fallen from

491,600 pounds in that year to 165,000 pounds in 1916 and to 86,812 pounds in the fiscal year ended 30 June 1917. A great deal of opium smuggling is carried on across the Mexican border and some across the Canada line and it is probable that an occasional batch gets in along the Pacific Coast. It is impossible to estimate as to these illegal importations.

OPODELDOC, ǝp-ǝ'dēl'dōk, a medicinal plaster, said to have been invented by Mindererus and used for external injuries. The name is now applied to a liniment which is much used as an anodyne application in sprains, bruises and rheumatic pains. It is prepared by dissolving three ounces of common soap in a pint of alcohol by the heat of a sand bath, then adding an ounce of camphor and a fluid dram each of oil of rosemary and oil of origanum. It concretes into a soft, translucent, yellowish white mass, of the consistency of soft ointment; but it becomes liquid when rubbed upon the skin.

OPON, ǝ'pōn, Philippines, a pueblo of the province of Cebú, situated on the northwestern shore of Mactán Island, three miles across the channel from the town of Cebú. In 1521 Magellan was killed here in conflict with the natives. Pop. over 20,000.

OPOPANAX, ǝ-pǝ'p'a-năx, a gum resin with a peculiar acrid odor, the produce of an umbelliferous plant, *Opopanax chirorium*. This plant is a native of southern Europe and Asia Minor and the granular gum is brought to market from the Levant. The physicians of ancient times highly esteemed it for its purifying and aperient virtues and it still continues a famous medicine in the East, where it is looked upon as a cure for almost all diseases. The perfume known as opopanax is not derived from this gum-resin. There is a commercial opopanax, a kind of perfumed myrrh, obtained from a Balsamodendron, largely imported into Germany, where an essential oil is distilled from it.

OPORTO, ǝ-pǝr'tō (Port. "the port"), Portugal, a large city and seaport, capital of the province of the same name, on a steep declivity on the right bank of the Douro, about two miles from its mouth, and 170 miles north of Lisbon. The river is crossed by a bold and striking railway bridge, and a high and low level bridge for tramways and foot passengers. The houses rise one above another in terraces, and there are well-built quarters with broad and straight streets, public gardens, promenades, and other attractive features. The chief buildings comprise the Gothic cathedral, and some interesting churches; the bishop's palace, the exchange, the town-house, the custom-house, the English club, the great hospital, the opera-house, theatre, crystal palace. One of the most striking architectural objects is the Torre dos Clerigos (Tower of the Clergy), attached to the church of the same name. Oporto, which is very modern, is noted for its commercial interests and its extensive industries. Its principal trade is in wine, white and red, but chiefly the latter, much of which is sent to Great Britain, and derives its name *port* from this city. There are manufactories of excellent cottons, silks, woolen and linen stuffs, pottery, lace, buttons, jewelry, preserved foods, glass and leather. Royal tobacco and soap works, iron-

foundries and sugar-refineries are also in operation. The chief exports, in addition to wines, are olives, olive and other oils, raisins, onions, oranges, lemons and other fruits, salt, cork, cattle and building materials. In ancient times the site of Oporto was occupied by the harbor town Portus Cale afterward Porto Cale, from which the name of the kingdom, Portugal, is derived. Oporto was the capital of Portugal till 1174, when the seat of government was transferred to Lisbon. It was taken and sacked by the French in 1805, who retained possession of it till 1809, when the British crossed the Douro and compelled them to retire. Oporto having sided with Dom Pedro, it was besieged in 1831-32, for over a year, by the troops of Dom Miguel, when much of it was destroyed, and its trade was, for the time, annihilated. Pop. about 200,000.

OPOSSUM, the name, adopted from the Indian name of the northern species, for the family of American marsupial mammals *Didelphyidae*, more particularly for the typical genus *Didelphys*, and specifically for *D. virginiana* of the United States. The place of this family in the order is among the higher polyprotodonts associated with the dasyures and bandicoots (*Perameles*). Their greatest peculiarity lies in the fact that, with a single exception, this group contains all the marsupials existing outside of Australasia. The family itself is not represented there, for various marsupials carelessly called "opossums" in Australia are not members of this family, which is confined to America, and mainly to its tropical parts, where doubtless it is a survivor from the Mesozoic Age when marsupials were generally distributed over the whole world. The opossums are arboreal omnivorous animals, ranging in size from that of a cat to that of a mouse. They have 50 teeth, having 10 incisors in the upper jaw and eight in the lower, one canine tooth on each side in each jaw, three compressed premolars and four sharply-tuberculated molars on each side. The head is long, muzzle pointed, ears large and naked. The fur is long, loose and grizzled. The tail is long, prehensile, and in part scaly. The feet are plantigrade, with five toes on each foot, their claws long and sharp; but the inner toe of the right foot converted into a thumb, destitute of a claw, and opposable to the other digits. The pouch, so characteristic of marsupials, is absent in the familiar northern species, and most others, the nipples opening between folds of skin which represent a marsupium. To these the minute young are attached by the mother as soon as born, which is after only about 26 days of embryonic life, and when still in a very undeveloped condition; and there they cling five or six weeks until able to run about. The young are numerous and remain with the mother until well grown, clinging to her fur and being carried about as she scrambles among the branches, with their tails tightly wound about hers, or about her limbs or neck. Their prehensile rope-like tails are of vast service to these animals, enabling them to use all four feet in food-gathering while suspended by this useful fifth member.

In habits the opossums generally are nocturnal. The food consists chiefly of insects, small mammals, and birds; most species are fond of fruits; and the Brazilian crab-eating

opossum (*D. cancrivora*) obtains its name from its partiality for the flesh of crabs, which the northern species will also eat, as well as frogs, when other food is scarce. They are pre-eminently arboreal animals, and make their homes in hollows of trees, bedded with leaves and soft grass; here the days are spent in drowsy hiding, and the young are brought forth in early summer. Owls frequently share these hollows with the opossums. On the ground the movements of the opossums are slow and awkward. They get credit for being exceedingly cunning animals, and are famous for their skill, and patient endurance of indignities and even torture, in counterfeiting death when threatened with harm. "Playing 'possum" has passed into a proverbial expression to indicate any deceitful procedure. Some observers declare that this supposed counterfeit of death is solely the paralyzing effect of fear, but this simple explanation is not generally regarded as wholly adequate to account for the phenomenon.

The number of species in this family is undetermined, but more than 20 have been named, mainly small animals of South America. The most remarkable form, perhaps, is the tiny reddish "mouse-opossum" (*D. murina*) of Mexico and southward, which is no larger than a field-mouse. Other species are shrew-like. Of a different genus is the curious yapok (*Cheironectes variegatus*), found from Guatemala to Paraguay, which has the hind-feet webbed. It swims and dives with great ease, gathering from the water its food, consisting of fishes and crustaceans. It inhabits holes in the banks of rivers, and is strongly marked with brown bands on a gray ground. Several of the tropical species are more strongly colored than the northern opossum, which is simply whitish gray.

The flesh of all the larger species is eaten, and that of the Virginia opossum is regarded as one of the woodland delicacies of the Southern States. Hunting the opossum with dogs at night is a favorite sport in the South, especially in autumn, when the body has a thick layer of fat all over. The animal takes refuge in a tree, and is either shaken down or shot as it hangs by the tail. The flesh is usually baked and eaten with roasted sweet potatoes.

Consult writers upon American mammals, as Audubon and Bachman, Goodman, Allen, Merriam, C. C. Abbott, D. L. Sharp, etc. For the family generally consult Beddard, 'Mammalia' (1902); Goeldi, 'Proceedings' of the Zoological Society of London, 1894, p. 457; or any treatise on mammals.

OPOSSUM-MOUSE, one of the diminutive, active, very mouse-like flying phalangers (q.v.) of the genus *Acrobates*.

OPOSSUM-RAT, a book-name, translated from the local name "*raton runcho*," in Ecuador, of a rare little marsupial inhabiting the northern Andean region, which is of special interest because it represents in America an entirely different branch (the diprotodont) of marsupials from the marsupials, and is the sole survivor of a family (*Epanorthidæ*) formerly prevalent in Patagonia. It looks like an opossum of the size of a rat, lives in high brush-wood, feeds mainly on birds and their eggs, and specimens are obtained rarely and with difficulty. It was first described in the 'Proceedings' of the Zoological Society of London

for 1860, by R. F. Tomes, in working out a collection of small mammals obtained by Louis Fraser in Ecuador, who published the first notice of *Cænolestes*, which he described under the name *Hyracodon fuliginosus*. Oldfield Thomas rediscovered Tomes' genus in a specimen obtained near Bogotá. This specimen Thomas found it necessary to consider as representing a new species. The name *Hyracodon* having been found to be preoccupied, Thomas suggested *Cænolestes*, calling his specimen *obscurus* and Tomes' *fuliginosus*. Consult Thomas, *Proceedings* Zoological Society of London for 1895, p. 870.

OPOSSUM-SHRIMP, *mysis stenolepis*, a small, shrimp-like marine crustacean of the order *Schizopoda*, so called because of the egg-carrying pouches between the thoracic legs of the female. See CRUSTACEA.

OPPELN, ȯp'pĕln', Prussia, river port and capital of a district in the province of Silesia, on the Oder, 51 miles southeast of Breslau, on the railway to Kattowitz and at a junction connecting it with Beuthen, Neisse and Tarnowitz. It has a church of Saint Adalbert, founded in the 10th century, and the 15th century palace of its dukes is situated on an island in the Oder. The town was in a prosperous condition as early as the 11th century, and was incorporated in 1228. In 1163-1552 it was the capital of the duchy of Oppeln. On the extinction of its line of dukes it became Austrian territory but was ceded to Prussia in 1742. There is a normal seminary and a Roman Catholic gymnasium. Manufactures include beer, cement, cigars, lime, lumber, machinery and soap; and there is an extensive trade in cattle, grain and the rich mineral products of the district. Pop. (1910) 33,907.

OPPENHEIM, ȯp'ĕn-hĭm, E. Phillips, English novelist: b. 1866. He was educated at Leicester, England, has become very popular there and in the United States. Among his published works are 'Enoch Strone'; 'A Man and his Kingdom'; 'A Millionaire of Yesterday'; 'The Survivor'; 'The World's Great Snare'; 'The Master Mummer'; 'Anna the Adventuress'; 'Mysterious Mr. Sabin'; 'The Traitor'; 'A Prince of Sinners'; 'Mr. Wingrave'; 'A Maker of History'; 'The Secret'; 'Conspirators'; 'The Missioner'; 'Jeanne of the Marshes'; 'The Illustrious Prince'; 'The Missing Delora'; 'The Falling Star'; 'Havoc'; 'Double Four'; 'Peter Ruff.' Later works include 'The Lighted Way' (1912); 'The Mischief Maker' (1913); 'The Way of these Women' (1914); 'The Amazing Partnership' (1914); 'The Game of Liberty' (1915); 'A Peoples' Man' (1916); 'Mr. Grex of Monte Carlo'; 'The Double Traitor'; 'The Hillman' (1917); 'The Wicked Marquis' (1919); 'The Curious Quest' (1919).

OPPENHEIM, James, American fiction writer: b. Saint Paul, Minn., 24 May 1882. He was a special student at Columbia University in 1901-03, and at the same time was assistant head worker at the Hudson Guild Settlement. He is well-known as a contributor of verse, short stories and articles to the leading American magazines. He edited, in 1916-17, the *Seven Arts Magazine*. Author of 'Doctor Rast' (1909); 'Wild Oats,' novel (1910); 'Pay Envelopes,' short stories (1911); 'The

Nine-Tenths,' novel (1911); 'Idle Wives' (1914); 'The Beloved' (1915); 'War and Laughter, poems (1916); 'The Book of Self,' poems (1917); 'The Solitary' (1919), etc.

OPPENHEIM, Lassa Francis Lawrence, Anglo-German international lawyer: b. Windekken, Prussia, 30 March 1858. He was educated at the universities of Göttingen, Heidelberg, Berlin and Leipzig. He was later lecturer and professor at the University of Freiburg, and in 1891 became professor at Basle. In 1895 he became lecturer at the University of London, and in 1908 he was appointed Whewell professor of international law at Cambridge University. He was naturalized a British subject in 1900. Author of 'Die Rechtsbeugungsverbrechen' (1886); 'Die Objekte des Verbrechens' (1894); 'Das Gewissen' (1898); 'The Science of International Law' (1908); 'The Future of International Law' (1911); 'The Panama Canal Conflict' (1913); 'The Collected Papers of John Westlake on Public International Law' (1914), etc.

OPPENHEIM, Nathan, American physician: b. Albany, N. Y., 17 Oct. 1865; d. 5 April 1916. A graduate of Harvard (1888), and of the College of Physicians and Surgeons (1891), he made a specialty of the diseases of children. He published in that field 'The Development of the Child' (1899); 'The Medical Diseases of Childhood' (1900); 'The Care of the Child in Health' (1901); 'Mental Growth and Conditions of Children' (1902).

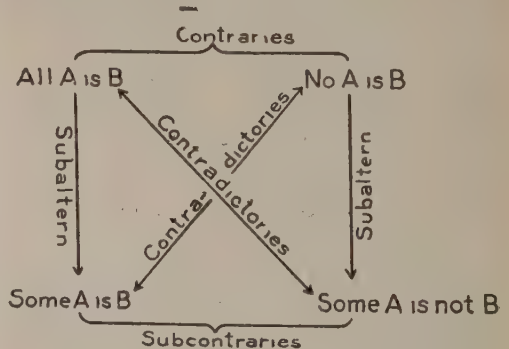
OPPER, Frederick Burr, American illustrator: b. Madison, Ohio, 2 Jan. 1857. He left school at 14, worked in a newspaper office and then in a store in New York, soon succeeding in getting his humorous sketches published. He was employed upon the Frank Leslie publications three years, and was associated with *Puck* 1880-99. In the last named year he joined the staff of the New York *American*. He has published several of his series of humorous drawings in book form, and has illustrated humorous books by Bill Nye, Eugene Field, Mark Twain and others, an edition of 'Mother Goose,' 'Æsop's Fables,' etc.

OPPERT, öp'pért (Fr. ö-pär), Jules, French Orientalist: b. Hamburg, Germany, 9 July 1825; d. Paris, France, 21 Aug. 1905. He was educated for the law at Heidelberg, studied Oriental languages at Bonn and Berlin and philosophy at Kiel. His first literary work, 'Das Laut-system des Altpersischen,' was published in 1847, and in 1848 he accepted a professorship of German at the Lyceum of Laval and two years later he went to Rheims in the same capacity. He was a member of the expedition sent by the French government to Mesopotamia in 1851; and on his return he laid before the institute his system of deciphering Assyrian inscriptions. In 1857 he was appointed professor of Sanskrit at the schools of the National Library; in 1869 teacher of assyriology in the Collège de France, and in 1874 he became full professor of the same subject in the latter institution, receiving election to the Académie des Inscriptions in 1881. He published 'Les Inscriptions des Achéménides' (1852); 'Grande Inscription du Palais de Khorsbad' (1863); 'Le Peuple et la Langue des Mèdes' (1879); 'Etudes sumériennes' (1881); 'Le Calendrier perse' (1899).

OPPIAN, öp'i-an, Greek poet: b. (at Korylus or Anazarbus in Cilicia) in the 2d century A.D. He wrote a didactic poem of five books on Fishing 'Halieutica' in lively but often tumid diction, and with correct and polished versification. A good edition of the 'Halieutica,' the 'Cynegetica' (and a paraphrase) is by Lehrs (1846). Another poem on Hunting 'Cynegetica' has been falsely attributed to him; but the diction is rough and the verse halting, and the work is no doubt the production of a writer of the time of Caracalla, 3d century A.D., to whom it was dedicated. Internal evidence would seem to show that it was written about 212 A.D. by another Oppian who came from Apamea in Syria. Consult Miller, 'Oppians des Jüngern Gedicht von der Jagd' (1885). Consult Draper and Jones, 'The Halieutica' (Oxford 1722); Mawer, 'The Cynegetica' (London 1786); Bourguin, E. J., 'Halieutica' (1877).

OPPIUS, öp-pi-üz, Caius, Latin author and friend of Julius Cæsar. He, with L. Cornelius Balbus, had charge of affairs in Rome during the absence of Cæsar. Suetonius (Cæsar 56), asserts that Oppius was believed by many to have written the histories credited to Cæsar chronicling the events of the Spanish, African and Alexandrine wars. The contention is now considered unwarranted as Oppius was in Rome during these campaigns and the writer evidently participated in them. He wrote a life of Cæsar, and of Cassius and the elder Scipio, but these are lost. Consult Schanz, M., 'Geschichte der römischen Literatur'; Teuffel-Schwabe, 'History of Roman Literature'; Nipperly, 'De Supplementis Commentarium Cæsaris.'

OPPOSITION, in logic, opposition of judgments is the relation between any two which have the same matter, but a different form, the same subject and predicates, but a different quantity or quality. There are four kinds of opposition, namely, contradictory, contrary, subaltern and subcontrary. The following diagram illustrates what is known as the square of opposition.



The assertion of a proposition is equivalent to the denial of its contradictory. Contraries can both be false but cannot both be true. Subcontraries can both be true, but cannot both be false. A proposition implies the truth of its subaltern. The validity of the square of opposition depends on the preliminary assumption that some A, the subject of discourse, exists. For example, you cannot conclude that because

no mermaids live in the sea, some mermaids do not live in the sea. See LOGIC; LOGIC, SYMBOLIC.

In *politics*, the party who, under a constitutional government, are opposed to the existing administration, and who would probably come into power on its displacement. A fair and temperate opposition is a wholesome check upon the party in power, as it is for its interest to demonstrate the injustice, impracticability or insufficiency of the laws or proceedings of the government; but, on the other hand, the despatch of public business may be seriously delayed by the conduct of a factious or obstructive opposition.

In *astronomy*, the situation of two heavenly bodies when they are diametrically opposed to each other, or when their longitudes differ by 180° . Thus there is always an opposition of sun and moon at every full moon; also the moon, or a planet, is said to be in opposition to the sun when it passes the meridian at midnight. Signified by the symbol $\circ$; as $\circ$ the opposition of Jupiter to the sun.

OPS, Roman female divinity of plenty and fertility. She was supposed to make her abode on the earth as the protectress of agriculture, and was worshipped usually in the temple of Saturn, whose wife she was believed to be. Newly born children were especially recommended to her care, and her festivals were called Opalia (19 December) and Opiconsivia (25 August).

She shared the Saturnalia festival with Saturn. At the Opiconsivia celebration, which seems to have been of a priestly character only the vestals and one of the pontifices were permitted to be present. As the mother of Jupiter, Ops was honored with Jupiter himself on the capitol. Not far from the temple she had also an altar in common with Ceres.

OPSONIN, a term applied by Sir Almworth Wright to the substance which is believed to exercise an opsonic or seasoning action in blood serum, rendering bacteria susceptible to phagocytosis. Based upon the researches of Metchnikoff, who founded upon the phagocytosis process a theory of immunity to disease, the study of opsonin by Wright, Douglas and others led to the formulation of the opsonic index which furnishes a record of the condition of tubercular patients subjected to vaccine treatment. See PHAGOCYTOSIS.

OPTIC, Oliver. See ADAMS, WILLIAM TAYLOR.

OPTIC AXIS. See LIGHT.

OPTIC NERVE. See EYE.

OPTICAL GLASS. See GLASS, VARIETIES OF.

OPTICAL ILLUSION. See ILLUSION.

OPTICAL IMAGES. See LIGHT.

OPTICAL LANTERN, the highest development and refinement of the magic lantern (q.v.). Like its progenitor, it consists essentially of a source of light of a brilliancy adequate to its designed use, a condensing system of lenses to gather and concentrate the light rays upon the object to be illuminated, and a projection system of lenses to magnify and define the enlarged image upon a screen or blank

wall. In the gathering of these essentials into one convenient instrument a general pattern prevails, but there are minor differences in the designs of the various manufacturers which do not, however, affect the working results in any considerable way.

Although its most common use is for the exhibition of transparent photographic pictures by transmitted light, in churches, halls and lodge rooms, the optical lantern is very largely employed in educational work for lectures in class-rooms. In the State of New York there is maintained as a part of the educational system a department of visual instruction possessing a collection of 300,000 educational lantern slides which are loaned free of charge to schools making proper application for them. Many individual schools throughout the State own an optical lantern, and make frequent use of the slides offered by the State department. A more scientific use of the optical lantern is in the study of the enlarged images of microscopical subjects and other scientific photographs. With suitable attachments it is possible to use the lantern to great advantage in the study of polarized light and in spectrum analysis.

The sources of light available for use in the optical lantern are practically two—the oxyhydrogen or calcium light, and the electric arc light. The calcium light (q.v.) will give adequate illumination for screen pictures up to 15 or 16 feet square, and under favorable conditions even to 18 feet square. From 18 up to 25 feet square no light is sufficient but the electric arc. In the latter case the direct current is almost a necessity. The alternating current can be used, but it is so noisy as to be offensive. The handling of the current and connections requires an operator conversant with electrical equipment, as many precautions must be taken. The strength of current best suited to use in the lantern is 50 volts, and the usual voltages of 110 volts and 220 volts should be reduced to 50 by a suitable rheostat. The brilliancy of the arc light as used in lanterns ranges up to 3,000 candle-power. In the case of the calcium light, the necessary oxygen and hydrogen gases are found on the market in most cities in cylinders in condensed form, under pressure of 225 pounds per square inch. The apparatus for burning these gases in the lantern is known as a jet. In the preferred form the gases are conducted separately to the two tubes of the jet, and pass through these tubes into a mixing chamber which is packed with wire gauze or finely perforated metal plates. From the mixing chamber projects a spout which delivers a jet of the mixed gases slantingly upward against a cylinder of lime about one-fourth of an inch distant.

The hydrogen gas is first turned on at the cylinder valve, and lighted at the jet. The oxygen gas is then admitted slowly into the jet, and the combustion of the hydrogen in the oxygen produces the intense heat necessary to render the lime cylinder incandescent. The impinging of the current of gas upon the lime wears it away gradually, and necessitates the revolving of a new face to the flame. The necessary paraphernalia for this movement forms a part of the jet. Another form of jet, known as the "blow-through" jet brings the hydrogen gas to the mouth of the spout in a ring-shaped

aperture, forming a conical flame, and the oxygen is delivered into the centre of this cone. With the blow-through jet a soft lime is required; with the mixed-gas jet the lime should be hard. The usual size of the lime cylinders is one inch in diameter. A somewhat larger picture may be forced when necessary by using a larger lime—up to one and one-half inches in diameter, but at the expense of equal sharpness in the picture, and a larger consumption of gas. While the electric light gives a more brilliant picture, the quality of the oxy-hydrogen light is more agreeable, being “warmer” and of a mellow character, where the electric light is “cold” and harsh. The brilliancy of the oxy-hydrogen light as used in the lantern is

convex lens with a plano-concave lens cemented on the rearward surface, the plane side toward the light. At the rear end of the mounting are two lenses set a very small distance apart—a double-convex lens toward the rear, and a thin concavo-convex lens in front of it, with its convex face toward the front. These lenses are graded according to the photographic plate with which they are commonly used in making portraits—as quarter-plate and half-plate lenses. The quarter-plate lens is used generally on lanterns, as it gives a 10-foot picture at 20 feet distance from the screen; and a 20-foot picture at 40 feet. These proportions are adaptable to the large majority of public halls, and to the average church and class-room. The

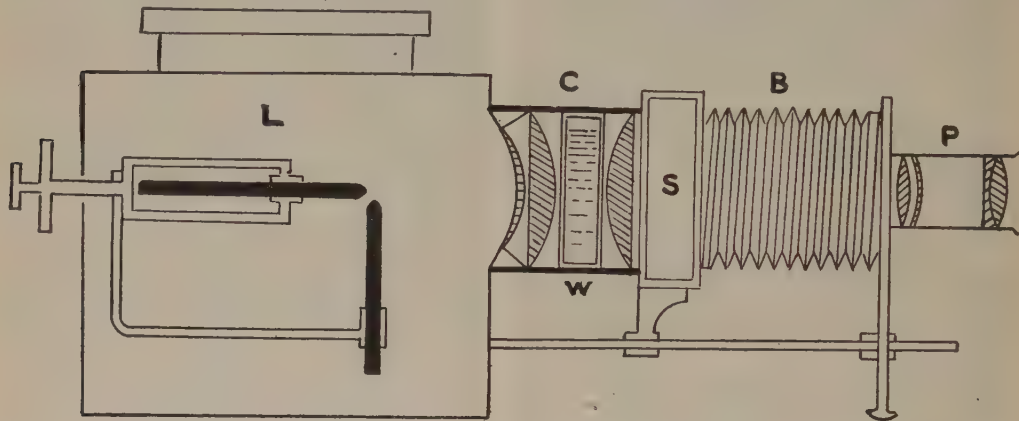


FIG. 1.

about 600 candle-power, and thence up to 800 candle-power under the most favorable conditions.

The light produced is gathered and concentrated by the condensers, a system of two or three lenses set from four to six inches from the source of light. This distance can be adjusted in the lantern by sliding the light mechanism forward or backward, as may be indicated by the circle of light thrown upon the screen. Where the condensing system is of two lenses, they are plano-convex lenses of four to four and one-half inches in diameter, their convex sides toward one another, and about three-fourths of an inch apart. Sometimes these lenses are set far enough apart to allow a glass cell filled with water to be inserted between them, to cut out heat rays which might damage the objects being shown—as in the case of living animalculæ. Where a third lens is added to the condensing system it is a concavo-convex lens, placed at the end of the condenser mount nearest the light, and with the concave side turned thereto. It is somewhat smaller as to diameter than the other two. There is much dispute among lanternists as to whether the third lens adds any advantage. It is useful in certain conditions, but it is an optical fact that every new lens added to an optical instrument reduces the amount of light passing through, unless it is joined to the others by cementation.

The projecting lenses are of the type known to photographers as portrait lenses. The combination is made up of four lenses in one tube or mounting. In the forward end is a double-

“third-plate” size, intermediate between the other two, is useful in the larger cities, where it is desirable to put the instrument in a gallery. Having a longer focus, it gives a smaller image on the screen as compared with the distance; an 8-foot picture at 20 feet; a 16-foot picture at 40 feet; a 24-foot picture at 60 feet. The standard for quality in projection lenses is the Darlot portrait lens, made in France. But the American lenses of the same type are at least fully as good.

Having provided these essentials, instrument makers vary the housing and the framework with which they are mounted for convenient use. The accompanying sketch in Figure 1 shows the customary arrangement for exhibition purposes. L is the lamp house showing the position of the carbons of the electric light, the horizontal carbon being placed accurately in the optical axis of the instrument. C is the three-lens condensing system, with a water cell, W, in place. S is the slot for the slide carrier. B is the light-tight bellows which allows the projection lens to be run back nearer to the light, for focussing. P is the projection system of lenses.

In Figure 2 is given a sectional diagram (in elevation) of the lantern used to project images of opaque objects. L, L, indicate the positions of the carbons in the two lamp houses; C, C, the two condensing systems for throwing parallel rays upon whatever object is placed upon the field (F). The projecting lens system (P) is of much larger aperture in proportion than with the ordinary optical lantern, as the image is made up of light rays reflected

from a surface more or less absorbent of light, instead of being the direct rays of the arc passing through a transparent medium. The rays forming the image pass upward through the projecting system and strike upon the tilting mirror M, being thence reflected to the screen. Both lanterns may be used for an intense illumination, or one may be used to give high

effects known as interference colors, shadows known as interference figures and the like. By these means it is possible to study very small mineral grains in a rock, and identify the minerals, when it would not be possible to recognize them in any other way. This study is known as Optical Mineralogy and it forms the basis of all microscopic study of rocks,

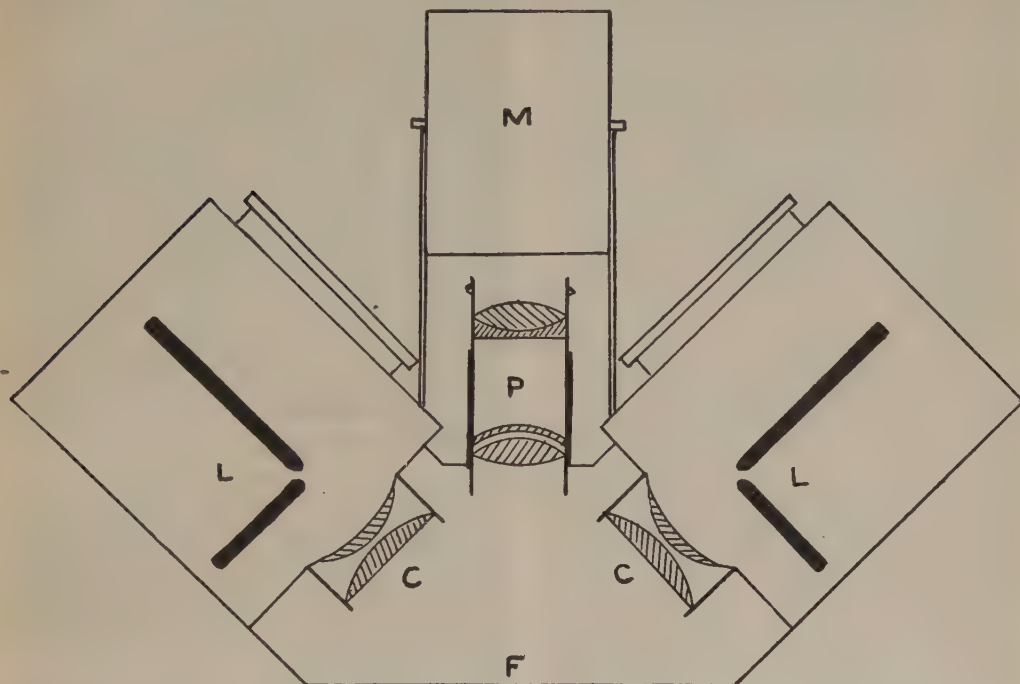


FIG. 2.—Elevational Diagram of Lantern for Projection of Opaque Objects.

relief, or the intensity of either lantern may be varied.

Attachments of several kinds are provided for educational work, including a moving picture apparatus, microscope, etc. See LANTERN SLIDES; MAGIC LANTERN; MOVING PICTURES. Consult Fraprie, F. R., 'How To Make Lantern Slides' (Boston 1918); Gage, S. H. and H. P., 'Optic Projection' (New York 1914); Niewenglowski, G. H., 'Traité Pratique des Projections Lumineuses' (Paris 1910); Norton, C. G., 'The Lantern and How to Use it' (London 1901).

OPTICAL MINERALOGY, the study of minerals by means of their optical properties, in other words by means of their effect on light. The minerals or rocks are ground into sections .03mm in thickness, in which condition most minerals are transparent. Each different mineral has its own peculiar effect on polarized light, especially as seen under the microscope. In some cases the minerals absorb rays of certain color more readily than others, or absorb certain rays more when the light passes through in one direction than in another. Some minerals have the power of breaking light up into an ordinary and an extraordinary ray, one of which travels faster than the other. This property, known as double refraction, possessed by certain minerals, produces a host of phenomena under the microscope, such as color

Petrography. See PETROGRAPHY; MINERALOGY; POLARIZED LIGHT; MICROSCOPE.

OPTICAL PHENOMENA OF THE ATMOSPHERE. See LIGHT.

OPTICS. See LIGHT.

OPTIMISM (Lat. *optimus*, best), the opinion that this world, physically, socially and morally, is the best that could possibly exist. It is opposed to pessimism (Lat. *pessimus*, worst), the opinion that this is the worst possible world. The optimist looks upon existence as a great and unmixed good. Some advocates of optimism have maintained that while the Author of all things was not compelled to produce the best and happiest order to things, he has in fact actually done so, because the presence of evil teaches mankind to discern and choose the good, by striving through suffering and self-exertion to attain the blessedness which is within the reach of all alike. Other optimists reason *a priori* that it is impossible that God could produce anything that was not the best; that in spite of evil and suffering, it harmonizes with the idea of His perfect goodness to infer that the motive for the creation of man is stronger than that for non-creation, in that life affords means of enjoyment which are unquestionable and give the opportunity and capability of attaining perfection. The discussion as to the preponderance of good or evil in the world and their admixture was maintained by

the fathers of the Church and by the schoolmen. In modern philosophy optimistic tendencies have been exhibited by Descartes, Malebranche and Spinoza, but the full development of the theory was left to Leibnitz (q.v.); who in his 'Theodicée' elaborately expounds the thesis that the present world is the best possible creation, and the most perfect that omnipotence would produce. The word 'optimism' is also used to designate that attitude to life which always looks on the bright side of things, without necessarily involving any philosophic theory. That view which, without necessarily committing itself to the belief that this is the best of all possible worlds, believes that it exhibits a general tendency of improvement, or that it can be improved through our efforts, is known as *meliorism*. See PESSIMISM.

OPUNTIA. See PRICKLY PEAR.

QUASSA, or QUASKY, Trout. See TROUT.

ORACH, or ORACHE, a weed. See GOOSE-FOOT.

ORACLES, responses believed to be given by a deity to a worshipper or inquirer. There were in ancient Egypt oracular shrines, or oracles, as there were in many other countries; but by far the most celebrated were those of Greece. The oracle at Dodona, in Epirus, the oldest in Greece, appears to have originally belonged to the Pelasgians. Everything points to a native origin, but at a later period Egyptian influence produced important changes, notably the substitution of priestesses for the earlier male interpreters known as Selli. At this oracle Zeus himself was supposed to speak to men through the rustling of the leaves of a lofty oak (pointing back to primitive nature worship). Other forms of divination were introduced from time to time, such as the striking of metal basins. From Plato we learn that in his day the priestesses, following the example of those at Delphi, made their pronouncements in a state of religious frenzy. Dorimachus, an Ætolian general, razed the temple of Zeus here to the ground in 219 B.C., and the oracle appears never to have recovered from the blow. Not so old, but far more important, was the oracle of Apollo at Delphi, in Phocis, where the oracular declarations were made during a period of frenzy by the Pythian priestess seated on a tripod over a chasm from which a peculiar exhalation was supposed to issue. This was the chief national oracle of the whole Hellenic race, and its influence on Greek history must have been considerable. It was sometimes consulted also by foreigners. It attained the zenith of its power in the 6th century B.C., and from the time of Alexander the Great its influence was of little account. Other noteworthy oracles of Apollo were those at Abæ in Phocis, at Thebes in Bœotia, at Hysia in Bœotia, at Claros in Miletus, at Gryneia in the Æolian territory of Asia Minor, at Argos and at Delos. Oracles of other gods, such as Dionysus, Hermes and Pan, are mentioned, and there were also oracles of heroes such as Asclepius, Heracles, Trophonius (a famous one at Lebadea in Bœotia), Tiresias, Amphiaraus, Mopsus and Colchus. The spirits of the dead were supposed to utter oracular sayings in certain places, especially near Lake Aornos among the Thracians and at Tanarus in the south of La-

conia. In Italy the only oracles in the strict sense of the term were the temples of Fortune at Praeneste and Antium. The oracles were consulted at the outset of every great undertaking, such as the founding of a city or colony, the declaring of war or the conclusion of peace; but their responses were generally expressed in more or less ambiguous language. In an age when the principles governing the laws of nature were unknown and when superstition held its grip on the educated almost as firmly as on the illiterate, scarcely anything, however important or unimportant, was undertaken without consulting the oracles. The kings of Egypt, Assyria, Babylonia, Rome and Greece sought the advice of the oracles before undertaking any move of importance and biblical history shows the Jews, though disclaiming these heathen practices, placing faith in dreams and revelations which had their origin in the same source. Consult Bouché-Leclercq, 'Histoire de la Divination dans L'Antiquité' (1879-82); Myers, W. F. H., 'Greek Oracles' (London 1897); Farnell, L. R., 'Cults of the Greek States' (Oxford 1907); König, 'Das Orakelwesen im Alterthum' (1877); Schneider, 'Die Divinationen der Alten mit besonderer Rücksicht auf die Augurien der Römer' (1862).

ORAL HYGIENE. See HEALTH EDUCATION.

ORAN, ô-rân' (Fr. ô-rôn), Algeria, (1) a town, capital of the department of the same name and on a bay of the same designation in the Mediterranean, 209 miles by rail southwest of Algiers. It rises in the form of an amphitheatre, on the side of Mount Murdjadjo, has quite the appearance of a French town and is mostly modern. It is strongly fortified by works of recent construction. Among the buildings may be mentioned the cathedral, the grand mosque, the citadel or castle, the Kasbah or old citadel and the large military hospital. There are two harbors, an old or inner, 10 acres in area, and a new or outer of 60 acres area. The principal articles of export are esparto grass, cereals, wine, olives, tobacco, hides, skins, cigarettes and cattle. Pop. about 130,000, of whom three-fourths are Europeans. The town was built by the Moors. It was captured by the Spaniards in 1509, by the Turks in 1708 and again by the Spaniards in 1732. It was destroyed by an earthquake in 1791 and shortly after abandoned by the Spaniards. In 1831 it came into the possession of the French and has been developed by them into a large and prosperous town. (2) The department, forming a long belt along the Mediterranean, bounded on the east by the province of Algiers, south by the Sahara and west by Morocco, has an area of 25,650 square miles and a population of 1,231,000. Among the communes are Sidi bel Abbès, 31,000; Mostuganem, 24,000; Mascara, 25,000; and Tlemcèn, 40,000.

ORANGE, ôr'ênj, Prince of. See WILLIAM THE SILENT, PRINCE OF ORANGE; WILLIAM III, KING OF ENGLAND; MAURICE OF NASSAU.

ORANGE, Cal., city in Orange County, 30 miles southeast of Los Angeles, near the Santa Sua River, and on the Southern Pacific and the Atchison, Topeka and Santa Fé railroads. The city is situated in a productive fruit region and

has canneries, packing plants and other establishments connected with the fruit industry. Poultry raising is also being developed extensively. Pop. (1920) 4,884.

ORANGE, Conn., town in New Haven County, near Long Island Sound, and on the Housatonic River, six miles southwest of New Haven, on the New York, New Haven and Hartford Railroad. The town is the centre of a productive agricultural region and manufactures automobiles. Pop. 13,094.

ORANGE, Mass., town, Franklin County, on Miller's River and on the Fitchburg Railroad, 37 miles north-northeast of Springfield. The town includes the villages of Orange, North Orange and Tully. The town was incorporated in 1810. The surface is very uneven, the village of Orange being built on a hill that rises abruptly from the river. Orange is one of the most enterprising manufacturing towns of the county. The manufactures include sewing machines, motor-carriages, water-wheels and other machinery, furniture, boxes, shoes and clothing. It has three handsome parks and a public library. Pop. (1920) 5,393.

ORANGE, N. J., city in Essex County, on the Delaware, Lackawanna and Western and the Erie railroads, about four miles west by north of Newark. It has electric railroad connections with Newark, Jersey City, East Orange, South Orange, Bloomfield, Montclair and other cities and towns in the vicinity. Orange was settled about 1666 by a colony from Connecticut. At first it was a part of Newark and was called "Newark Mountain." The residents of "Newark Mountain," in 1718, established a separate church, and the organization was known as "The Mountain Society." This same church was known in 1781 as the "Second Church of Newark," and now (1904) as the "First Presbyterian Church of Orange." In 1790 a further separation took place, and the place was called Orange Dale. In 1806 Orange became a separate town, incorporated under the name of Orange. Other divisions were made and South, West and East Orange were established in the years 1861, 1862 and 1863, respectively.

Orange is on an elevation, the lower slope of Watchung Mountain, a ridge extending northeast and southwest, rising in some places 650 feet above tidewater. The town itself is from 150 to 200 feet above sea-level. Adjoining the city or in the near vicinity are Hemlock Falls, in South Orange; Llewellyn Park, which contains 750 acres, and many fine residences, West Orange. Eagle Rock, an eastern crest of the mountain, is now within the limits of the Essex County Park System. The city and vicinity have miles and miles of good roads, many shade trees and long lines of well-kept hedges. Orange and all the "Oranges" are residential sections for New York business men, many of whom have their homes there, while others remain only during the summer months. The city has considerable manufacturing interests, among which are hat factories, for which Orange is noted, printing plants, lawn mower establishments, breweries and chemical laboratories and the Edison laboratory near Llewellyn Park. The number of employees in the manufactories is about 5,000. The city has an extensive trade in hats and considerable trade in other manufactures and fruit. Some

of the prominent buildings are the Metropolitan building, Music Hall, Masonic Temple, Decker building, the "First Presbyterian Church," already mentioned, the original still standing, but several times remodeled, and the church, school and library buildings. It has a House of the Good Shepherd, an orphanage and the Orange Memorial Hospital. The educational institutions are public and parish schools, the Stickler Memorial library, a city library, the Orange Training School for Nurses, and at South Orange, Seton Hall College, a Roman Catholic institution for boys and men. The Locke College for Boys and other private schools are in the "Oranges." There are 20 churches, representing a number of denominations. The city has a number of organizations whose objects are educational and charitable, as the Mendelssohn Union, a Bureau of Associated Charities, a New England Society and several literary societies. It has also a number of athletic and social clubs. The government, administered under a revised charter of 1879, is vested in a mayor and council, who appoint or elect the administrative officials, except the board of education, which is chosen by popular vote. The city owns and operates the waterworks. Pop. (1920) 33,239. Consult Wickes, 'History of the Oranges from 1666 to 1806' (1892); Whittemore, 'The Founders and Builders of the Oranges' (1896).

ORANGE, Tex., city, county-seat of Orange County, on the Sabine River, at the head of navigation, and on the Orange and North-western and the Southern Pacific railroads, 85 miles northeast of Galveston and 20 miles east of Beaumont. It is the shipping centre for the surrounding region, exporting rice, cotton, sugar and livestock. It has several large lumber mills, shingle and saw mills, and also oil, paper, cotton gins and a rice mill. The public schools include a high school for the colored race. The city owns and operates the waterworks. Pop. (1920) 9,212.

ORANGE, Fort, a former fort built in 1623, on the site of the present city of Albany, N. Y. It was erected by the Dutch as a defense work against the Indians.

ORANGE CITY, Iowa, town, county-seat of Sioux County, on the Chicago and North-western Railroad, 40 miles north-northeast of Sioux City. It is in an agricultural and stock-raising district. Its most notable public building is the county courthouse. It is the seat of the Northwestern Classical Academy (coeducational), founded in 1882 under the auspices of the Reformed Church. Pop. (1920) 1,632.

ORANGE FREE STATE, Province of the, South Africa, early known as ORANGE RIVER COLONY and from 1854 as ORANGE FREE STATE, in 1900 was annexed by Great Britain after joining in the Boer invasion. On 20 Sept. 1909 it was made part of the Union of South Africa (q.v.). It is bounded on the north by the Transvaal, east by Natal, southeast, south and southwest by Basutoland and Cape Colony, and west and northwest by Griqualand West and South Bechuanaland. Area, over 50,000 square miles, divided into 19 districts. Capital, Bloemfontein (q.v.) connected by rail with Cape Town and Port Elizabeth, and also with the

Transvaal and Natal. The country generally consists of vast undulating plains, lying 3,000 to 4,000 feet above sea-level affording good pasture lands, and interspersed in many places with rocky hills called kopjes. The country is cold in winter, and in summer is liable to violent thunderstorms and long droughts; the climate, however, is generally healthful. The rivers that intersect the country are all small, and the boundary rivers, the Vaal and Orange, are unavailable for traffic. Agriculture and pasturing are the chief occupations, and wool, hides and ostrich feathers the principal exports. Grazing is still the chief industry of the state, but agriculture is becoming yearly of more importance. Among the agricultural products which are growing in output from year to year are wheat, oats, corn, potatoes and tobacco. Of these corn is by far the most important crop, amounting, in normal times, to over 7,000,000 bushels. Some 35,000,000 pounds of wool are produced yearly. Diamonds and other precious stones have been found in paying quantities, rich coal mines exist, and the state is said to abound in other mineral wealth. Gold was discovered in 1887. The diamond mines are at Koffyfontein, Jagersfontein and in the neighborhood of Kroonstad. The value of the diamonds mined in the state is over \$7,000,000 a year.

The state has about 1,200 miles of railway which traverse the middle of the country, southwest and northeast from border near Colesberg to the Transvaal border at Vereeniging. Branch lines connect the trunk line with the Natal system, Frankfort and other points.

As a member of the Union of South Africa, the Orange Free State has an elective provisional council of 25 members with power to legislate on all local matters not affecting the Union as a whole, the executive committee of four members selected by the provisional council and an administrator appointed by the governor-general. The state is represented in the House of Assembly of the Union by 17 members. The government aided schools number somewhat less than 1,000; at all of which fees are charged.

Prior to 1836 this region was inhabited by Bushmen, Bechuanas and Zulus. The colony was founded in 1835-36 by Dutch settlers from Cape Colony. It was annexed by Great Britain in 1848 in order to put a stop to the Boer outrages on natives; but in 1854 it was recognized as an independent state. The language of the country is a Dutch dialect, and the Dutch Reformed Church is the dominant religion. Under its independent régime the executive was entrusted to a president elected for a period of five years by universal suffrage; while the volksraad or parliament, elected for four years, exercised legislative functions. The history of the Orange Free State till 1899 was one of steady, peaceful progress, interrupted by hardly any stirring event, except some fighting with the Basutos down till 1869, and a more serious quarrel with the British government in 1871 concerning the Kimberley region. The latter dispute was settled by arbitration, under which the British government agreed to pay £90,000 to the Free State as compensation for its loss. In 1889 the state was admitted into the Customs Union of South Africa, and in that year also

the railway from the Orange through Bloemfontein to the Vaal was completed. The greatest president of the state was Johannes Hendrikus Brand, afterward knighted as Sir John Henry Brand, who held office from 1863 till 1888. His successor was Francis William Reitz, who was latterly state secretary of the Transvaal republic. The last president of the state was M. T. Steyn, elected in 1896 and re-elected in 1901. In 1897 an alliance with the Transvaal for mutual defense was confirmed. When the war between Great Britain and the Transvaal broke out in October 1899 the Free State Raad decided to stand by its alliance treaty, and joined the Transvaal in the invasion of British territory. After the state had been invaded from the west and Bloemfontein occupied, it was annexed to the British Empire under the name of Orange River Colony, by proclamation of date 28 May 1900.

In 1907 self-government was granted and this was maintained until 31 May 1910, when the colony was consolidated in the Union of South Africa as the province of the Orange Free State. Pop. about 200,000 whites, 360,000 colored, most of the latter being Bantus; total 560,000. See SOUTH AFRICAN WAR.

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ORANGE INDUSTRY, The. In international commerce the orange is the most important fruit marketed in the fresh state. It is grown in warm parts of all the continents and enters important market channels from two—Europe and North America, while in the popular mind the apple is doubtless placed first it occupies a secondary place because in only North America and Australia is it planted on a large commercial scale and its fruit goes mainly to temperate climate markets whereas the orange commands a market range from the equator to the limits of civilization. The grape, fresh, dried as raisins, manufactured as wine, juice and jelly, has always been and is still greater in the value of its contribution to commerce and in the distance it safely traverses, but the grape rules not as a fruit, but through its manufactured products, while the orange carries its natural beauty, fragrance and flavor unchanged around the world. The date is also an important rival as a world food, but its use, though worldwide, is more important in countries where it is indigenous. From the earliest times the orange has not only been accepted in northern climes as an expressive exponent of tropical and subtropical salubrity, but by its own distinctive characteristics as a fruit it has won recognition as befitting the highest uses of mankind. By its nature, too, the orange ministers to its own commercial popularity. It endures long shipment; it ripens slowly and through a season of several months which con-

stitute the winter in northern latitudes when local fruits are scant or absent and the refreshment in the citric juices most welcome. The production of such a commercial commodity has from the earliest times constituted an important industry.

Though the orange thrives in the tropics it will withstand a few degrees—seven is the lowest record in Florida—below freezing point; but where frost is likely to occur the risk is considered too great for commercial ventures.

The fruit grown in semi-tropical countries, especially those which have a more or less distinctly marked two-season climate, differs in character from the strictly tropical orange. It is firmer, heavier, more sprightly in flavor and has much better keeping and carrying qualities. The tropical orange has but small commercial importance; the semi-tropical orange rules in the markets of the world. That the semi-tropical orange should have this distinctive character is most fortunate, for it ministers directly to the will for industry which is superior in semi-tropical countries.

Thus its ability to withstand slight frosts of short duration has enabled it to supply a market range of 70° of north latitude and more than 50° of south. Though the tropical orange might reach most distant markets in small quantities, it could never attain the commercial supremacy which the fruit now enjoys.

The sweet orange, which is the species from which commercial varieties have been developed, is a native of eastern Asia whence it was carried to India, to Asia Minor and to Mediterranean countries especially in southern Europe. It possibly reached Portugal from India through the early Portuguese navigators. Thus the distribution of the fruit was westward. The history of modern commercial orange growing consists of a series of progressive movements always trending westward and gaining in volume—the newer centres of production outstripping the older and ultimately largely displacing their product in the greatest markets of the upper divisions of the Temperate zone. When the Moors introduced orange growing into Algeria and Spain they displaced the traffic from Asia Minor and gave the Mediterranean region for several hundred years undisputed possession of the markets of the north of Europe and possession also of the American demand when that arose. When the Spaniards and Portuguese carried the orange to the West Indies and to Florida they laid the foundation for an industry which American enterprise developed in Florida until that district not only contended with the Mediterranean region for American markets, but was planning to invade northern Europe by direct shiploads, but the demonstration came that the climate of northern Florida and of the Gulf Coast westward was too treacherous for commercial ventures in orange-growing—at least with the popular varieties and proved methods of propagation.

When the Florida supply failed through the severe freezing of 1894-95, California came forward and is now not only supplying four-fifths of the oranges consumed in the United States, but is selling the highest priced oranges in the London market against a world of competitors. This competition with the product of California

is working hardship in the Mediterranean region because that region can more than supply Europe and needs American markets as an outlet. Italy has exported \$6,000,000 worth of oranges and lemons in a year, but since the first of this century prices have declined and the interest is depressed. Every effort is being made to secure relief from local taxation and from duties imposed by north European countries. The Spanish product of oranges and lemons, which ranks next to the Italian, has to meet heavy tariffs in all countries except the United Kingdom and the belief at Valencia as far back as 1902 was ('U. S. Commercial Relations,' Vol. 2, 1902, page 686) that the limit of British markets' consumption of Valencia oranges at paying rates has been reached; in fact, the British markets collapsed under the heavy shipments of 1901. When it is stated that the value of oranges imported into the United Kingdom in 1900 was \$10,603,950 and such a free buyer has more than enough, it can be realized how important it is to the Mediterranean producers that the populous countries of central Europe should hold less strictly to agrarian interests which aim to hamper the entrance of food supplies even if they cannot themselves produce them. Manifestly the American product can enter such markets only with a fancy product which will win an extra price, except as a little difference in the ripening season may afford an opportunity.

The commercial position of the orange in the United States is also such as to awaken apprehension. The present strength of the situation lies in the protective tariff and the *bête noir* of growers is the possibility of making gaps in it by reciprocity treaties. The product of the West Indies is a direct menace to the Florida product, which meets it in point of market season and the Mexican product, which is undergoing expansion at the hands of American capitalists, is constantly feared by the California growers because the Mexican railway will give it quick entrance to the great central States and consequent advantage in distribution to the East and the Northwest. The orange from the West Indies and South Florida is different from the California orange in main ripening season and in character of the fruit, but the differences do not give full relief. With the late ripening varieties, the California grower extends his shipments into the autumn and thus laps upon the early fruit from Florida and Jamaica, while the parts of California which bring earliest maturity to the fruit are shipping before the southern fruit is cleared away. In fact, California of itself can keep the markets supplied with oranges fresh from the trees and in prime condition the year around.

As to the difference in oranges grown under humid and arid conditions, the moisture being supplied by rainfall in one case and by irrigation in the other, the arid-region orange shows superior density, thinness and texture of rind, higher sugar and acid percentages and a more sprightly or vinous flavor. The popular conception of the superior sweetness of the orange grown in humid countries is due both to a greater amount of sugar in the juice and to a less amount of acid; for determinations of sugar and acid in fully ripe navel oranges grown in southern California and in Florida

show the former to contain approximately 10 per cent of sugar and $1\frac{1}{2}$ per cent of acid, whereas the latter contains about 2 per cent less sugar and scarcely 1 per cent of acid.

The quality of an orange is largely inherent in the variety, but all varieties are similarly changed by growth under humid or arid conditions of climate and soil and this modification becomes a factor of much industrial importance. This fact is strikingly illustrated in California by the standing of the navel orange which has been grown for a century or more as the chief orange in Bahia, Brazil, whence it was imported. In Brazil it demonstrated no shipping qualities and according to Burke ('U. S. Special Consular Reports,' Vol. I, p. 411) would need to be picked before maturity if to be shipped, while, as grown in California and Arizona, it is picked at full maturity and is successfully shipped all over the United States and to Europe.

Orange growing in Florida has recovered from the serious reverses prior to 1900. The product of 1894 was about 6,000,000 boxes. Then came the disastrous freezing in December of 1894 and February 1895, with a temperature of 14° F. at Jacksonville. In the latter year only 75,000 boxes were shipped. In 1903 the product was about 900,000 boxes. Confidence is being restored by the safety of the trees in the southern half of the State and by the promising results of trial of hardier varieties in the older citrus district in the northern part.

In Louisiana the freezing of 1895 nearly annihilated the citrus fruit interest. Not until about 1910 was there evident a disposition to resume production on a commercial scale. In the Gulf parts of southwestern Texas and in the southwestern corner of Arizona the navel orange is being grown on a small business scale for shipping to distant markets. Conditions favor early ripening and an advantage is secured by sale in advance of the main California product. From California the shipments of oranges beyond State lines in 1913-14 were over 48,500 carloads. This is the largest crop in the history of the State, though the season of 1910-11 approached it with nearly 46,400 carloads. Only in two other years has the crop exceeded 40,000 carloads.

Planting during the last two decades has been very active. It is estimated that in 1915 the California citrus industry, including grape fruit, lemons, etc., represented a capital of \$200,000,000, a labor employment of 40,000 people and an area of 200,000 acres. The orange is by far the most important of the fruits represented by these figures. The orange industry of the United States is now largely supplying the home demand for the fruit. Imports of oranges reached their highest value in 1883 at \$3,010,662 and have since then declined. The value in 1910 was \$82,546, of which one-half came from the British West Indies; a quarter from Italy and an eighth from Mexico.

The orange industry of the United States is unique in the high social and financial standing of those who have engaged in it and in the striking features of its development. Both in Florida and in California large scale production was first undertaken by northern men who had gained wealth and had lost health in pursuit of it. They brought capital and commercial ability to the ventures which they exploited. The professional classes of the North also par-

ticipated largely in the work, bringing scholarship, insight and experience in organization. There were a few also who possessed horticultural experience, but the other classes largely predominated. The result has been the development of an industry characteristically American in spirit and new in methods. It has borrowed very little from the practices of Old World orange growers. Free from tradition and prejudice, it proceeded rapidly upon the results of original investigation and experiment, establishing a system of culture and of commercial handling of the product which are without precedent in the older orange regions of the world. For the care of the orange orchard, see ORANGE AND ORANGE CULTURE.

ORANGE-MELON, a sort of muskmelon. See MELONS.

ORANGE OIL, an essential oil obtained from the rinds of oranges and used in manufacturing perfumes and liquors. The oil is extracted either by distillation or by expression, generally under warm water. The oil, being lighter than the water, rises to the surface, from which it is skimmed off. Another method of extraction is to press the peel of the fruit against a flat sponge which absorbs the oil as it exudes from the broken cells. Orange oil consists of over 90 per cent limonene or terpene with small amounts of citrol, citronellol and other component parts. It is usually of a pale yellow color, of specific gravity between 0.846 and 0.853. The greater part of the orange oil of commerce comes from Italy, Sicily or Southern France—orange-flower water is produced by steam distillation and has a specific gravity of 0.87 to 0.88; while orange-leaf varies from 0.885 to 0.900.

ORANGE AND ORANGE CULTURE, various species of the genus *Citrus* (family *Rutaceae*), and their fruits. The most important species is the sweet orange (*C. Sinensis*) which is the parent of most of the commercial varieties. It is a small, branching long-lived tree or shrub, with oval or elliptical, evergreen, apparently simple but really compound leaves and very fragrant white flowers. The fruits are globular or elliptical, and vary considerably in size. Botanically considered they are berries divided into 8 or 10 cells (locules) filled with a juicy and more or less acid pulp. The tough, yellow rind is valued, especially in some varieties, for its oil, which is extracted for use in flavoring and in perfumery. The flowers also are employed in decoration and worn as a significant ornament, especially by the bride, at her wedding. But it is as a dessert fruit, and for the manufacture of preserves, marmalade, etc., that the orange is of chief importance. For these purposes the tree has been taken from its presumably native home in southeastern Asia to all tropical and sub-tropical climates in the civilized world, and is cultivated extensively in many places not only to supply the local demands, but for the shipment of its fruits to climates beyond its range of cultivation. See ORANGE INDUSTRY.

In the United States the two important commercial regions of orange growing are Florida and southern California. In the former the region of successful cultivation has been restricted by experience of killing frosts to the southern counties, although previous to 1894 the



ORANGE, FRUIT, LEAF AND BLOSSOM

orange-growing region extended over most of the peninsular parts of the State. In many places the trees were growing wild when the State was settled, and it is surmised that these trees were the progeny of specimens introduced by the Spaniards in the early days. A third region is the delta of the Mississippi River. Parts of southwestern Texas and southwestern Arizona have been found suitable to commercial orange culture.

The species mentioned above has developed several well-marked botanical varieties, each of which has more or less horticultural forms. The most important botanical variety is *sinesis*, which is the immediate parent of the common sweet orange, and the Portugal or Malta orange. In the United States about 80 of the numerous varieties are cultivated, though those of commercial importance are scarcely more than a score.

They are characterized by usually round fruits, which are generally sweet or slightly acid, and have a sweet aromatic skin highly valued in cookery for flavoring. Their juice makes a superior wine. To this group belong the famous Bahia or navel varieties, which are extensively cultivated in California, and usually are seedless. The initial trees, originally native to Brazil, were introduced in 1870 by William Saunders of the United States Department of Agriculture at Washington, and distributed throughout the orange-growing sections of the country. It is, therefore, often called the Washington navel. Its peculiar formation is due to the development of a secondary axis with more or less cells in the centre of the fruit. The cause of this freakish development is unknown.

The bitter, sour or Seville orange (variety *aurantium*) is so named from its pulp. Though it is thoroughly naturalized in Florida from early Spanish importations, few of its horticultural varieties are cultivated in the United States, except as a stock upon which to bud varieties of sweet orange, lemon and pomelo,—a use for which they seem especially well fitted. In Spain, especially in the neighborhood of Seville, this species is extensively cultivated for shipment to Great Britain, where its chief use is in the making of marmalade. The flowers, immature fruits and young twigs of this variety are extensively employed in the manufacture of an ethereal oil, and the skin of the ripe fruit in making Bigaradia oil. In Southern France the flowers are widely used for making perfumery. The Bergamot orange (variety *bergamia*) is a small tree or shrub rarely seen in the United States, but cultivated in Europe for more than 200 years. The rind of the fruit furnishes Bergamot Oil, which is largely used in the manufacture of eau de cologne and other perfumes. The mandarin, or tangerine orange (variety *deliciosa*) is a very small tree or shrub with dense foliage and small fruits most noted for the looseness of the skin which is barely attached to the pulp. Because of easy removal of the pulp it has received its commonest name—kid-glove orange. Its varieties are gaining in popularity in the United States. The Otaheite orange (variety *taitensis*) is not, as its common name implies, a native of Tahiti but is probably either a variety of the common sweet orange or a hybrid between two other species of citrus, possibly

the lemon and the orange. It is a very popular pot-plant in greenhouses, on account of its diminutive size, free blooming and fruiting qualities. The fruits have a mawkish flavor. The king orange (variety *nobilis*) is a native of China whence it was introduced to California in 1880. Its large very juicy vinous flavored fruits are gradually becoming popular in spite of their rough skins. The Satsuma or onshiu orange (variety *unshiu*), a Japanese group of varieties, was introduced into Florida in 1876 but until recently has been rather quiescent. But since it is one of the hardiest of all edible oranges it is steadily becoming popular commercially in the Gulf States, especially when grafted upon stocks of the trifoliate orange. The Calamondin orange (variety *mitis*) a native of the Philippine Islands and popularly grown in Hawaii under the name of China orange, has been introduced into the Gulf States where it has proved very hardy but useful only as a home fruit. The three-leaved or trifoliate orange (*Poncirus trifoliata*) is a small thorny Japanese tree, whose chief use is as a hedge-plant. It is hardy as far north as New York, and is popular southward. Its small yellow downy juiceless, bitter, sour fruits are sometimes used in preserves. The plant is also valued as a stock upon which to bud various citrus fruits, especially the kumquat (kin-kin, or kin-kits, *Fortunella margarita*) and the Satsuma orange, a variety of mandarin orange. When used as grafting stock it is said to make the more tender varieties somewhat hardier and to reduce the size of the larger growing sorts. By hybridizing it with various species of citrus several promising hardy varieties have been produced, but so far have not been cultivated commercially. The Osage orange (*Maclura pomifera*) is a member of the family *Moraceæ*. It is therefore not properly an orange at all. See OSAGE ORANGE.

The orange was formerly propagated almost wholly by means of seeds, but since the sweet orange varieties so produced seemed to be seriously affected with root-disease ("foot-rot") and were variable both in habit of growth and value of fruit, propagation by means of buds has very largely replaced the more primitive methods. The stocks preferred in Florida and the Gulf States are the Seville and trifoliate orange and the so-called "rough lemon," apparently a natural hybrid, which resembles the lemon in foliage and flower, but whose fruit looks like the sour orange, being large, round and distinctly acid. These stocks are grown from seed, and when the seedlings are of suitable size they are budded with the desired variety. After growing in the nursery for a year, after being budded, the trees may be set in the orchard. The distances usually chosen vary between 25 and 30 feet, but varieties upon trifoliate stock may be set closer together.

When transplanted the tops are rather severely cut back so as to balance the loss of root in digging; and to check evaporation the ground is frequently covered with a mulch of straw, pine needles or other loose material. Clean cultivation is also given from the time the orchard is set, at least during the growing and dry season, followed by the sowing of some cover-crop, which will enrich the soil. This crop may be cut for hay, but its equivalent in such cases should be returned to the land in

the form of fertilizer and humus. Fertilizers should be applied liberally because the orange is a gross feeder.

There are several conditions essential to success in orange growing: soil, naturally rich or generously fertilized; temperature, suitable not alone to the life of the tree, but to the soundness and quality of the fruit; moisture, constantly available in adequate quantity, but not in excess; cultivation, to promote root growth by aeration and distribution of moisture; pruning to promote adequate wood growth and leaf action; protection from destructive insects and fungi. The soils which best befit the tree are deep loams with a good amount of clay, although the tree is not fastidious about soil-texture if plant food and moisture are ample. In Florida the orange soils are predominantly light at the surface and are largely sustained by regular fertilization, but a firm subsoil, for moisture retention within reach of the deeper roots and yet with drainage to obviate standing water renders light soil acceptable. A leachy subsoil, as for instance a deep sand stratum, is undesirable. In California the soils chiefly used for the oranges are clay loams of considerable depth without change in character and which are, therefore, of more enduring richness, but even the best and deepest soils in California are now showing the need of fertilizers to meet the heavy draft of the fruiting trees.

The orange tree is in danger whenever the temperature reaches the freezing point. The degree attained must, however, always be considered in connection with the length of time it prevails: for instance, four degrees of frost for an hour may do less harm than two degrees for two hours. As the temperature falls lower the duration becomes less important. Five degrees of frost for a very brief interval may injure the ripening fruit and the tenderer leaf growth; 10° will ruin the fruit and considerably injure the tree. A temperature of 20° F., or a little less, may kill younger trees to the ground and older trees to the stump, while 14° F. in Florida in 1895 killed to the ground trees some of which were more than half a century old. The root, however, escapes destruction and will send up new shoots provided the injured top is soon removed.

Where the temperature does not fall below 25 degrees injury has been successfully averted by burning numerous small fires among the trees. In California systematic use of electric-alarm bells connected with thermometers to arouse the sleeping workmen and the lighting of small pots of crude petroleum have saved the fruit from injury by six degrees of frost. Such protection has been demonstrated to be profitable in places where such frosts are to be expected. The occurrence of frost is local in California and is not conditioned upon latitude. Oranges are successfully grown in suitable locations between lat. 32° and 40° N.—nearly 500 miles of distance, and the extreme low temperature is practically the same at about the same elevation throughout this distance. It is also true that owing to the intervention of high ranges of mountains giving protection from cold currents of air from the north and northwest, the season is earlier at the north than at the south, and the oranges from northern and central California are marketed in advance of the main crop from southern California—the

fruit being marketed previous to the time of the lowest temperatures (December and January).

Oranges are grown with moisture from rainfall in Florida, while in Arizona and California irrigation is essential. Even in parts of California where deciduous trees fruit satisfactorily without it, the orange must be irrigated. The amount of water depends upon the age of the trees, the depth and retentiveness of the soil, the local rainfall, etc. The average amount is an annual total of 15 inches depth of water over the whole surface of the land occupied by the trees, and the application is made in fractions at intervals of about three weeks during the dry season. Upon the lighter soils the land is laid off for each irrigation by low levees or dykes into squares enclosing one or several trees, according to the slope of the ground, and these squares are filled from an adjacent ditch. In the heavier soils where the water can be distributed well by lateral seepage, the water is turned into several parallel furrows plowed between the rows of trees and is allowed to run in small streams for 24 hours or more.

Cultivation follows irrigation as soon as the ground has dried sufficiently to work well, for the purpose of preventing the surface from baking and preventing also the loss of moisture by evaporation. Thus the surface soil of a California orange orchard is kept constantly clean and mellow. No growth of weeds or other plants is permitted except when crops of legumes for plowing under green, to promote friability and to increase the humus-content of the soil, are undertaken. This cultivation of the surface promotes deeper rooting of the tree and aeration of the lower soil layers and the general thrift of the tree. California experience amply proves that irrigation and fertilization, unaccompanied by thorough and adequately deep cultivation, do not secure the best results.

The orange tree requires only light pruning after its proper shape is attained, but pruning to maintain the shape and to prevent the foliage from becoming too densely matted is essential. Pruning for shape has been more definitely pursued in California than elsewhere. The trees are grown with very short trunks; in fact, the lowest branches almost touch the ground. Cultivation is extended a certain distance beneath the tree by having a lateral extension to the cultivator. The men and teams never pass under the trees. The trees are encouraged to enclose themselves with a solid wall of foliage and all the work upon the tree and gathering of fruit is done with stepladders in the spaces between the trees. It would be well-nigh impossible to climb into the branches of such an orange tree, nor is it ever expected to do so. The trees are generally bluntly-conical or pyramidal in form, though some prefer a more roundish outline. The trees of the varieties most largely grown are low and of a semi-dwarf stature; only a few seedling trees of 30 feet or more in height are now to be seen.

Orange trees continue to bear, with reasonable care and under favorable conditions, for many years, reaching profitable age in some cases when less than six years old. The trees bear more or less continuously, flowers and fruits in all stages of development being found upon the same tree throughout the year. The

great mass of fruit, however, becomes ripe at one time. When ready for harvest the individual fruits are cut off with scissors, not pulled from the trees. They are then allowed to stand for a few days to dry and soften somewhat before being graded and boxed for shipment. Each fruit is wrapped in tissue paper before being packed. The standard orange-box contains two cubic feet and usually holds about 200 oranges. Large specimens occasionally reduce the number below 100, and small ones increase it to more than 250. When properly managed both before packing and during shipment the fruits should keep for several months.

Among the difficulties in orange growing are several so-called diseases which also attack other cultivated members of the genus *Citrus*. Perhaps the most widely distributed and troublesome is the "foot-rot," which seems to be worst upon sweet oranges and lemons. It is feared in Australia, Europe, California and Florida, in the last-named region having caused annual losses of \$100,000 or more. Though its origin has not been satisfactorily explained, it is readily recognized by the abundant exudations of gum near the ground, the yellow leaves reduced in size and number, the dry, peeling bark and the dead twigs. Ultimately the trees become girdled and die. Good drainage, resistant stocks, the avoidance of over-cultivation and stimulation with nitrogenous manures have been found the most satisfactory preventives. The removal of soil from the base of the trunk has been recommended as a remedy.

Blight is another little understood affection. Only bearing trees seem to be troubled by it. The leaves wilt even in moist weather; water-sprouts are produced in profusion on the trunk and main branches, but live only one or two seasons; the trees blossom abundantly the season after the wilting, but fruit fails to set and very little reaches maturity. The result is always fatal, even when only a small branch is originally affected. Scab, attributed to a species of fungus (*Cladosporium*), appears as excrescences upon the fruit and foliage. It is considered most troublesome upon lemons, and four or five applications of ammoniacal solution of copper carbonate is recommended as a remedy. (See FUNGICIDES).

"Die-back" is among the most troublesome pests of Florida orange orchards. It seems to be due to imperfect drainage and improper cultivation, which are succeeded by imperfect nutrition. Hence, improved drainage, cessation of cultivation, withholding nitrogenous manures and reducing the present content of such foods in the soil by cropping the orchards with nitrogen-consuming crops such as grass, have all been urged as remedies. Mulching is also recommended. The characteristics of this trouble are the dying back of the tips of the twigs, reduction in the "set" of fruit, premature ripening, splitting and shedding of the fruit. These characteristics may be seen in trees of all ages and varieties. The sooty mold (*Meliola camelliae*), which also appears upon many other kinds of trees, is not a disease, but because of its presence in abundance may prevent adequate aeration of the leaves. It is a mold that lives upon the honey-dew (q.v.) which is exuded by various species of insects (see APHID), which may be held in check by various insecticides,

notably resin washes and hydrocyanic acid gas. It often covers the fruit with a felty mass which precludes sale.

Melanose, stem-end rot and wither tip or anthracnose are fungous diseases generally kept in check by good orchard sanitation, removal of diseased fruit, pruning and destruction of injured wood, and by spraying with Bordeaux mixture. Citrus canker, a bacterial disease, is caused by *Pseudomonas citri*. In Florida it has been very threatening, but by burning the affected trees where they stand it is being held in check.

Among the numerous insects that feed upon the orange are several caterpillars, the most prominent of which are perhaps the orange dog, the caterpillar of a butterfly (*Papilio cresphontes*), the saddleback caterpillar (*Empretia stimulea*) and the bag-worm (*Oiketicus abbotii*). The cotton-stainer or red-bug (*Dysdercus suturellus*) and the leaf-footed bug (*Leptoglossus phyllopus*) puncture the fruit. The Morellos orange-worm, the maggot of a fruit-fly (*Trypeta ludens*), does great damage in Mexican orchards, and its possible introduction is dreaded by American orchardists, because the maggots destroy the fruit by tunneling in it. Several species of leaf-rollers and sucking bugs are troublesome, as are also various species of aphids, notably the orange aphid (*Siphonophora citrifolia*). In Florida and somewhat in Louisiana the white fly (*Aleyrodes citri*) is sometimes so abundant upon the foliage as to impair aeration of the leaves. It is not only a serious pest because of its sap-sucking habits, but because of its exudations of sugary matter upon which the smut fungus mentioned above lives. The rust-mite of the orange, also called the silvery mite of the lemon, because of the appearance of its work upon the two trees, sometimes injures the fruit; and the six-spotted mite (*Tetranychus sexmaculatus*), a close relative of the red spider of greenhouse notoriety, feeds upon the under sides of the leaves. The mites may be controlled by flowers of sulphur, which for the former should be added to kerosene emulsion.

The most dreaded group of insects, however, is that of the scale insects, of which there are a very large number that attack both foliage and trunks. With few exceptions the remedies found most satisfactory for these insects are hydrocyanic acid gas. Consult 'Farmers' Bulletin 923' of the United States Department of Agriculture.

The most notable exception is the white or fluted scale (*Icerya purchasi*), an introduction from Australia. Having become exceedingly troublesome in California, its natural enemy, a ladybird beetle, was introduced with the result that it is now rarely seen in the State. Other well-known scale-insects in California orange groves are the red scale (*Aspidiotus citricola*), the black scale (*Lecanium oleæ*); in Louisiana groves, the chaff scale (*Parlatoria pergandei*) is most important, but the purple scale (*Mytilapis citricola*) is also somewhat troublesome, as is also the orange chionaspis (*Chionaspis citri*); in Florida groves, the chaff and the purple scale are well-known pests, as also are the long scale (*Mytilapis gloveri*) and the Florida red scale (*Aspidiotus ficus*). Many of the insects mentioned occur in Mexico, the West Indies, etc.; some of them in Europe, Australia

and other parts of the world; but the insect fauna of foreign countries is rich in species that do not appear in the American list.

Consult Risso and Poiteau, 'Histoire naturelle des Oranges' (Paris 1822); Bonavia, 'The Cultivated Oranges and Lemons of India and Ceylon' (London 1890); Garey, 'Orange Culture in California' (San Francisco 1882); Moore, 'Treatise of Orange Culture in Florida, Louisiana and California' (1883); Harcourt, 'Florida Fruits' (Louisville, Ky., 1886); Wickson, 'California Fruits' (San Francisco 1891); Manville, 'Practical Orange Culture' (Jacksonville 1883); Spalding, 'The Orange: Its Culture in California' (Riverside, Cal., 1885); B. Aliño, 'El Naranjo' (Valencia 1900); various bulletins of the California State Experiment Station, Berkeley, Cal., and publications of the California State Board of Horticulture, especially the one of 1902. Hume, 'Citrus Fruits and Their Culture' (New York 1904); Coit, 'Citrus Fruits' (New York 1916); also many bulletins, small books, pamphlets or reports by Davis, Fish, Prange, Canada, Fowler, Garcelon, Lelong and Gallezio.

M. G. KAINS.

ORANGE RIVER, South Africa, the most important southern river of the continent, rising in the Kathlamba or Drakensberg range, within 100 miles of the Indian Ocean, and traversing the country eastward to the Atlantic Ocean, with a slight northerly inclination. The native name of the river is Gariep, which, in the Hottentot language, means "great water." It received its present name in 1777 in honor of the House of Orange. It describes numerous wide curves in its course of 1,300 miles, and separates Cape Colony on the south from the Orange River Colony, Griqualand West, Bechuanaland and German Southwest Africa on the north. Area of basin, 325,000 square miles. Its principal tributaries are the Caledon and the Vaal, both joining it from the right. Its volume varies greatly between the dry season, when it is not navigable, and the rainy season, when it overflows its banks in the upper parts of its course. Its mouth is obstructed by a bar, but above the bar it is navigable for small vessels.

ORANGE-ROOT, the common name of the hydrastis. See **GOLDEN SEAL**.

ORANGE-TIP, one of the several butterflies of the family *Pieridæ* (q. v.), which are usually white and marked with black and with a conspicuous orange spot at the end of the front wings. The lower surface of the hind wings are mottled with a greenish network.

ORANGEBURG, ör'énj-bèrg, S. C., city, county-seat of Orangeburg County, on the Edisto River and on the Atlantic Coast Line and the Southern railroads, 81 miles north by west of Charleston and 50 miles south by east of Columbus. It was settled in 1735 by Swiss and Germans, was incorporated in 1755 and chartered as a city in 1870. It is in an agricultural and lumbering region. The chief manufacturing establishments are cotton mills, lumber and planing mills, a sash and blind factory, flour and grist mills, ice factory, brick works, wagon and carriage factory and printing works. There are two colleges for colored pupils, one a State industrial institution and

the other under the auspices of the Methodist Episcopal Church. There are graded schools for both white and colored and seven churches. The four banks have a combined capital of \$210,000, and the annual amount of business is about \$1,500,000. The city, which has adopted the commission form of government, owns and operates the electric-light plant and the water-works. Pop. (1920) 7,290.

ORANGEMEN, the unfortunate party designation which for more than a century has contributed to keep alive religious and political divisions of the worst character in the British Empire, especially in Ireland. The Orange organization had its origin in the animosity which had subsisted between Protestants and Roman Catholics in Ireland since the Reformation, but which reached their full development after the Revolution of 1688, and the wholesale confiscation of Roman Catholic property by which that event was followed. From that time the Roman Catholics of Ireland may be said legally to have lost social, political and religious status in their own country. Some attempts in the latter part of the 18th century to ameliorate their condition excited, especially in the north, the alarm of the Protestant party, who regarded the traditional "Protestant ascendancy" as endangered. Acts of violence became frequent, and, as commonly happens, combinations for aggressive and defensive purposes were formed by both parties. The members of the Protestant associations appear at first to have been known by the name of "Peep-of-day Boys," from the time at which their violences were commonly perpetrated; the Roman Catholics who associated together for self-defense being called "Defenders." Collisions between armed bodies of these parties were frequent. In 1785 a pitched battle, attended with much bloodshed, was fought in the county of Armagh. Attempts at repression of open violence were inefficient, yet had the effect of diverting the current into the more dangerous channels of secret associations. The rude and illiterate mob of Peep-of-Day Boys made way for the rich, influential and equally bigoted organization of the Orange Society, which by degrees extended its ramifications into every portion of the British Empire and into every grade of society from the hovel to the very steps of the throne. It was named from the Prince of Orange, William III, who, in Ireland, has been popularly identified with the establishment of the Protestant ascendancy. The first "Orange Lodge" was founded in the village of Loughgall, County Armagh, on 21 Sept. 1795. It was a region and time of outrage, 12 or 14 houses of Roman Catholics being sometimes, according to disinterested witnesses, wrecked in a single night. The association which began among the ignorant peasantry soon worked its way upward. The general disaffection toward English rule, which at that time as it does to-day pervaded Ireland, and in which Roman Catholics, as a natural consequence of their oppressed condition, largely participated, tended much to identify in the mind of Protestants disloyalty with popery; and the rebellion of 1798 inseparably combined the religious with the political antipathies. In November of that year the Orange Society had already reached the dignity of a grand lodge of Ireland with a grand mas-

ter, a grand secretary and a formal establishment in the metropolis; and in the following years the organization extended over the entire province of Ulster and had its ramifications in all the centres of Protestantism in the other provinces of Ireland. In 1808 it extended to England. A grand lodge was founded at Manchester, from which warrants were issued for the entire kingdom: its seat was transferred to London in 1821. Memorable in the history of the Orange Society was the election of a royal duke (Cumberland) in 1827 as grand master for England and as imperial grand master in 1828. The Roman Catholic Relief Act of the following year stirred up all antipathies of creed and race in the Ulster bigoted horde and emissaries were sent out to organize lodges in Wales, Scotland, Canada, the Mediterranean region and in the other colonies. A formidable part of this zealous propagandism was its introduction into the army about 1824-26. No fewer than 32 regiments were proved to have received warrants for holding lodges in Ireland and the English grand lodge had issued 37 warrants for the same purpose. The organization was complete and extensive. The only condition of membership was that the applicant should be a Protestant and 18 years of age. In 1835 the association numbered 20 grand lodges, 80 district lodges, 1,500 private lodges and 200,000 to 220,000 members. Its worst effect was its supply of a constant incentive to party animosities and deeds of violence. The spirit of fraternity which pervaded its members was a standing obstacle to the administration of the law; and confidence in the local administration of impartial justice by magistrates was destroyed forever for the Irish Catholic. An alleged Orange conspiracy to alter the succession to the Crown in favor of the Duke of Cumberland led to a protracted parliamentary inquiry in 1835; the Orange Society had overreached itself, and this inquiry, as well as a shocking outrage by an armed body of Orangemen, on the occasion of a procession in Ireland, so discredited the association that its respectability has since gradually diminished. For several years the Lord Chancellor laid down a rule by which no member of the Orange Association was admitted to the commission of the peace, and the association became comparatively without influence, except among the very lowest classes of Protestants in northern Ireland. Of the colonial offshoots of the Orange Association, those of Canada have at all times been most active, and outrages against Roman Catholic churches and convents were frequent until recent years; and on the occasion of the visit of the Prince of Wales (afterward Edward VII) to Canada, an attempt was made to force from his royal highness a recognition of the association, which was defeated by his own firmness and by the judicious counsels of his advisers. The Orangemen of British America constitute about 1,200 lodges, with about 150,000 members. The Repeal agitation in Ireland in 1848, the disestablishment of the Protestant Church of Ireland in 1869 and the Fenian and Nationalist associations were all violently opposed by the Orange faction. The Home Rule campaigns again called forth their animadversions, and more recently the Sinn Féin party and policy and the Gaelic League program for an Irish

Ireland have aroused all the latent bigotry of this unchristian, undemocratic society. The society holds great demonstrations annually on 12 July, the anniversary of the Battle of Aughrim and (reckoning by old style) of the Boyne. Serious riots have attended some of these demonstrations of alleged loyalty. That the Orange Society has secured a grip on the British army was shown during 1914, when several officers at the Curragh and elsewhere, including General French (later marshal and viceroy) and General Gough (later removed for inefficiency in the battle of Picardy), were prepared to resign their commissions rather than lead a military contingent to enforce an act of the Imperial Parliament against the Orangemen of Ulster, who resisted that same edict. However, the power of Orangeism is waning; the democratic, liberal atmosphere of the 20th century is not conducive to the growth of bigotry and Orangeism is being slowly choked to death, especially in the United States, where its dying efforts awaken little sympathy. In the United States the organization has four branches or classes; a supreme grand lodge, which is the highest jurisdiction in the United States; State grand lodges, with jurisdiction over district and subordinate lodges in their respective States; district lodges, with jurisdiction over the fourth class, or subordinate lodges in their respective jurisdictions. In a number of States some subordinate lodges are under the direct jurisdiction of the supreme grand lodge. State grand and district lodges exist in Pennsylvania, New York, New Jersey, Ohio and California. District lodges without State jurisdiction exist in Massachusetts and Michigan. There are upward of 400 subordinate lodges throughout the United States with a membership aggregating about 30,000. A higher branch of the order, known as the Royal Black Encampment of Israel, also exists in nearly all States of the Union. Its various branches are known as preceptaries and its members are recruited from the full-degreed Orangemen. There is also a ladies' auxiliary, known as the Ladies' Loyal Orange Association of the United States. It has a total membership of about 20,000, with upwards of 200 lodges. The institution maintains a National Home for the Care and Support of Aged Inmates and Orphan Children at Hatboro, Pa. Consult Lecky, 'History of England in the Eighteenth Century' (Vols. VII, VIII, London 1878-90); Lilburn, 'Orangeism: its Origin, Constitution and Objects' (1866).

ORANGEVILLE, Canada, town, county-seat and outport of Dufferin County, on a branch of the River Credit, 49 miles northwest of Toronto and on the Canadian Pacific Railway. It is a large grain shipping centre, has flour and woolen mills, foundries, machine-shops, casket works, furniture manufactories and other industries. Pop. about 2,340.

ORANGUTAN, ō'räng-oo'tän, the Malay name, signifying "man of the woods," of the large anthropoid ape (q.v.) of Borneo and Sumatra. The orang belongs to the typical genus *Simia* of the family *Simiidae*, and there is probably but one species (*S. satyrus*), though some naturalists believe otherwise. The face and skull of the young are very human, but in the adult the jaws become protruding and the crown elevated. The body is short and

massive, the legs short and bowed, and the arms and hands disproportionately long, reaching to the ankle, but the thumb is very short. Except for the face, hands and feet, the animal is thickly clothed with coarse, reddish-brown hair, which is especially long on the arms, where it converges to the elbow, the thighs and the beard of the male. There are no ischial callosities and no tail. Cheek-pouches are absent, but old males have the face much broadened by the development of prominent fibrous warty protuberances and in this sex the canine teeth become much enlarged. In some respects this ape approaches man more closely than any other existing species, but in others it differs widely and resembles the lower apes. In size it is much inferior to the gorilla of equatorial Africa, seldom exceeding four feet in height, and it lacks the high sagittal crest, and particularly the prominent superciliary ridges, which give to the males of that species so ferocious an aspect. At the present time the orang is confined to the deep swampy forests of Borneo and Sumatra. It is arboreal in habit and builds nests of boughs and leaves among the branches of the trees. For this mode of life its structure is eminently adapted, its long arms, crooked legs and great strength enabling it to travel through the tree-tops with the greatest facility. To an equal degree these structures ill adapt it to terrestrial locomotion. It does not stand erect, as often represented, except now and then for a short time, and when supported, but in a semi-erect attitude, resting on the side of the inturned feet and on the knuckles of the hands, which, as a consequence, develop callosities. The orang lives exclusively upon a vegetable diet, consisting chiefly of fruits. The males especially have powerful voices, made possible by the great development of the larynx. Naturally they are sluggish and sullen, but the disposition is mild. Stories of their great ferocity, and particularly of their habit of lying concealed in the branches of trees above pathways, from which they reach down a foot to grasp men by the throat, are pure fables. In confinement one of their most interesting characteristics is their teachability and the changing expression of the face resulting from the great mobility of the lips. Consult Hartmann, 'Anthropoid Apes' (1886), in which many other authorities are given; Forbes, 'Allen's Natural History,' Vol. I (1897); and the books of Wallace, Forbes, Hornaday and other scientific travelers in the Malayan region.

ORATION ON THE CROWN, The.

This oration, like the speech of Achilles in the ninth book of the 'Iliad' and many of the finest speeches in the world, is a reply. It is Demosthenes' final vindication of his entire life and policy against the censure of his life-long rival and adversary, Æschines. In 336 B.C., two years after the Macedonian defeat of Athens and Greece at Charonea, Ctesiphon proposed in the senate the honor of a golden crown for Demosthenes in recognition of his services to the state as commissioner for the fortification of Athens and treasurer of certain public funds. The main purpose of the bill, however, was to affirm Athens' loyalty to the lost cause of democratic resistance to Macedonian imperialism. Æschines stopped the progress of the bill by an indictment analogous to a plea of unconstitu-

tionality in our Supreme Court. For some six years while the success and the consolidation of Alexander's conquests in the East hung in the balance neither side ventured to bring the suit to trial. But in 330 the party of Demosthenes found courage to press for a decision. There was some force in the technical pleas that Demosthenes' accounts had not been audited at the time of the introduction of the bill and that the proposed proclamation of the Crown in the theatre was illegal. But everybody knew that the real issue was the charge that the allegation that Demosthenes had well served the state was false. It was to be a duel between the two greatest orators of Athens. A huge popular jury and a large audience attracted from all Greece were to pass judgment on the policy of Athens for the past 30 years. The logic of fact favored Æschines. The Macedonians had won. But Æschines was embarrassed by the narrow technicality of his strongest pleas and by the suspicion that his retrospective pacifism was the veiling camouflage of pro-Macedonian sympathies that verged on treason. His speech is very clever. But its effect is marred by these doubts of his sincerity and also by his strident insistence on the petty technicalities of his case and his tediously repeated demand that Demosthenes shall meet this issue first in his reply.

Demosthenes is too shrewd to fall into that trap. He merely animadverts on the unfairness of the attempt to prescribe to him the order of his topics, and postpones his plausible and contemptuous treatment of the two technical issues to a convenient place between two of the strongest patriotic passages of the speech. This leaves him free to review his entire political career and the relation of Athenian democracy to Macedonian autocracy in the chronological division adopted by Æschines himself for that portion of his argument. There is no space here for this historical detail. Fully to appreciate the oration on the Crown one should come to it fresh from the perusal in chronological sequence of the 'Philippics' and 'Olynthiacs' and other public orations of Demosthenes in Kennedy's translation. Failing that the late Prof. S. H. Butcher's admirable little book, 'Demosthenes,' in the Classical Writers Series, or the chapters in Jebb's 'Attic Orators' or the historical introduction in Goodwin's edition of the 'Oration on the Crown' will serve. Even without this historic background the oration may be enjoyed as the supreme expression of the sentiment that in a righteous cause it is better to have fought and lost all save honor than never to have fought at all. This is the meaning of the famous oath by Marathon and Salamis which detached from the context may seem in a rough English rendering a mere flight of rhetoric: "They deceive you, men of Athens, they lie who tell you that it was a mistaken policy for you thus to imperil your city for the salvation and enfranchisement of all the Grecian world. It was no error; no, by our fathers, who first faced the barbarian at Marathon, who held the lines of Platea and manned the ships of Salamis and Artemisium — no, by the thousands who sleep in our national cemeteries, brave men all, all worthy of like memorial honors, not only those who succeeded, no not the victors alone." Only a professional student of Greek style can appreciate the



ORANG-UTAN (*Simia satyrus*).

minute finish of Demosthenes' diction, rhythm and sentence structure. But the essential quality of his oratory is apparent in any good translation. It is neither the stately, elaborate rhetorical diffuseness of the tradition of Cicero, Burke and Webster, nor the matter-of-fact aridity of modern business oratory, nor the loose, familiar colloquialism of modern popular eloquence. It is impassioned logic, an indissoluble blend of close, if sometimes sophisticated, reasoning and feeling. In this it resembles some of the more combative speeches of Lincoln, and it also recalls Lincoln in its art of pressing the definite issue home in a series of unanswerable questions and inescapable dilemmas. There is less, of course, of Lincoln's supreme and almost unique quality, absolute fairness to the other side. 'The Oration on the Crown' was usually read in the junior or senior year of the old-fashioned American college, and it would be an interesting task to collect the distinct reminiscences of this study in American oratory from Webster to Bryan and to note the influence of Demosthenes in modifying the more florid tradition of Cicero and Burke.

PAUL SHOREY.

ORATIONS AGAINST CATILINE. In 63 B.C., Lucius Sergius Catilina (Catiline), descendant of an ancient Roman patrician family and long a conspicuous figure in the political life of Rome, renewed his candidacy for the consulship. At the same time he began the organization of his famous conspiracy, rallying to his support the elements of discontent throughout Italy and planning for simultaneous uprisings at various points, in case he should encounter defeat at the polls. When in the autumn of 63 B.C. this defeat became reality, his adherents raised the standard of revolt at Fæsulæ (Fiesole) in Etruria. The news of this uprising and of other details of Catiline's treasonable projects moved Cicero, as the first magistrate of the republic, to deliver against Catiline and his accomplices several vehement speeches. The first of these ("Quo usque tandem abutere, Catilina, patientia nostra?") was delivered 8 November before the Senate, where Catiline himself had had the presumption to appear in person. The orator assails Catiline's effrontery in being present among the very men he had marked for slaughter, and declares that the government has full knowledge of the plans of the conspirators. He urges Catiline to leave Rome with all his followers. The second oration ("Abiit, excessit, evasit, erupit") was delivered the following day before the people assembled in the Forum. Cicero congratulates them on Catiline's departure. Now, he says, it will be possible to wage war openly against the traitor, although many of his secret supporters still infest the capital. Cicero then proceeds to define the issues, enumerating the different classes of Catiline's adherents, who are asserted to consist of all the most disreputable elements of the state. Such of these as have remained in the city are warned that they must expect no indulgence, if they undertake to lend help and comfort to the conspirators. On the departure of Catiline from Rome the direction of the conspiracy fell into the hands of Lentulus, a man of irresolute and indolent character. Reasonable negotiations were begun by him with cer-

tain Allobrogian envoys, who happened to be in the city. Cicero, obtaining information of these schemes, arranged to surprise and capture the envoys as they were leaving Rome with incriminating documents upon their persons. The evidence thus procured was laid before the Senate, which was then convened by Cicero in the Temple of Concord abutting on the Forum. In the third oration, delivered before the people, 3 Dec. 63 B.C., the orator presents the details of these recent occurrences, not omitting to inform the people that the Senate had decreed a thanksgiving to the gods in honor of his success in unearthing the plots laid against the government. He promises to remain worthy of the continued confidence of the people. The fourth oration against Catiline was delivered in the Senate, 5 Dec. 63 B.C., in the course of the formal debate concerning the penalty to be inflicted on the arrested conspirators. Two courses were advocated by different groups in the Senate. One group, headed by Julius Cæsar, urged that the conspirators be distributed among some of the provincial towns of Italy and kept in confinement for life. Cicero admits that this course of procedure would be simpler for himself, as it is the more popular and will relieve him of the odium of having executed the decree of death against fellow-Romans. Yet he declares that duty compels him to support the proposition of the senator Decimus Silanus, who urged that the penalty of death be imposed upon those who had attempted not only to murder the Roman magistrates and senators, but also to devastate the city itself by fire. When it was urged that Roman law forbade the execution of Roman citizens without allowing them an appeal to the people, Cicero met this argument with the specious plea that men guilty of the monstrous designs of the indicted conspirators could not enjoy the protection of this privilege, since by these very designs they had forfeited all claims to their rights as citizens.

The fame of these four Catilinarian speeches lies partly in their authorship, partly in the importance of the events with which they deal. There can be no doubt of the grave menace to the government in 63 B.C. There was great social distress and political unrest. Unprincipled men with large political influence and ambitious designs were ready for a reckless assault upon existing institutions and vested rights. Yet Cicero, while undoubtedly correct in his assertions as to the existence of a carefully laid conspiracy, probably exaggerates the criminal intent of Catiline and his accomplices, and paints the personal character of Catiline himself in darker colors than warranted by the facts. All four of the orations abound in vehement personal abuse and in turgid rhetoric, not a little of which is devoted to magnifying Cicero's own merits in saving the city from destruction. There is a translation by C. D. Yonge in the Bohn Library.

CHARLES E. BENNETT.

ORATORIANs, or CONGREGATION OF THE ORATORY. The name of two religious associations in the Roman Catholic Church, the Oratory of Saint Philip Neri and the Oratory of Jesus. See **ORDERS, RELIGIOUS; NERI, SAINT PHILIP; NEWMAN, JOHN HENRY.**

ORATORIES, The. See **ORDERS, RELIGIOUS.**

ORATORIO. A musical setting of a sacred theme, generally dramatic in character, consisting of choruses and solo voices with an orchestral accompaniment. The name seems to be derived from the oratory of the churches in which it had its beginning. While technically its origin may be traced back to the first dramatic representation of Bible History, for practicable purposes its history as a distinct art form began about the middle of the 16th century, when Filippo Neri, a learned priest, instituted a series of public lectures on Scripture History in his church in Rome; and in order to make them the more attractive he arranged narrative dialogues on the subject matter of his discourses, interspersed with hymns of a type known as "laudi spirituali." Pope Gregory XIII encouraged the development of the scheme, and no less important a composer than Palestrina lent his aid by writing music for this special purpose. Neri died in 1595, and five years later there was produced at Rome a sacred drama with music, entitled 'La Rappresentazione dell' Anima e del Corpo' ('The Soul and the Body'), written by Cavalieri, a Roman composer of note. By a singular coincidence, the year 1600 also saw the first performance of Peri's 'Euridice,' the earliest example of modern opera. The oratorio employed the same new style of music, and there has been much learned discussion on the subject of the priority of the discovery, never finally decided, although it is said that Peri himself conceded the honor to Cavalieri. The development of the two forms continued side by side, though, unfortunately, Cavalieri's death shortly prior to the first performance of his work cut short his efforts; and for a time interest generally centred on the growth of opera. The next great composer to enter the field was Carissimi, who wrote numerous oratorios as well as sacred cantatas (choral works of smaller design) and did much to give the new art form, stability and permanence. His most illustrious successor was Alessandro Scarlatti, his pupil, and a still greater and more versatile genius, who attained a mastery over the technical requirements of his art that make his oratorios even now a source of deep musical, as well as historical interest. Handel drew on both Carissimi and Scarlatti for material used in his oratorios. Caldara, Leo and Stradella form a brilliant trio who are enrolled high in the list of oratorio writers. The famous story of Stradella's music melting the hearts of the ruffians sent to murder him refers to the first performance of his oratorio 'San Giovanni Battista.'

The oratorio in Italy always retained its intimate association with Italian opera. In Germany, its origin also was the miracle-play; but it developed along quite a different path—that of the passion music. For a time, composers absolutely limited themselves to the story of the Passion of Christ. Heinrich Schütz may fairly be called the father of the modern oratorio; since his work represents really the connecting link between the two styles out of which grew the oratorio of Handel and his followers. After Schütz, the chorale, a hymn tune harmonized for congregational singing and distinctively a German contribution, became a regular feature of the oratorio and supplanted the plain-song which was used by the Italian composers as a

natural result of the Church influence on their work. The name of Bach, pre-eminent in musical history, is most closely associated with his Church music. There are four oratorios from his pen extant—the 'Christmas Oratorio,' which is really a group of six cantatas intended for performance on separate days, and three Passion oratorios, 'Saint Matthew,' 'Saint John and Saint Luke' (the last named not of unquestioned authenticity)—and probably there were two more which have disappeared. The Saint Matthew Passion shares with the B minor Mass the distinction of filling the highest place in the list of Bach's works. A contemporary of Bach, whose proximity to the great composer has dimmed his real worth, Karl Heinrich Graun, was the last great composer of Passion music. His 'The Death of Jesus,' a posthumous work, shared for many years the popularity of the 'Messiah' and the 'Creation.'

Handel is to-day best known for his long series of oratorios; but he was more than 50 years old before he began to write them. Previous to that, he had devoted most of his great energies to the production of operas and had become the most prominent living composer in that field. The 'Messiah' is, of course, his best-known and best-loved oratorio, and is accorded by musicians first place among his works, though 'Israel in Egypt' is characterized by Rolland as "the most gigantic effort which has ever been made in oratorio." A performance of the 'Messiah' directly inspired Haydn, then advanced in years, to write his 'Creation,' and the 'Seasons,' Beethoven's only oratorio, 'The Mount of Olives' is not strongly characteristic of the composer and is marred by an inferior text. Spohr was the most successful oratorio writer of the early part of the last century, but he was eclipsed by Mendelssohn, on whom, with his 'Saint Paul' and 'Elijah,' fell the mantle of Handel. 'Elijah' forms with the 'Messiah' and the 'Creation,' the most popular group of oratorios in the present-day repertoire. Liszt's 'Christus' and 'Saint Elizabeth' (the latter often performed on the opera stage), Gounod's 'Mors et Vita' and the 'Redemption,' Brahms' German requiem and Franck's 'Les Beatitudes' are important finger-posts on the road of the oratorio. Elgar's 'Dream of Gerontius' is the most conspicuous recent contribution to its literature. In England, choral music has always found a fruitful soil and Elgar is only the most prominent of a number of composers who have worked assiduously in that field. America has not added many to the list of notable achievements in oratorio. John K. Paine, one of the pioneer American composers, wrote a 'Saint Peter' that is entitled to greater recognition than it has received; and Horatio Parker's 'Hora Novissima' has made a prominent place for itself.

The line of demarcation between the oratorio and other choral works of a religious character is not very definite; and some examples of The Requiem, Te Deum, Stabat Mater and Magnificat are so elaborated and developed that they are closely akin to the oratorio proper, and in fact are often performed as oratorios. In the appended list are included some of the greater works which by their importance and architectonics are fairly to be classed with true oratorios.

LIST OF PRINCIPAL ORATORIOS.

TITLE	Composer	First performance
Apostles.....	Elgar.....	3 Oct. 1903
Beatitudes, Les.....	Franck.....	Summer 1891
Children's Crusade.....	Pierne.....	18 Jan. 1905
Creation.....	Haydn.....	2 April 1798
Christmas Oratorio.....	Bach.....	Dec. 1734
Christus.....	Liszt.....	29 May 1873
Dream of Gerontius.....	Elgar.....	3 Oct. 1900
Eli.....	Costa.....	29 Aug. 1855
Elijah.....	Mendelssohn.....	24 Aug. 1846
Franciscus.....	Tinel.....	22 Aug. 1888
German Requiem.....	Brahms.....	10 April 1868
Hora Novissima.....	Parker.....	3 May 1893
Israel in Egypt.....	Handel.....	4 April 1739
Judas Maccabaeus.....	Handel.....	1 April 1747
Judith.....	Parry.....	29 Aug. 1888
Last Judgment.....	Spohr.....	25 March 1826
Light of the World.....	Sullivan.....	27 Aug. 1873
Manzoni Requiem.....	Verdi.....	22 May 1874
Messiah.....	Handel.....	13 April 1842
Mors et Vita.....	Gounod.....	26 Aug. 1885
Mount of Olives.....	Beethoven.....	5 April 1803
Prodigal Son.....	Sullivan.....	3 Sept. 1869
Redemption.....	Gounod.....	30 Aug. 1882
Requiem.....	Berlioz.....	5 Dec. 1837
Requiem.....	Mozart.....	14 Dec. 1793
Rose of Sharon.....	Mackenzie.....	16 Oct. 1884
Saint Elizabeth.....	Liszt.....	15 Aug. 1865
Saint Ludmilla.....	Dvorak.....	15 Oct. 1886
Saint Matthew Passion.....	Bach.....	15 April 1729
Saint Paul.....	Mendelssohn.....	22 May 1836
Saint Peter.....	Paine.....	June 1873
Saul.....	Handel.....	16 Jan. 1739
Seasons.....	Haydn.....	24 April 1801
Stabat Mater.....	Rossini.....	7 Jan. 1842
Woman of Samaria.....	Bennett.....	27 Aug. 1867

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LEWIS M. ISAACS,
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ORATORY. A full treatment of this subject would include the History of Oratory which, like other important educational subjects, has its philosophy of cause and effect, effort and achievement, and inherency and environment. This phase of the theme is treated in the article ORATORY (q.v.). For a more extended study the reader is referred to the 'History of Oratory from the Age of Pericles to the Present Time,' by Dr. Lorenzo Sears. While the Oration is recognized as the highest form of public discourse the term Oratory is here used in its broadest sense and includes all kinds of public speaking from the lowest to the highest. The subject will be treated under three main divisions, the Kinds of Discourse, the Plan of Discourse and the Qualities of Discourse.

I. Kinds of Discourse.—1. *Business Remarks.*—Perhaps the lowest form of public speech is Business Remarks, which are usually made for the comfort or the welfare of the members or audience but have no bearing upon the object or discussions of the meeting. They should be brief, to the point and wholly without display; the chief temptation is to magnify them into a set speech.

2. *Committee Reports.*—Another low form of speech is the Report of a Committee through its chairman who acts as the spokesman of the committee. The report may be read as a concise statement adopted by the committee or it

may be given in substance from notes or records, but in all cases it should be devoid of any coloring in phraseology or manner which might betray the chairman's own prejudice or convictions.

3. *Essays.*—The Essay when read by the author to an audience rises higher in the scale and is a much used form of discourse; when read by another or a mere clerk, though it may be an important document such as a presidential message, it becomes a low form of public address and rarely claims much attention from the audience. Fundamentally an Essay should be didactic, critical and instructive in style; though with more color of language and a high degree of mastery of the subject matter so that the eye may not be confined too closely to the page, it may become a highly effective speech.

4. *Debates.*—The Debate differs from all other forms of speech in that the speaker expects a reply from opponents who hear him, his statements are made under the cross-fire of rebuttal and repartee and the debaters expect an immediate decision of the question by vote of the judges, the verdict of the jury or the voice of the people. The speaker may or may not choose his subject, but he finds himself in the attitude of attack or defense of some proposition or resolution to be established or disproved, with the resultant condition of the victor or the vanquished. A good question for debate must have two sides of about equal strength, it should have some human interest at stake and be worth discussion. In preparation for debate the speaker should make a good selection of material from books, magazines and newspapers, study both sides of the question, clear his mind of all mere notions or prejudices for or against the proposition, and prepare a clear, logical outline or Debater's Brief setting forth the Burden of Proof and Presumption, the main Issue, the argument and the law and authorities relied upon in trying the case. The logical trend of debate is treated in the article on ARGUMENTATION (q.v.).

5. *Topical Speeches.*—A Topical Speech, as the name implies, is a speech on some topic or subject chosen by the speaker or assigned to him. It is a somewhat informal speech made to a limited audience. It should be as brief as possible and rarely include more than "three good points and three good illustrations." It has a wide range of subjects, some of which should be treated in a purely didactic way, while others may rise to the glow of conviction and give the flavor of good-will, pathos or humor. The kinds of Topical Speeches are:

(1) *Toasts*, or After-Dinner Speeches of various degrees of importance. In recent years this form is much used by political aspirants for making public their ambitions and desire to "right the public wrongs."

(2) *Speeches of Introduction of the Speaker* to his audience, which should be brief and complimentary, but devoid of unwarranted assurances of the speaker's abilities.

(3) *Before Classes, Clubs, Conventions and Associations* of an educational, religious or benevolent nature, which should be didactic and very direct in style.

(4) *Gavel Speeches*, in which the retiring president of an association presents that emblem of authority to a newly elected president

who is not yet ready to give a formal Inaugural Address; and the response by the president-elect who acknowledges the honor and asks the co-operation and support of the Association for his approaching administration.

(5) *The Notification Speech* of the Chairman of a committee to a presidential nominee in which he reiterates the platform of the party as expressed by the nominating convention.

(6) *The Acceptance Speech* of a presidential nominee made several weeks after the notification in which he gives his mature interpretation of the platform of the party and sounds the key-note of the campaign.

6. *Addresses*.—The Address is much more formal than the Topical Speech and is better suited to larger assemblies. There are six varieties as follows:

(1) *The Salutatory* which is an address of greeting or welcome. In college life it is usually given by the second honor member of the senior class on the commencement occasion, but it has its counterpart in practical life in the address of welcome to some noted statesman, philanthropist or other distinguished citizen or guest. It is necessarily complimentary in nature and requires good taste on the part of the speaker that his praise may not become fulsome or his admiration smack of hero-worship.

(2) *The Valedictory* is a formal farewell address usually made by the first honor graduate at the commencement exercises of a college. It calls up pleasant associations, enshrouds all shortcomings in a mantle of charity, extols those virtues which promise future success and attainment, and pledges loyalty to the treasured memories of the past. Such an address would be appropriate in practical life when a speaker retires from an important field of service. It admits of a high order of eloquence and should inspire hope and confidence in the administration of a successor.

(3) *The Commencement Address*, usually provided by the senior class or the literary societies, is a distinct college speech which inspires students to high standards of literary effort, lofty purposes and aims in life, and noble character. The form should be methodical, the style dignified, and the language a model of good English and rhetorical excellence. Great care should be exercised in the selection of the speaker who should be a literary man of high character, marked achievement and good delivery.

(4) *The Inaugural* of the President of an association or of the nation, the governor of a State, or the chairman of a large and formal convention is an important kind of an address. The speaker should acknowledge the honor conferred upon him, pledge faithfulness to duty and proclaim his policy. He should not criticize his predecessor, but show a strong desire to build by the light of past administrations.

(5) *The Political Address* has for its primary aim the interests of the party or its official candidates, and asks an expression of the will of the people in a vote on election day. The occasion and message of such an address ranges from the harangue of the stump speaker to the most dignified and learned discussion of vital national issues by some great statesman. The speaker should not be too statistical nor use the language of the political demagogue,

but try to be clear, candid and generous to opponents.

(6) *Addresses Before Conventions*, Congregations and other large bodies of people of similar tastes and convictions, not of a political nature, such as Teachers' Institutes, Chautauqua assemblies, Synods, and Conferences, vary according to the occasion and the message, but they are distinctly unlike the other addresses named. They are generally of a professional, educational, scientific or moral order and deal largely with methods, motives and aims of work in a given sphere of activity.

7. *Lectures*.—The lecture is a well recognized form of speech somewhat akin to the address; yet it is more formal, bears the stamp of greater preparation and is used repeatedly in about the same language and form. There are two kinds:

(1) *Lectures to Classes in Schools*, colleges and other institutions, which should be didactic in style, precise in statement, methodical in arrangement, progressive in development and so presented that the students may fully comprehend the subject treated and take notes for future study.

(2) *Platform Lectures* before popular audiences the object being instruction and entertainment. No matter how scientific the subject it must be treated in a popular way with ample illustration and sufficient reduction of technical terms to common phraseology so that the audience may fully understand the speaker. There is a large demand for the highest type of this form of public entertainment.

8. *Sermons*.—The sermon is a spoken discourse by a duly ordained clergyman on some theme or text from the Bible and delivered as a part of a church service. There are six varieties as follows, the first three of which are named by Dr. Broadus from the standpoint of the subject or text, and the last three are considered from the standpoint of the occasion:

(1) *The Subject Sermon* in which the text from Scripture only suggests the theme, the analysis of which and plan of treatment must be entirely constructed by the preacher.

(2) *The Text-Sermon* in which the analysis, headings and subdivisions are all inherent in the text, leaving the tactful preacher, as Dr. Shedd put it, "to find the hidden skeleton."

(3) *The Expository Sermon* which is exegetic in method—a purely Scriptural form of preaching—in which several passages or even a whole chapter may be expounded.

(4) *Didactic Sermons* relating to Church government, influences, beliefs, creeds or the ethics of religion.

(5) *Exhortatory Sermons* which are more emotive in nature and intended to move the will of the congregation to immediate action.

(6) *Special Occasion Sermons*, such as the dedication of a church, installation services, the institution of baptism or the sacrament, sermons on Thanksgiving Day, Christmas, Easter and on fraternity, memorial and funeral occasions.

9. *Orations*.—The oration, as we conceive it, is the loftiest type of public speech and it marks the highest attainment of the public speaker. It is dignified and formal in style, clear in logic, forceful in thought, sound in philosophy, eloquent in language, emotive and

persuasive in spirit, and, withal, it is constructed with the plot and motive of a great drama. It gathers up the salient facts of history and experience bearing upon the subject discussed, holds them up in the searchlight of the present day and generation and weaves them into the fabric of the future. It moves the audience by persuasive, climatic impulses and stirs men to action. It must spring from the orator's own conviction and bring a message that is genuine, unmistakable and generally optimistic. Its object is to educate and inspire the masses, elevate the standards of morality and citizenship, or bring about great civic reforms and national movements. The stamp of its influence is clear in the national life and character of the past, it is a vital, living force in the civil polity of the present and its promise of power and usefulness in the future is so great that it should be placed in the curriculum of every college and university that lays claims to a thorough preparation of youth for the duties and responsibilities of life.

Perhaps owing to a failure to distinguish the oration from the other forms of speech which we have named the rhetoricians of the present day have not greatly improved the classification of orations given by the ancient Greeks and Romans. In view of the preceding discussions we believe that the terms commemorative, panegyric and civic will prove comprehensive and inclusive.

(1) *The Commemorative Oration* celebrates some great event of history and aims, as Dr. Sears states, at "perpetuating something which is worth saving from oblivion and extending into the future what is too valuable to be restricted to the brief period when it was present among mankind." It is a high and inspiring order of oratory. Noble deeds are idealized, the outgrowth of past events and their relation to the needs of the present is shown and eloquent strains of warning or triumph mark the speech. Webster's two "Bunker Hill Monument" orations and Everett's oration on "The National Cemetery at Gettysburg" are notable examples of commemorative oratory.

(2) *The Panegyric Oration* is a formal and elaborate eulogy upon some great person who has passed away. It is an old form of oratory practised by almost all the great orators of the world, and, having stood the test of ages, it will doubtless live as long as virtue is praiseworthy among men. It combines the strongest points of demonstrative oratory and employs the highest type of eloquence. The style must be elegant, the praise, truthful, the encomium specific and not general, and the finished life and its closed events held up as an inspiration to the living for future guidance. George William Curtis' oration on "Wendell Phillips" and James G. Blaine's eulogy on "Garfield" are good illustrations of panegyric oratory.

(3) *The Civic or National Oration* is a deep, earnest discussion of great ethical principles, civic laws, social relations or economic movements necessary to the welfare and perpetuity of the state or nation. It has for its aim the elevation of standards of citizenship, national prosperity and international relations. Like the other forms of orations it employs the philosophy of history in forecasting future events, and rises to the loftiest eloquence whenever ques-

tions of great human interest are considered. "The Labor Problem," "Anarchy," "Arbitration," "Obedience to Law," "The Puritan and the Cavalier in our National Life" and "Internationalism" are appropriate subjects for civic oratory.

II. The Plan of Discourse.—All kinds of discourse should be constructed according to a good plan which will secure proportion, insure growth and prevent digression. Rhetoricians give variously from two to eight divisions of the discourse, but the simple outline, introduction, main discourse and conclusion seem to meet the demands in all kinds of speeches.

1. *Introduction.*—The importance of the first impression is of great moment to the speaker as well as to the audience. With a good introduction the critical attitude of the audience gives place to open-mindedness and acceptance of the truth as it is presented in the main discourse and enforced in the peroration. At the start the speaker must consider the occasion, the object of his speech and the mood of the audience he confronts. He may enjoy the support and sympathy of his hearers, or he may have their prejudice, false impressions or ignorance to overcome before he can discuss his subject successfully. To cover all cases we may say that the introduction should be local as to time, place and object of the speech, generally concrete and always definite in statement, deferential to the audience and to the preceding speakers if there be any, conciliatory if conciliation is needed, dignified both in commendation and condemnation, calculated to awaken attention and interest, brief as the occasion will allow, and it must name the subject or proposition to be discussed.

2. *Main Discourse.*—The distribution of materials, the statement of facts and the logical trend of discussion are closely allied to the subject itself and must vary according to conditions; but one of the following orders, or a combination of them, will apply to any kind of speech:

(1) *The Historical Order* arranges the facts, events, statements, proofs and conclusions, with regard to the time of occurrence. Antecedents relating to the past, circumstances relating to the present and consequents relating to the present and the future are all arranged chronologically. Webster's speech in the trial of Knapp for the murder of Capt. Joseph White, delivered 3 Aug. 1830, is an excellent illustration of the historical order of discussion.

(2) *The Logical Order* links all incidents, testimonies, proofs and arguments into a complete chain of argumentation, the whole subject being to convince the judge, jury or audience. (See ARGUMENTATION). Burke's speech on "Conciliation with the Colonies," delivered in the House of Lords 22 March 1775, illustrates the logical order.

(3) *The Distributive Order* arranges coexisting matters into groups and distributes these groups in their relation to each other and to the general aim of the speech. It often reverses the historical order. This method is especially adapted to the more eloquent styles of oratory, such as the panegyric or civic oration and has been employed by the greatest orators. It tests the tact and skill of the speaker who

must conform unswervingly to the three great principles of rhetorical structure, unity, climax and proportion.

3. *The Conclusion or Peroration.*—This is the crucial point for the skill of the speaker; it is the place of deepest interest and also of greatest peril. It leaves the final impression which may prove a triumph or a dramatic catastrophe for the orator. It should be carefully prepared in thought, language and even in delivery. The essential requisites of a good Peroration are Summary, Brevity and Termination and in formal oratory the heightening effect of eloquent language should be added.

III. *The Qualities of Discourse.*—Various qualities of discourse from Quintilian's three to Professor Bain's seven, have been described by rhetoricians. We suggest the following as inclusive terms for all speeches:

1. *Clearness*, which is the quality by which the thought and emotions are presented intelligibly to the audience. It deals especially with the diction and the syntax of sentences and the logic of thought. To insure clearness the speaker should cultivate the habit of clear thinking, study authors who are notably clear in style, have a definite knowledge of the subject and the main issues, follow a well ordered plan of discourse and yield to wholesome criticism.

2. *Force* is that quality which renders discourse capable of strong, vital utterance and energetic, expressive action. It is acquired by the selection of weighty idiomatic words whose meaning and phonetic constituents are full of power, by the use of strong, figurative language, by a skilful interweaving of short, energetic sentences with the necessary longer ones and by arranging the plan of discourse with special reference to climax and dramatic strength.

3. *Persuasiveness* is that quality of discourse which appeals to the will through the emotions. Persuasive passages should be in proper proportion to the thought-action of the speech and follow only when the minds of the audience have grasped the situation and when the enforcement of truth has been accomplished; hence persuasion is the special function of climaxes and the peroration. The language should be fraught with expressive words, pathetic or stirring associations of ideas and experiences, there should be a judicious use of expletives and striking figures of speech, and, above all, the speaker should manifest an earnestness of purpose and a full mastery of elocution or delivery.

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ORATORY, History of. Oratory first became a subject of particular study among the Greeks settled in Sicily on account of the general unsettlement of all titles to property in Syracuse in consequence of wholesale confiscations. The exiles, on returning to their country, applied to the government for restoration of their possessions, but that could be effected only by their appearing and appealing in person to the courts. In this emergency Corax, by drawing up a few simple rules for the orderly and effective presentation of their claims and drafting a skeleton of an address to the court laid the foundation of the art of oratory

on which, 150 years later, Aristotle reared his immortal work on Rhetoric or Oratory, "incomparably," says Professor Jebb, "the most scientific work which exists on the subject: it may be regarded as having determined the main lines on which the subject was treated by nearly all subsequent writers"—of modern as of ancient times. But between the time of Corax and that of Aristotle was a period of development of the art, both in its theory and its practice, and that period is the golden age of Grecian, or rather Attic, eloquence. Corax had at the first mere imitators who developed the art of logography or of composing speeches or pleadings to be made in the courts by the parties to suits. The logographers then began to furnish to their clients, instead of the mere divisions and heads of a pleading, the whole speech written out, and trained their client in the memorizing and delivery of it. The first notable logographer at Athens was Antiphon (480-410 B.C.), but he had been preceded by a few years by the exceedingly brilliant but shallow sophist Gorgias, native of Leontini in Sicily, an orator and professor of oratory, who by his highly ornate style and his daring paradoxes commanded the interest of all and created a veritable furore. He exacted enormous fees for the privilege of attendance at his lessons in oratory and had for his pupils the most gifted and aspiring of the Athenian youth. He does not appear to have committed to writing the secrets of his special art. He laid the principal stress on delivery, elocution and proposed to his pupils as topics for declamation the philosophical speculations of the Eleatic school and others of an ethical nature. But Antiphon, though he was only a writer of speeches that were to be delivered by others, is reckoned as one of the 10 great Attic orators. He composed speeches not only for parties in suits at law, but also for speakers in the popular assembly, and thus he is to be regarded as the founder of the art of political oratory at Athens. Never in his life till in its last act did he appear as a speaker in the assembly of the people or in the courts of law. When he was brought to trial on the charge of high treason he delivered in self-defense a speech, of which, though it proved ineffectual to save him from capital punishment, Thucydides declared that no abler oration was ever made by any man in a like position. There are extant 17 orations composed by him, among them three "tetralogies"—presumably examples of forensic oratory designed to serve as school exercises and models. Each of the tetralogies comprises four speeches such as might be delivered in a trial for murder, namely, (1) the charge presented by the accuser; (2) the defendant's reply; (3) the accuser's answer to this; and (4) the rejoinder of the accused. The style of Antiphon's orations is rugged and lacks grace and elegance, as compared with that of most of his illustrious successors, but his discourse is ever forceful and convincing. Lysias, the third of the Attic 10, was also a logographer, but he was besides a man active in public life, and in addition to orations prepared for clients to be delivered by them in the law courts or in the assembly, he composed and himself delivered a great many political and forensic speeches. More than 160 orations of Lysias are mentioned by ancient authors; of these, 34 are extant, a few of them

in fragments. In his simple but refined style he presents a contrast to Antiphon. His vocabulary is simple and pure, the vocabulary of common life; he makes little use of showy rhetorical figures, he excels in vivid description; and he passes gracefully from the full and flowing periodic style to that of simple narrative. He was the first to fit the style of the speeches he wrote to the character of the client, who was to deliver them before the court. Isocrates (436-338 B.C.), an eminent teacher of oratory and one of the founders of the art in its highest development, was also by profession a logographer. Twenty of his orations are extant, marked by great elegance of style, but inferior in natural simplicity to those of Lysias, and in fire and fervor to the orations of Demosthenes. To Isocrates Cicero awards the praise of having brought Attic oratory to perfection. Among his pupils were very many who attained high eminence as orators. From the scant records that are extant are gathered the names of 41 famous orators who are known to have come from the school of Isocrates; among them the great Isæus (390-353 B.C.), who, like his master, was a logographer and perhaps the most eminent representative of that profession. He was deeply learned in the law, and was also a great political orator. In forensic oratory he was without a peer. Demosthenes is said by some ancient writers to have been one of his pupils. With Demosthenes and Æschines closes the period of the grand Attic oratory.

After Greece fell under the Macedonian domination Grecian oratory had no longer any arena in public life and it degenerated rapidly. The tradition of the best days was, it is true, preserved in Aristotle's great treatise, and the monuments of Attic eloquence remained, but the virile eloquence of the great orators of Athens was ill fitted for the political circumstances of enslaved peoples. The taste for oratory was industriously cultivated by the Hellenes of Asia Minor and the Greek cities as an elegant accomplishment, and in their hands it became merely one of the arts of decoration. A pompous, florid style, abounding in exquisite figures of speech, extravagant metaphors and empty but sonorous periods displaced the sane, temperate speech of the Athenian masters and exemplars of oratory. And it was while Greek eloquence was in this low estate that the Latins first became acquainted with the arts of Greece. Fortunately the works of the great orators and of the great theoretic expositors of the art, Isocrates, Aristotle, Theophrastus, were still extant, and in them was to be found the corrective of this debased Asian oratory. It was the good fortune of the greatest of the Roman orators, when he resorted to the Greek schools for training in the liberal arts, to have his studies from the first directed to the authentic works of those great masters, and not to the extravagances of the Asian school. Cicero's great rival in aftertimes, the orator Hortensius, was captivated by the glitter of Asianism, and sought to win verdicts in the courts by resonant sentences and flowery rhetoric rather than by clear, calm argumentation commended by a chaste, temperate style of speech. Cicero's orations, of which 56 are extant, are either deliberative and political, delivered in the Senate or the forum, or judicial, forensic, all in defense of accused persons,

with the exception of the memorable four orations against Verres, in which Cicero acts as accuser and prosecuting attorney. He wrote three treatises on the subject of oratory, *De Oratore*, *Orator* and *Brutus*, and there are extant two other treatises relating to the art of oratory, *De Inventione* and *Rhetorica* which have been ascribed to him as author. In the treatise *De Oratore* he expresses his view of what the consummately accomplished orator should be. He must not be the mere rhetorician; neither should he be the mere technical lawyer or the keen political partisan; but he should be the man of thorough education and perfect taste, who can speak on all subjects out of the fullness of his mental store, with variety and copiousness. Such is Cicero's ideal orator, an ideal which unquestionably he approached as nearly as any orator in antiquity, though of course even in his time it stood immensely remote. Though Julius Cæsar, "the greatest name in history," was not by profession an orator, he has been justly rated as second only to Cicero as a master of the art of oratory. It is not to be doubted that had he devoted himself to forensic practice and the oratory of the Senate he would not have been inferior in that career to any of the great orators even of Athens. To Julius belongs the unique distinction of having quelled a rebellion by a speech. Quintilian, born about 80 years after Cicero's death, was a very eminent instructor in the art of oratory and wrote on the subject a practical systematic treatise, *De Institutione Oratoria*, remarkable for its sound criticism and faultless taste.

The triumph of Christianity was in part at least a triumph of oratory: the appointed chief means of disseminating the religion was preaching. The Apostle Paul was an orator of no mean rank. The apologies written in defense of the Christian religion in the 2d and 3d centuries and addressed, most of them, to the Roman emperors by Justin Martyr, Athenagoras, Melito, Apollinaris, Miltiades, Minucius Felix and others were, except that of the last named, in effect harangues written, not spoken. The style is oratorical; but it is oftentimes of the debased Asian kind. Many of the Fathers of the Church, as Tertullian, Cyprian, Athanasius, Basil, Cyril of Jerusalem, the Gregories (of Nazianzum and of Nyssa), Augustine, Ambrose, were eminent as orators no less than as theologians and controversialists. In the Middle Ages the art of oratory played no inconsiderable part when employed for religious instruction or moral exhortation by Bernard, Dominic and his Preaching Friars, Bonaventure, Thomas Aquinas, Berchthold of Ratisbon, Vincent Ferrer and Tauler.

Political oratory was meanwhile in abeyance. It had its revival in England in the times succeeding the Revolution of 1686. Since that time the English bar and the British House of Commons have been almost continuously illustrated by the genius of orators hardly or not at all inferior to those of ancient Athens. It was a crisis in the affairs of the little Syracusan Democracy that gave occasion for the first essay to formulate the laws of the art of oratory; and it is in great crises of states that the highest powers of oratory are called into action. As in England the question of war against the American colonies, the misdeeds of proconsuls

in India, the war with Revolutionary France, Catholic Emancipation, Abolition of the Corn Laws and Liberation of the Blacks, gave inspiration to orators; so here in the United States the questions of Independence, of forming a Constitution, of Nullification, of Abolition of Slavery, of maintaining by arms the Union and of Tariffs, have called into exercise the oratorical powers of our Henrys, Otises, Hamiltons, Clays, Websters, Sumners and Phillipses.

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ORATORY OF SAINT PHILIP NERI.

See ORDERS, RELIGIOUS.

ORB-WEAVER, a spider of the group *Orbitellaria*, represented most familiar by the garden spiders of the family *Epeiridae*, which form their webs on a flat plane in the form of concentric lines of thread sustained by cables radiating from the centre of the coil to various points of support. See SPIDERS.

ORBEGOSO, Luis José, loo-ēs' hō-sā' ōr-bā-gō'sō, Peruvian general: b. Chuquisongo, Huamachuco, Peru, 25 Aug. 1795; d. Lima, Peru, 1847. He was educated in the College of San Carlos, Lima, and entered the militia in 1815. He was a man of wealth and high position and engaging actively into military and political affairs attained great popularity among his countrymen. In 1833 he was chosen President of the republic and though the election was not strictly legal he held the position without interference until 1834 when his predecessor, Gamarra, raised a rebellion against his authority. Several revolts followed and Orbegoso was defeated. He accepted the intervention of President Santa Cruz of Bolivia and the Peruvian-Bolivian confederation was formed with Orbegoso as President of North Peru. When the alliance was dissolved in 1836 he was exiled by Gamarra and his followers, but returned to Peru several years before his death.

ORBIS PICTUS. See COMENIUS, JOHANN AMOS.

ORBIT, in astronomy, the path of a planet or comet; the curve-line which a planet describes in its periodical revolution round its central body. The orbits of the planets are elliptical, having the sun in one of the foci; and the planets all move in these ellipses in accordance

with the law that a straight line drawn from the centre of the sun to the centre of any one of them, termed the radius vector, always describes equal areas in equal times. Also, the squares of the times of the planetary revolutions are as the cubes of their mean distances from the sun. The satellites also move in elliptical orbits. See ASTRONOMY.

ORCA, a genus of whales. See KILLER.

ORCAGNA, ōr-kān'yā, or **ARCAGNOLO**, ār-kān-yō'lō, easel names of Andrea di Cione, Italian painter, sculptor and architect: b. about 1300; d. 1368. He belonged to the school of Giotto as a painter, but his energy and dramatic characterization indicate a great advance on the flatness and conventionality of the Giottoesque style. His main works are three large frescoes, 'The Last Judgment'; 'Hell' and 'Heaven' in the Strozzi chapel of Santa Maria Novella at Florence. In the same chapel is an altarpiece marked with his name and the date 1357. It represents Christ handing the keys to Peter and a book to Thomas Aquinas. In the London National Gallery is his 'Coronation of the Virgin by Christ,' a large altarpiece which originally belonged to the church of San Pietro Maggiore at Florence. All these works exhibit powers of exquisite design, graceful composition and delicacy of coloring. The proportions of the chapel of San Michele and its elaborate tabernacle furnish a magnificent testimony to his powers as a sculptor and architect, for he ranked first in his day as sculptor, painter and architect; and he was also reputed to be an excellent poet and one of the best, if not the best, goldsmith in Italy. His Or San Michele tabernacle is classed among the few very great Gothic structures in Italy. His mosaic work on the façade of the cathedral of Orvieto is among the best of his age. Orcagna's figures are graceful and exceedingly well proportioned and expressive. There has been much trouble in distinguishing Orcagna's work from that of his brother Nardo and also from that of Jacopo di Cione.

ORCEIN, $C_7H_7NO_3$, the chief ingredient of the red and purple dyestuffs known under the name of archil. It is formed by the action of ammonia and oxygen on orcin, $C_7H_5O_3$, and consists of two substances, one having the composition $C_{14}H_{13}NO_4$, the other $C_{14}H_{12}N_2O_3$. When ammonia is added to a solution of orcin, and the whole is exposed to the air, the liquid assumes a dark-red or purple tint by the absorption of oxygen. On acidulating with acetic acid, a dark-red precipitate of orcein is obtained. Orcein is slightly soluble in water and freely soluble in ammonia and fixed alkalis, with a purple or violet color; it is very soluble in alcohol.

ORCHARD, Harry (real name ALFRED E. HORSLEY), American assassin: b. Northumberland County, Ontario, Canada, 18 March 1866. He killed ex-Governor Steunenberg of Idaho with a bomb in December 1905, was arrested, brought to trial, sentenced to death and later received commutation to life imprisonment. He made what purported to be a complete confession in which he admitted himself a forger, arsonist and professional murderer. He claimed to have been employed by the Western Federation of Miners in the commission of his crimes

and laid definite charges against its leaders, Haywood, Moyer and Pettibone, who were tried for complicity in Orchard's crimes, but were acquitted. Orchard's confession, believed to be sincere by Rev. E. S. Hinks, dean of Saint Michael's Cathedral, Boise, Idaho, absolved the general membership of the unions from knowledge of the acts of the leaders, but laid the most serious charges against the officers of the unions. The labor leaders denounced the confession as a conspiracy against labor organizations. It was published in serial form in *McClure's Magazine* and in book form, 'The Confessions and Autobiography of Harry Orchard' (1907).

ORCHARD. A collection of fruit-bearing trees, especially of those bearing deciduous fruits, as the apple, pear, peach, plum, cherry, apricot and quince. For oranges, olives and various cultivated nuts, the term "grove" is probably in more general use. American orchard culture differs widely from European. European conditions require conservation of space and make necessary such artificial methods of training as dwarfing, training upon walls, forming cordons and espaliers, and also that the fruit itself shall be of special attractiveness with respect to size, color, flavor or some other desideratum. As a result, far more hand-work is required in European fruit plantations than in America. In America the intensive methods of Europe are rarely practised, since land is plentiful and cheap, and since the demand is for a large quantity of fruit rather than for fruit of exceptional quality. The trees, therefore, are left more nearly to nature, aided by as little hand labor as possible. As a consequence the orchards of America are the most extensive in the world. According to the United States census of 1900 the total number of fruit trees in orchards was 367,164,694, of which 55 per cent were apple, 27 per cent peaches and nectarines, 8 per cent plums and 4.5 per cent pears. In that year the yield of fruit was valued at \$83,751,840; which was increased, in 1909, to \$140,867,347. This had been increased over 50 per cent by 1917.

During the closing quarter of the 19th century, and especially during the last decade, the management of American orchards was decidedly improved. Prior to that orchards were largely mere adjuncts of the farm, supplying little more than the home need, or at most the small demands of local markets. As a result the trees were allowed, usually, to shift for themselves; harmful insects thrived, plant-diseases spread and the quality of the product was poor. As means of shipment of fruit were improved more distant markets could be supplied and the progressive men began to devote attention to their orchards. Great care is now taken in the selection of land and site for an orchard. Not only must the tree be considered with respect to its nourishment, but the effects of cold, heat, wind, light and other factors must be kept in view. Air drainage has been found to be of equal importance to water drainage. Orchards planted in hollows generally fail because of the settling of cold air from the high ground, and good managers now avoid a situation where no draft of air will tend to keep the trees clear of such chilling influences. The land selected is thoroughly prepared by

plow and harrow before the trees are planted, instead of placing them in separate holes dug in the sod. The trees planted, rarely more than two years of age, are carefully trimmed root and branch, and set in rectangles or hexagons, the latter method permitting cultivation in three directions and being more economical of the land. Instead of allowing the land to grow up with weeds and grass as formerly, modern practice keeps it cleanly cultivated until mid-summer, and in many cases a "cover-crop" is planted for plowing under as a green manure in the following spring. During the first three to six or perhaps eight years, according to the kind of fruit, distances between trees, etc., many orchardists plant hoed crops between the trees to offset the cost of cultivation. Cereals and grasses are now almost never sown in orchards except to reduce the amount of nitrogenous food in the soil and then only when such food is so abundant that the trees are making too great a growth of wood to allow of profitable productivity. The cover-crops act more or less as checks to growth and thus help in the ripening of the wood and the buds. They also serve to hold snow, and to check washing, puddling and leaching of the soil, and if they consist of beans or similar legumes, they enrich the soil with nitrogenous food derived from the air.

Thinning of the fruit has been found of distinct advantage with many kinds, especially when the grower aims to supply the annually increasing demand for finer individual specimens. The objects gained are the removal of inferior, diseased specimens, the destruction of many insect pests and the saving of plant-food which can be utilized by the tree in the development of finer fruits or other parts. It is practised most with such fruits as peaches, pears and apricots, these supplying a fancy market; but is also gaining in favor with apples, plums and cherries. Often the practice removes two-thirds of the fruits set. But the number lost is usually more than offset by the increased bulk of the crop matured, and by the resultant price.

Whereas fruits, even peaches, were formerly marketed in bulk, they are now shipped in small individual packages, even apples being sent to market more and more in smaller packages than barrels. This change has been brought about by the demand of consumers who dwell in cities, where they have small facilities for keeping perishable food-materials and must buy their fruit in small quantities, more often than in large amounts. Means of transportation and storage facilities have developed in pace with this change in the market. Refrigerator cars have made possible the carriage of products hundreds, or even thousands, of miles to a final market, and the erection of cold-storage warehouses at both the shipping and the receiving ends of the line has enabled producers and dealers to control the supply and regulate prices to a great degree. The disadvantage in such a method of marketing fruit is the poor quality of fruits shipped long distances; as they must be gathered before their flavors have fully developed. See AGRICULTURE; FERTILIZERS; FUNGICIDES; HORTICULTURE.

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ORCHARD GRASS, a genus of grasses closely allied to the *Festuca*. See GRASSES IN THE UNITED STATES.

ORCHARD ORIOLE. See ORIOLE.

ORCHARDSON, ôrchard-sôn, SIR William Quiller, Scottish painter: b. Edinburgh, 1835; d. 13 April 1910. He entered the Trustees' Academy and encouraged by the success of his exhibits in the Royal Scottish Academy's exhibitions went to London in 1863 where he contributed to the Royal Academy and other art exhibitions. In 1868 he was elected an associate of the Academy, and in 1877 became an Academician. He was knighted in 1907. Orchardson's works consist almost entirely of historical and genre pictures and portraits. Later in life he often chose his subjects from the occupations and activities of the upper classes of to-day in England and Scotland. Some of his chief works are 'The Challenge' (1865); 'Christopher Sly' (1866); 'Napoleon I on Board H.M.S. Bellerophon' (1880), purchased under the terms of the Chantrey Bequest; 'Un Mariage de Convenance' (1884); 'Salon of Madame Recamier' (1885), in which many distinguished persons are introduced; 'The Rift within the Lute' (1887); 'The Young Duke' (1889); and portraits of the bishop of Saint Asaph, Professor Dewar, Viscount Peel, Lord Kelvin and others; for he excelled as a portrait painter. Almost all his paintings appeared in the Royal Academy exhibitions. He was a painter of brilliant technique with few rivals in certain effects of color and chiaroscuro. His coloring is delicate and luminous and he is a very artistic and skilful draughtsman. Consult Armstrong, 'The Portfolio' (London 1895); Little, 'The Art Annual' (1897).

ORCHESTRA, The, and Orchestral Instruments. The word orchestra, of Greek origin, denoted in classical times an open space in which dances were performed to the sound of various instruments. To-day it designates a corporate body of players upon various instruments ruled and directed by a conductor. The name orchestra is applied both to the performers and to the instruments, because, in technical language, the performers and the instruments are identified.

The so-called "Symphony Orchestra" of to-day, consisting of from 60 to 100 musicians, has been a development starting from a simple band, or group, of instruments and finally growing into the complicated body of various and varied instruments that can produce almost every known kind of tone. In the course of time old instruments dropped out gradually and were supplanted by newer ones, a process that is still going on to-day. The Orchestra of to-day consists of four divisions; (1) the "Strings," comprising the first and second violins, the

violas, the violoncellos and the double basses (or bass viols) which double the bass of the violoncellos; (2) the "woodwind," comprising pipes, or tubes, of wood (some furnished with a reed in the mouthpiece) through which the performer blows, stopping the holes on the pipe with his fingers placed on the keys, such as the flute, the clarinet, the oboe, the cor anglais, the bassoon, etc.; (3) the "brasses," comprising the horn, the trombone, the tuba, etc.; and (4) the "percussion," such as the kettledrum, the side drum, the cymbals, the triangle, etc. These are sometimes called the "battery." To this group also belong all miscellaneous and toy instruments that are sometimes called for by composers to give "local color," or to produce peculiar, or weird effects, such as castanets, tambourines, basque drums, cuckoo, xylophone, Hungarian dulcimers, carillon or "glockenspiel," rattles, celesta and tubular chimes. The harp, though not a permanent member, is often called for by modern composers. Liszt was particularly fond of it. The pianoforte, once an important member of the orchestra (as harpsichord), is now an occasional visitor, as are also the reed and the pipe organ.

The orchestra is as old as the music drama, whose first librettists were Æschylus and Sophocles and whose first orchestra was a band of flutes and lyres. The first known record of any kind of concerted group of instruments occurs in the magnificent 'Ballet comique de la Reyne,' performed in France in 1581 at the Château de Moutiers on the occasion of the marriage of the Duke de Joyeuse and Margaret of Lorraine. The instruments were played by the dancers in full costume and were hautboys (oboes), flutes, cornets, trombones, viola di gamba, lutes, harps, a flageolet and 10 violins. These instruments, however, were not combined into a regular orchestra; but were separated into 10 groups ("dix concerts de musique"). The violins were reserved for one particular scene, in which they played alone, five on each side. In another scene Neptune and his followers were supplied with lyres, lutes, harps, flutes and other instruments. In another scene "Jupiter descended from a golden dome in which were placed 40 musicians with new instruments."

The beginning of the orchestra coincides with the revival of the lyric drama (practically, then, a lost-art) toward the close of the 16th century by a little group of men of letters and musicians, who, filled with the culture of the Renaissance, met in Florence at the house of Giovanni Bardi, Conte di Vernio, with the object of resuscitating a form of musical art. This ultimately resulted in the birth of the opera. The meetings were transferred to the house of Jacopo Corsi; and it was in the Palazzo Corsi that 'Dafne,' words by Rinuccini and music by Peri, was privately performed in 1597. No trace remains of this first opera, which was succeeded by a greater work 'Euridice,' the book for which was also by Rinuccini and the music by Peri. 'Euridice' was given for the marriage festivities of Marie de' Medici and Henri IV of France and it was also performed in public in 1600. Several noblemen took part in the performance. Behind the scenes Signor Corsi presided at the harpsichord (gravicembalo) assisted by three friends, who

played upon the chitarone (lute), viola di gamba and theorbo, or large lute. These instruments, with the addition of three flutes used in a certain *ritournella*, or short interlude or "sinfonia" (see ORCHESTRA MUSIC), seem to have comprised the entire orchestra. A considerable amount of freedom must have been allowed to the performers, for in the score, published in Florence in 1600 and reprinted in Venice in 1608, the accompaniment (or orchestral part) consists of little more than an ordinary figured bass.

A more important orchestra had also been used 10 months before the performance of 'Euridice' in Rome (1600), for the performance of the first sacred music drama or oratorio, called 'La Rappresentazione dell' Anima e del Corpo' and written by Emilio del Cavaliere. This work was practically an opera, for it was given with scenes, decorations, acting, dancing, singing and recitative. The orchestra consisted of one lira doppia, one clavicembalo, one chitarone and two flutes. No part was written for a violin; but a note on the score states that a good effect may be produced by playing a violin in unison with the soprano voice. The orchestra was entirely hidden from view; but it was recommended that the various characters should carry musical instruments in their hands and pretend to accompany their own voices and to play the *ritournelli* interposed. A madrigal with full instrumental accompaniment took the place of an overture. These two works, therefore, of the year 1600 mark the entrance of the body of instruments destined to become the Symphony Orchestra. At the beginning of the 17th century a change took place in the orchestra. Old wind instruments began to disappear and new ones to take their places: the delicate viols were deemed old-fashioned and had to give way to the new violin and violoncello. The famous opera of 'Orfeo,' which Monteverde brought out in Mantua in 1607, is considered a landmark in music and from it modern music finds its beginnings. But, although there were many innovations in the music, the orchestra was conservative in the matter of its instruments. In fact 'Orfeo' was the last great work that was written for the conventional orchestra of the Renaissance. The score calls for 40 instruments: two gravicembali (harpsichords), two organi di legno (little organs), one regale (little organ), two double bass viols, three viole di gamba, two chitaroni (deep lutes), two little violins, 10 viole di braccio (soprano, alto, tenor and bass) and a few ordinary violins of the style that Gasparo di Salo and Mazzini were making at this period, a clarino (shrill trumpet), three trompettes (with sordini), four trumpets, two cornets à bouquin, flutes shrill and deep, two oboes, and an arpa doppia (double harp). But although the orchestra in 'Orfeo' showed nothing new in instruments. Monteverde *individualized* the instruments and made them portray the characters of his music drama and intensify their emotions. He used them, moreover, to depict the terrors of Hades and the beauties of the Elysian Fields. Twenty years later when Monteverde produced his opera 'Tancred and Clorinda,' he used a very different orchestra from that of 'Orfeo.' Twenty years had made a great difference in musical instruments and also the choice of them.

In this work Monteverde called for two violins, two viols (tenor and bass) and the contrabasso da gamba (the double bass). Here it will be seen that he had the complete string quartet—soprano, alto, tenor and bass—and also the reinforcing second violin and double bass (doubling the bass). In a still later work called the 'Incoronazione di Poppea,' brought out in 1642, Monteverde used special instruments to produce certain effects; for instance, trumpets and drums for triumphal scenes; flutes for pastoral scenes; and cornets and trombones for fantastic scenes. Monteverde, in fact, used his orchestra so dramatically and so picturesquely that Wagner copied his methods 300 years later in what the world in the middle of the 19th century was pleased to call the "Music of the Future." Of particular interest is the orchestra for the oratorio of 'San Giovanni Battista,' by Alessandro Stradella (17th century), which is said to have been the means of saving his life by melting the hearts of the ruffians sent to assassinate him on the occasion of its first performance in the Church of Saint John Lateran, Rome. The date is said to be 1676. The work opens with a 'Sinfonia,' consisting of three short fugues followed by a recitative and aria for Saint John. The accompaniment to some of the arias, or airs, is most ingenious and complicated, calling for two complete orchestras.

Renaissance Instruments.—The lute, so famous in song and story, was the favorite mediæval and Renaissance instrument. It was distinguished for its beauty of ornamentation as well as for its tone. It has a pear-shaped, or melon-shaped, body or back (proclaiming its Oriental ancestry), a low bridge with sound-post beneath it, a flat belly, pierced with from one to three sound holes in decorative roses and often beautifully inlaid with colored woods and mother-of-pearl. Attached to the body was a long neck, covered by a fingerboard divided with frets of brass, or catgut, into a measured scale. The strings were of catgut until the end of the 17th century, when silver-spun brass strings were introduced. There were "single-neck" and "double-neck" lutes. The latter were known as theorboes, and after a time they banished the "single-neck" variety. These "double-neck" lutes were known variously as archlutes, chitarmoni and theorboes, according to size. The lute is now esteemed chiefly for its beauty of form and the ornamentation of the sound-board, or belly, frequently embellished with inlays of tortiseshell, ivory, mother-of-pearl and rare woods. As the new violin tribe of instruments arose, the lute fell into disuse and finally into oblivion with the viol family, its gentle companions. The violin-makers destroyed many fine lutes for the sake of their valuable wood; but a number of fine specimens have happily escaped destruction and are preserved in museums and in private collections. The lute-player did not use our system of notation. The special system by which his music was noted, written, printed and read by him was called "Tablature."

The "viol family" consisted of four sizes of instruments: (1) the treble, or discant, which always played the melody; (2) the *viola da braccio* (played with the arm), the tenor viol; (3) the *viola da gamba* (leg viol), corre-

sponding to the modern violoncello; and (4) the violone (double bass), the bass viol which doubled the bass of the viola da gamba. From a small variety of the tenor viol, called *violino piccolo*, the beautiful violin was developed. An idea of the variety of tone that could be obtained from a "concert of Viols" is realized when it is remembered that there were six kinds of *viola da gamba*, three for the bass and one each for soprano, alto and tenor—all with frets on the fingerboard. Then there were seven kinds of *viola da braccio* (arm viols), named great quint bass, bass and tenor, and four little ones. Rich amateurs bought entire sets of these instruments. Then there was the *viola d'amore* (love viol), rather larger than the modern viola and supplied with seven catgut strings (the three lowest wound with silver wire) and below the neck and passing under the bridge seven additional strings tuned in unison with the others, vibrated "sympathetically" with them and produced an effect full of mystery and sweetness. Then there was the *viola bastarda* (a large bass instrument with from 12 to 14 strings); and the *viola di bordone*, or *baryton*. The latter had five to seven strings for the bow to set in motion and 24 metal strings under the neck to be played on by the thumb "pizzicato" (plucked). Haydn composed a large number of pieces for the baryton, as it was the favorite instrument of his patron, Prince Esterhazy.

Another instrument of the Renaissance orchestra was the *lira*, a kind of viol with 12 or 14 strings tuned in a very peculiar way, which permitted the player to find all kinds of chords in peculiar positions. Turning now to the wind-instruments, there were then as now two groups of woodwind and brass. The former was known as the Bombardo, Bombardino, Bombardi, Pommer, Chalumeau, Schalmey, Schalmay, or Shawn family. They appeared in various sizes from soprano to bass. At first these instruments were not played directly by the lips, for the mouthpiece was enclosed in a bag. Later the bag was discarded and a reed was placed in the mouthpiece. In some instruments the reed was double; in others single. The type of the instruments with double-reed was a conical tube of wood with a bell at one end and a bent metal tube at the other containing the double reed mouthpiece. There was a quartet of these: the oboe, or *haut bois*, or hautboy (*high wood*), was the treble; there was also an *oboe d'amore*, and an *oboe di caccia*, hunting-oboe (from which the cor anglais is thought to have been developed); and there were many other sizes and kinds that old records and writers refer to generally as shawms, chalumeaux and schalmeyes—all oboes and bassoons of one kind, or another. Old oboes are called for in Bach's scores, but after his time they dropped out of use. Sometimes a modern composer revives one for the sake of eccentricity, as Richard Strauss in his 'Domestic Symphony' writes for the *oboe d'amore*. The other group of wind instruments, also a large one, was known as Zinke. They required such force of lungs to play them that they were rapidly disappearing in Bach's time. These instruments were made of wood covered with leather and had six holes for the fingers and one for the thumb on the lower side. One of the most important was the *cornetto*. Cornetti ap-

pear in many of Bach's scores and are chiefly used to support the voices. All these Zinke instruments were associated with the trombones, or sackbuts. The Renaissance orchestra also included the harpsichord, gravicembalo, or clavicembalo (the name is spelled variously), and small portable organs called *regale*, or *regal*, positive and *organo di legno*. There were also harps and double harps (*arpa doppia*) and two classes of flutes—*flutes à bec* or "block flutes" (that developed into the flageolet); and "transverse flutes," which appear to have superseded the *flute à bec* about 1720. The *flute à bec* had a mouthpiece at the end, like the clarinet. There were eight sizes of *flutes à bec*, ranging from soprano to bass.

All through the Renaissance period and until the time of Lully it was customary to combine instruments of the same class only. Therefore, we read of a "concert of violins" and a "concert of flutes," etc. A "concert of flutes" required more varieties of the flute than we have to-day. Consequently, there were tenor and bass flutes. In Lully's ballet '*Le triomphe de l'amour*' (Paris 1681), there is a quartet of flutes, the lowest part of which is only possible on a bass flute. When the combination of wind and string instruments was found preferable, the feeble bass of the flute was insufficient and the larger kind of flutes, therefore, fell into oblivion.

Modern Instruments.—Various causes have contributed to the survival of certain instruments and the extinction of others. Quality of tone, mechanical practicableness and the fashions in vogue at different periods of combining instruments have been the causes which have preserved certain instruments and abolished others.

The Strings.—No instrument has had so great an influence on the development of the modern orchestra as the violin. It was developed from the *piccolo violino*, a small instrument, whose chief recommendation was a shrill, piercing tone. This was experimented upon by the early violin-makers for many years until at last, under the hands of the Amati family and their pupil, Stradivari, the resonant and sweet-toned violin arose. The great work of the Cremonese makers had been to perfect an instrument that would have a beautiful tone as well as a penetrating one. When the violin took its commanding place in the orchestra, naturally it needed a stronger bass instrument to support it. Therefore, the old *viola da gamba* was developed into the violoncello. For a long time; however, the *viola da gamba* lingered in drawing-rooms; for amateurs were loth to give it up. The tenor viol and the alto viol were combined into one instrument, the viola; and this explains why the viola is today sometimes called the "alto" and sometimes the "tenor." The double-bass, which "doubles" (that is plays in the lower octave the bass part given to the bass voice), is, strange to say, the old violone, or bass viol, with a few changes. It is still called "bass viol." It retains the characteristics of the old viol family: a flat back (instead of the arched back of the violin family), and the slanting shoulders of the old viols. On the other hand, it has yielded to the shape and position of the *f* holes and the four corner blocks and general shape and curve of the waist.

In 1676 Scarlatti used a double orchestra consisting of two solo violins and violoncellos for the first and a large body of accompanying violins, tenors and basses for the second. In Scarlatti's time the strings—violins, viola, violoncello and double-bass—constituted the real body of the orchestra. The wind-instruments were accessory and used only to give effect and variety.

2. *The Woodwind*.—The woodwind family consists of wooden tubes, or pipes, through which the performer blows. Most of these have reeds. These are subdivided into two groups: double-reed and single reed. The double reed instruments comprise the oboe, cor anglais and bassoons; the single reed instruments, the clarinet tribe. All have a curious nasal, melancholy quality of voice, which was characteristic of the old chalumeaux or shawm family. The oboe is the most complicated of all the reed instruments. It is made in three pieces screwed together, forming a wooden pipe, or tube, with conical bore that widens out into a bell, shaped like a morning-glory. Along this tube are two "speaker-keys," worked by metal rods. The mouthpiece, called "staple," is supplied with a reed. The reed consists of two blades of thin cane attached by silken threads. The cor anglais is the tenor, or alto-oboe, standing in the key of F, a fifth below the oboe. It ends in a kind of ball instead of a bell and the mouthpiece containing the double reed is bent at right angles. The name is derived or corrupted from *anglé* (bent) and corrupted into anglais: the English (*anglais*) have had nothing to do with the development of the instrument. It should, therefore, never be referred to as "English horn" but as *cor anglais*. The oboe and cor anglais assumed their present appearance about the same time. They both preserve the peculiar harsh, plaintive family voice. The bassoon, the bass of the oboe group, has the same general tone on account of the double reed; but it has a comic quality about it and might almost be called the clown, or joker, of the orchestra. Mozart fixed the place of the bassoon in the orchestra: first and second and double bassoon, an octave below the regular bassoon, doubling the bass, just as the double bass doubles the violoncello.

The clarinet has a *cylindrical* bore and a single reed. From a crude instrument of two keys and seven holes, has evolved the present day clarinet with 17 keys and 21 holes, seven of which are covered directly with the fingers and the others by keys. The basset-horn is the tenor clarinet, with two additional keys and a longer bore than the clarinet, taking its name from a German named Horn, who made a little bass clarinet in 1770 and named it for himself. Mozart used it often; for he loved all clarinets. The bass clarinet resembles the ordinary clarinet, only the bell is turned upward. This is doubled by the contrabass clarinet, a big instrument over 10 feet long, folded up and ending in a big metal bell turning upward. The latter is also called the pedal clarinet.

The flute has no reed. It is a tube of three pieces called "joints." On the lower part are six holes to be stopped by the fingers. At about an inch from the head is a hole, across which the performer blows, i.e. throws the "air-

stream" of his preath against the outer edge of the hole, *obliquely*. Formerly the flute had no keys or levers. Its system of keys was developed between 1823-1847 by Theobald Boehm, who continued the experiments begun by a Captain Gordon of Charles X's Swiss Guards. The flute is now a complicated instrument of marvelous agility. Sometimes it is made of silver. Modern composers usually demand two flutes and a piccolo. The piccolo is the little flute. It should properly be spoken of as the *piccolo flute*. It plays the upper octave of the flute, of which it is less than half the length. Its voice is shrill, wild and piercing.

3. *Brasswind*.—The brasswind consist of the French horn, trumpet, trombone, bass tuba, etc. The French horn was introduced into the orchestra about 1720. It is derived from one of the most ancient instruments. The horn is represented in painting and sculpture in the monuments of Assyria, Egypt and India. Originally the horn was taken from the head of an animal, or it was the tusk of an elephant, whence its name "oliphant" in the inventories of the Middle Ages. At first, it had no mouthpiece. The Romans had a huge metal horn, called Bucina, or Cornu, which was curved spirally and wound around the performer's body. In the old hunting-horn this idea was still followed: the tube passed over the player's right arm with the bell projecting over his left shoulder. This instrument was carried from the hunting-field into the orchestra without change. Haydn and Mozart showed the world its possibilities; and then Weber, Mendelssohn and Wagner made poetic and dreamy use of it. The horn was used in its simple form until after 1830, when valves, or pistons, were added. The instrument then became known as the "chromatic horn."

The horn of to-day consists of a great tube, over seven feet long, curved spirally for the performer's convenience of holding it. This tube becomes narrow toward the mouthpiece and widens toward the huge bell. The horn has no reed. The performer's lips do all the work. The "crooks" are movable pieces of tubing inserted into the coils to alter the pitch. There are "crooks" for all keys. The right hand of the player is always placed in the bell to prevent harsh sounds and to produce a sweet, veiled quality of tone. The family of horns is now complete; there are horns in all keys. The modern orchestra usually has two horns; but for some compositions six or eight are required.

The trumpet is a descendant of the clarion. It is practically the soprano of the horn family, but it moves in a higher region than the horn. Like the horn, it is a "transposing instrument" (i.e., music written does not represent the real sounds); but, unlike the horn, it produces only "open sounds." It has a number of "crooks," or lengthening pieces. The scores of Bach and Handel call for many trumpets, because in their day the improvements had not been made that allowed one instrument to play all the notes required. When "keys" were added, it became possible to perform all difficult passages on the trumpet with ease and agility; and the orchestra, therefore, could dispense with the great number of trumpets, until then required. The trombone is a descendant of the old sackbut of

the Hebrews and Egyptians. Sackbuts were made in all sizes during the 16th century. The bass sackbut has come down almost without change to the trombone. The trombone is a slender, brass tube bent twice upon itself and ending in a bell. The two outer portions "slide" upon the inner one. There are seven "positions" for the "slide," each giving a fundamental tone and its harmonies. There are three varieties of the trombone: alto, tenor and bass. As a rule, there are three tenor trombones in the orchestra, but no alto nor bass. The bass tuba is an enormous instrument with a great bell standing upright, supplied with valves and a horizontal mouthpiece. It is over three feet long. It is a descendant of the "serpent" of the Zinke family with the ophicleide (serpent-key) as the connecting link. Wagner made great use of the bass tuba, the deepest voice in the orchestra, the tone partaking of trombone and organ. It has a compass of four octaves, and, having pistons, is a chromatic instrument (i.e., can play sharps and flats). Wagner gave the name *tuben* to a whole family, of which, however, the bass tuba is the only true tuba. Wagner's intention was to introduce a new tone color into the orchestra akin to that of the horns. These new instruments are *modified horns* and are arranged in two pairs—a high-pitched pair and a low-pitched pair. Wagner called them "tenor tuben" and "bass tuben," which has added some confusion to modern nomenclature. There are many other kinds of brass instruments that belong to the military orchestra, but have no place in the symphony orchestra.

4. *Percussion in the Symphony Orchestra.*—There are two kinds of percussion instruments: those that produce musical notes and those that produce only *noise*, not notes. All of these are beaten or shaken. First of the percussion instruments that produce *notes* are the kettledrums. The kettledrums are big copper basins, or bowls, over the heads of which a parchment is stretched, which, by means of screws, can be tuned to a musical note of definite pitch. They are ancient and were brought by the Crusaders from the East. The other drums are the "side" or "snare" (the military drum) with parchment heads and "snares" of catgut, and the big bass drum which always stands sidewise, and which is struck with a stick ending in a soft, round and padded knob. The larger the drum, the more resonant the sounds. The triangle is a steel rod bent into three sides as the name shows. It is tapped with a "beater." The sound is clear and sometimes silvery. The pitch is indefinite. The cymbals are round, thin plates, or discs, of copper, or brass, with a strap attached on the outside of each plate for the convenience of the player. Cymbals are rubbed together, or clashed. Cymbals were known to the Egyptians, Greeks and Romans. The tambourine, a wooden hoop over which a parchment head is stretched and hung with little, metal plates called "jingles" or "bells," is shaken, struck with the knuckles, or rubbed. It is sometimes called "tambour de basque." The tambourin is a long, narrow drum, which the performer beats with one stick. This is the old mediæval "tabor," which was hung around the neck of the player by a cord and played with one hand, while he held the flageolet in the

other. This was the famous "pipe and tabor" combination that the wandering minstrel often played and which even performing animals were taught to acquire. Castanets are two hollow pieces of wood held in each hand of the performer, who clicks them together. They make deep, hollow notes. They get their name from the Spanish word for chestnut, *castaño*, from the wood of which they are usually made. Spanish dancers use them to accent the rhythms as they dance; and they are often introduced in Spanish music to give "local color." When a bell is required in the orchestra, composers give the impression of a deep toll, or a silvery chime, by some ingenious device. Saint-Saëns has in his 'Danse macabre' notes plucked on the harp to sound 12 o'clock; and Wagner for the 'Bells of Montsalvat' in 'Parsifal' originated a row of steel pipes called "tubular chimes." The chime of bells that we often hear in certain pieces, and called, indeed, *carillon*, or *glockenspiel*, is made of a series of graduated bars of steel, or bronze, which are struck by two small hammers.

Even more silvery resonant, and bell-like is the new instrument called the *celesta*, which was introduced by Tschaiowsky and seized upon with avidity by Richard Strauss. The celesta is a square instrument resembling an upright piano, or parlor organ. It has a keyboard, like the piano, and also pedals. The sounds produced are fairy-like and charming. The *xylophone* is a primitive instrument, still used by uncivilized tribes. It consists of graduated slabs of wood, on the principle of the child's toy harmonica and the *glockenspiel*. Sometimes a watchman's rattle—the cogwheel revolved against a hard, but flexible spring of wood, or metal—is used. When an anvil is required, as in 'Das Rheingold,' to give an idea of the work of the Nibelungs, steel bars are used. These are struck by a metal "beater."

In the 'Don Quixote Variations' Strauss introduces a "wind-machine,"—a sort of barrel with some of the staves taken out and the space covered with black silk. This is revolved rapidly by means of a handle; and the silk coming into contact with some cardboard or wood conveniently placed for the purpose, makes a rushing, swishing noise like the wind blowing violently. The cuckoo is a toy instrument consisting of two tiny pipes mounted on a pair of tiny bellows. A plug is pushed in and pulled out to get the sound "cuck-koo"; Haydn used it in his 'Toy Symphony'; but Beethoven in his 'Pastoral Symphony' imitated the sound of birds more artistically than by direct imitation. In this great work the clarinet calls cuck-koo in a realistic manner, while the nightingale replies on the flute and the quail answers on the plaintive oboe.

Evolution of the Orchestra.—The first great orchestra, certainly the first that has come down to posterity in records, originated in France in the days of Louis XIII. It was called the "Twenty-four Violins of the King" and reached its climax of perfection in the time of Louis XIV. The "Twenty-four Violins of the King" played in court entertainments, particularly the splendid ballets; in churches; in gardens; at supper; and for the king and his court to dance. Although called "Twenty-four Violins," the orchestra consisted of violins, altos, tenors,

basses and it often played under Lulli (1632-87). Lulli was the first great conductor. He trained his men carefully and gave particular attention to "the first stroke of the bow." People travelled from England, Germany, Italy and elsewhere to hear Lulli's orchestra. Everybody admired the correct playing, the splendid rhythm, the perfection of the ensemble and the sweetness of the violins. Lulli beat time with a cane and created the traditions in conducting an orchestra which are in use to-day. Lulli's orchestra was large. Its chief instruments were violins in five parts; flutes—straight flutes *à bec* and "transverse," or "german"—oboes, bassoons and double bass viols. "All these parts sounding together" writes a contemporary, "make a symphony so precise and agreeable that whoever hears the 'Twenty-four Violins of the King' play all kinds of airs and dances confesses willingly that he never heard such suave and delicious harmonies before." Contemporary literature is full of allusions to this famous organization. Hardly less famous was the orchestra called "Petits-Violins," which Louis XIV created for Lulli in 1655. At first it consisted of 16 players; but afterward it was increased to 21. This "Twenty-Four Violins" and the "Petits-Violins" often played together, making one large orchestra. Sometimes Lulli added bag-pipes, guitars and hunting-horns, and once he introduced anvils (which the composer of 'Rheingold' and 'Siegfried' followed).

In the time of Corelli (1653-1713), the violin family became the very backbone of the orchestra. Corelli was a great violin virtuoso and a composer. People forget that he was an orchestral conductor of the first order. His orchestra in Rome was famous. Scarlatti was struck with his "nice management of his orchestra and the uncommon accuracy of his whole performance"; and Geminiani relates that "Corelli considered it essential that the bows should move exactly together up or down, and at his rehearsals he would immediately stop if he saw one irregular bow." Alessandro Scarlatti (1659-1725), was of importance to the development of the orchestra, not so much because of his conducting but because he wrote such fine orchestral accompaniments to the airs in his operas. The strings always formed the groundwork of his scores; but he also used oboes, flutes, bassoons, trumpets, drums and what was then unusual in Italy, *horns*. He often divided the strings into four parts and carefully balanced them with the wind instruments, but the latter were always subordinate to the strings. Rameau (1683-1774), also extended the technique of the violins and introduced many new effects, for example *pizzicato* (plucked) chords. He also used the woodwind in a delicate and enchanting manner.

Thus the orchestra had reached fine development with regard to technique and emotional expression in both France and Italy long before the Germans began to influence European music. John Sebastian Bach (1685-1750) stands between ancient and modern music. Bach's contribution to the development of the orchestra is that he treated each separate instrument as if it were an individual and prepared the way for occasional solos in orchestral compositions. Bach wrote for a great many instruments which

were going out of fashion even in his time, such as the oboe d'amore, the oboe di caccia, the viola d'amore and the viola da gamba.

Handel (1685-1751), more of a cosmopolitan than Bach, made his orchestra a strong ally of his singers, whether in opera or oratorio, in both of which he became so famous. Handel conducted at the clavier, or organ, and improvised what might be called a filling in of musical arabesque work. Handel's orchestra consisted of a smaller stringed band than we are accustomed to use to-day; but the violins were reinforced by a greater number of oboes and the basses by a far stronger body of bassoons. Flutes were chiefly used as solo instruments, but sometimes they played in unison with the oboes. The bass instruments were trumpets (doubled *ad libitum*) with drums for their natural bass; horns and trombones (alto, tenor and bass), when the character of the music called for them. The harp, viola da gamba and other instruments that may be described as "soft" were occasionally used for obligato accompaniments, in which they sometimes played an important part. The organ was used throughout. Its part was provided for by the figures of the thorough bass, which served also for the harpsichord. With these means at his command Handel was able to accomplish all that his fiery genius suggested. His orchestra was divided into three sections: (1) the Concertino, two violins and violoncello; (2) the Concerto Grossi, eight first violins, eight second violins, six violas, four to six violoncellos and four double basses; and (3) the Ripienist, or supplementary bass, consisting of six first violins, six second violins, four violas, three to four violoncellos and three basses.

Handel always sought for novel effects. He was the first to assert the personality of the violoncello; he appreciated the fantastic character of the bassoon; he loved the quality of the oboe; and he brought out the kettledrums on several occasions. He used them as a solo for Jupiter's oath in 'Semele.' Handel was considered "very noisy" in his day. Next came Gluck (1714-87), who banished the harpsichord from the orchestra; introduced the harp; employed the clarinet with superb effect, and used the orchestra to add force to a dramatic situation. "Gluck gave the orchestra a new life," writes Tiersot. "With him violins, oboes and trombones are not merely sonorous agents. They are living entities, personages of action. Through the orchestra he adds dazzling beauty to a temple scene, or a scene in the Elysian Fields; and by little touches on certain instruments here and there he can make us feel the mystery of the infernal regions. Gluck's great gift to the orchestra was to make it speak." Haydn (1732-1809) was fortunate in having such a patron of music as the Prince of Esterhazy, in whose magnificent home he lived for 30 years, conducting an orchestra of his own. When Haydn went to Eisenstadt the orchestra numbered 18 instruments. It was greatly enlarged as the years went by. The last symphonies that Haydn wrote are, therefore, much richer than his early ones. Haydn has been called "the Father of the Orchestra." Haydn fixed the form of the symphony. Mozart and Beethoven were his pupils and followers, yet Haydn learned much from Mozart in the way of

writing for instruments. Haydn's orchestra consisted of the string-quartet, two flutes, two oboes, two clarinets, two bassoons, two horns and two trumpets. He left the orchestra in shape for Beethoven to carry still farther. Haydn outlived Mozart; and his last symphonies show the influence of Mozart. Mozart (1756-91) drew surprising and new effects out of the orchestra by his discovering that every instrument had its individual voice or quality of tone. He gave the orchestra what we may call "tone-color." To Mozart a violin was a violin, a flute a flute and so on; and he wrote characteristically for each instrument. Mozart made great use of the clarinet.

The orchestra as left by Mozart and Haydn consisted of first and second violins, viola, violoncello and double bass, two flutes, two oboes, two bassoons, two horns, two trumpets, kettledrums, and, occasionally, two clarinets. Neither Haydn nor Mozart used trombones. As an exception Mozart used them in the last scene of 'Don Giovanni.'

In the First Symphony Beethoven (1770-1827), for the first time in the history of the orchestra, tuned the kettledrum in the key of the dominant instead of the key of the movement. In the 'Eroica' (Third Symphony) he introduced three horns,—a novelty! In every way Beethoven discovered and brought forward the capacities of each individual instrument. He gave each instrument a new dignity and a new standing. The viola, violoncello, double bass, horn, trombone and kettledrum were all brought forward and made solo instruments. The place of the clarinet also became established. No composer ever made the instruments converse as Beethoven. No composer ever made the strings so flexible, humorous, gay and languorous. Beethoven also was the first to take the violins up into the highest register—into the ethereal domain which Wagner exploited so marvelously. Weber (1786-1826) developed the woodwind and made poetic and romantic combinations. He loved the clarinets; made a ravishing use of the horns; and often subdivided the violins. Weber pointed out many ways of which Wagner made use. With Beethoven four horns and three trombones were exceptional. Weber made this number the rule. Schubert (1797-1828) wrote in novel way for the trombones and used the woodwind beautifully. Mendelssohn (1809-47) gave clarity, polish and balance to the orchestra, besides writing beautifully and individually for each instrument. Mendelssohn was a marvellous conductor. The influence of Hector Berlioz (1803-69) cannot be overestimated. He is called the "Father of Modern Orchestration." Berlioz discovered the value of pianissimo brass effects; the ethereal charm of harmonies on divided violins; the true worth of the viola; brought the harp back into the symphony orchestra; grouped instruments into families to get chords of rich and different shades of tone-color; substituted the tuba for the coarse ophicleide; divided the strings; and advocated the sunken and hidden orchestra, which Wagner realized in his theatre of Bayreuth. Liszt (1811-86) followed Beethoven, Berlioz and Wagner in his orchestration, which is always rich, heavy and full of "color." Liszt made great use of the harp. His Hungarian blood

showed itself in his stirring rhythms. Liszt also invented the Symphonic Poem. (See ORCHESTRA MUSIC). Richard Wagner (1803-83) developed the art of orchestral coloring to a point before him unknown and undreamed. In addition to the new combinations that he devised among the instruments of the classic orchestra he introduced new elements, notably the tubas, a family intermediate between horns and trumpets, and the bass trumpet which figures in nearly all of his scores. He also greatly enriched the family of brasses.

In Lohengrin, Wagner uses, in addition to the usual strings, three flutes, one piccolo, three oboes, one cor anglais, three clarinets, one bass clarinet, three bassoons, three trumpets, four horns, three trombones, one bass tuba, three kettledrums, side drum, cymbals, triangle, tambourine and harp. On the stage and behind the scene he has two flutes, one piccolo, one oboe, three clarinets, two bassoons, four trumpets, three horns, three trombones, kettledrum and cymbals.

Tschaikowsky (1840-93), as a rule, kept to the old Beethoven orchestra, with the addition of the bass tuba. His prominent use of the low woodwind combined with violas and clarinets in their *low range*, with bassoons in their *upper range*, accounts in part for his weird and gloomy orchestral effects. Tschaikowsky's instrumentation is particularly novel in his 'Casse Noisette Suite' (Nut cracker), in which he introduced the celesta (see above).

Richard Strauss (1864) has carried the ideas of Wagner still farther. His compositions tax the skill of performers to the utmost; for the Strauss orchestra requires virtuoso performers for the smallest instrument. The "battery" (instruments of percussion) has with Strauss acquired a new prominence. Strauss also calls for many new and unusual instruments. His 'Don Quixote Variations' carry instrumentation as far as possible unless a Chinese orchestra be called on the field. Strauss intricately divides his various instrumental choirs, setting one group in opposition, or juxtaposition, to another, producing the most marvellous acoustical effects and almost staggering the brain and deafening the ear when the entire orchestra is invoked.

Of striking contrast is the orchestra of Debussy (1862-1918), who gets the greatest effect with the simplest means. To produce these effects Debussy employs many old scales and harmonic chords. His orchestra for 'Après midi d'un faun' is composed of three flutes, oboes, clarinets, four horns, two harps, antique cymbals and strings. Debussy's instrumentation is diaphanous, ethereal, delicate and opalescent in color. With the modern French composers orchestral music seems destined to enter new realms; and there is a tendency to revive some of the antique instruments of the Renaissance. Modern ears seem to be tiring of great concussions of sound and to long for more subtle and poetic qualities of tone. *Beauty* rather than *force* seems to be the goal of the most up-to-date composers and conductors. See BAND; BAND, MILITARY; MUSICAL INSTRUMENTS.

The principal Symphony Orchestras of the United States are, in order of their foundation: Philharmonic Society of New York (1842);

Symphony Society of New York (1878); Boston Symphony (1881); Philadelphia Orchestra (1900); Chicago Symphony (1891); San Francisco Symphony (1894); Cincinnati Symphony (1895); Los Angeles Symphony (1897); Minneapolis Symphony (1903); Saint Louis Symphony (1904); Saint Paul Symphony (1905); Denver Symphony (1906); Seattle Philharmonic (1909); Denver Philharmonic (1911); and Kansas City Symphony (1912).

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ORCHESTRA MUSIC. The forms of music written specially for the orchestra have developed and changed in accordance with the evolution and development of orchestral instruments.

Symphony.—The most important of all orchestral compositions is the symphony, not only because of its breadth and dignity of form, but because the greatest composers have chosen it as the vehicle to express their highest musical ideas and their deepest emotions. The word *symphony*, *sinfonia*, or *sinfonie*, was originally used to denote any passages of music that were thrown into relief, as it were; or, in other words, purely instrumental passages in works whose chief interest was concentrated in the voice, or voices. Whenever the instruments, or instrument, played without the voices their work was called a symphony, or symphonies. Gradually the word symphony was used to describe the introductory movement, or prelude; and, in the course of time, it was used in the particular sense of describing the big composition (in four separate divisions, or movements), which reached its greatest climax in Beethoven. The evolution of the symphony forms a long chapter in the history of music. In those introductions to his operas that Lulli (1633-87) produced in Paris, which became known as

"Overtures in the French style," consisting of alternate quick and slow movements, usually dances, the germ of the symphony is found. Sometimes the symphonies composed for certain operas were of sufficient beauty and interest to warrant their performance in concerts. In early days the forms of music were more or less related. Madrigals, fantasias and dances were often strung together loosely. Out of this arrangement the suite was developed; and from the suite arose the majestic symphony.

Various early composers produced symphonies that to-day are interesting only to the student. The Bach family were pioneers in this form; but it was Joseph Haydn (1737-1809) who enlarged the sphere of the symphony, determined its form and developed its capacities of expression. From 1775 to 1794 Haydn wrote more than 40 symphonies, some of which—the 'Military,' the 'Farewell,' etc.—are still played. Next comes Mozart (1756-91) with 49 symphonies, of which the most famous are the 'G-minor' and the 'Jupiter.' Mozart, keeping to the form as arranged by Haydn wrote more than 40 symphonies. Next comes Beethoven (1770-1827) with his nine masterpieces, including the 'Eroica,' the 'Fifth,' the 'Pastoral,' the 'Seventh,' and the 'Ninth,' or 'Choral,' carrying the form of the symphony to the highest climax of majestic expression. Since Beethoven's day the symphonies that are played by modern orchestras are: Mendelssohn's 'Italian' and 'Scotch'; Schumann's works; Raff's 'Lenore' and 'Im Walde'; Schubert's 'C' and 'Unfinished'; Rubinstein's 'Dramatic'; and 'Ocean'; Brahms's four great symphonies; Berlioz's 'Harold in Italy,' 'Romeo et Juliette,' and 'Symphonie fantastique'; Liszt's 'Dante' and 'Faust'; Dvorak's 'From the New World'; Tchaikowsky's six colossal works, including the 'Polish' and the 'Pathetic'; César Franck's 'Symphonie in Re Mineur'; Richard Strauss' 'Aus Italien' and 'Symphonie Domestica'; and works by Gustav Mahler, Sibelius, Sinding, Saint-Saëns, Vincent d'Indy, Chausson, Chabrier, Sgambati (Symphony in B), Scriabine, Balakireff, Borodine, Glazounov, Rimsky-Korsakoff, and other French and Russian composers.

Overture.—Although this name was originally given to the introduction to an opera, oratorio, or drama, the form and name have also been applied extensively to orchestral pieces intended solely for concert use. Formerly a simple movement (or, indeed, sometimes an entire symphony) from a symphony was called on the program "Grand Overture" or simply "Overture." For example, Haydn's symphonies are thus described on the programmes of Salomon's London Concerts of 1791-94. Among the famous overtures that have been composed for independent performance are Beethoven's 'Weihe des Hauses,' written for the opening of the Josephstadt Theatre, Vienna, in 1822; Schumann's 'Bride of Messina,' 'Julius Caesar,' Festival Overture and 'Manfred' (written with incidental music to Byron's poem); Schubert's 'Rosamunde' (1823); Mendelssohn's 'Hebrides' ('Fingal's Cave'), 'Calm Seas and Prosperous Voyage,' 'Melusine' and 'Midsummer Night's Dream' (afterward supplemented by incidental music);

Bargiel's 'Overture zu einem Trauerspiel' (op. 18); 'Medea' (op. 22) and 'Prometheus' (op. 16); Gade's 'Hamlet' and 'Michelangelo'; Goldmark's 'Sakuntala'; Elgar's 'Froissart' and 'Cockaigne' (London Town); and Tschai-kowsky's 'Triumphal Overture on the Danish National Hymn'; 'Storm,' written for Ostrovsky's drama; 'Hamlet,' overture-fantasie; and 'Romeo and Juliet,' overture-fantasie.

Overtures, which, although written for operas, are frequently heard on the concert stage are: Gluck's 'Alceste'; 'Iphigenie en Tauride,' and 'Iphigenie en Aulide' (perhaps the finest specimen of a dramatic overture); Mozart's 'Idomeneo' (1781); 'Die Entführung aus dem Serail' (1782); 'Nozze di Figaro' (1786); 'Don Giovanni' (1787), and 'The Magic Flute' (1795); Cherubini's 'Medea' (1797); Mehul's 'La Chasse du Jenne Henri' (1797); Beethoven's 'Coriolan' (1807), 'Egmont' (1810), and the four overtures to *Fidelio* (1806-07), of which 'Leonore,' No. 3, is the most famous; Weber's 'Preciosa' (1820), 'Der Freischütz' (1821), 'Euryanthe' (1823), and 'Oberon' (1826); Spohr's 'Jessonda'; Rossini's 'Giulianne Tell' (1829); Berlioz's 'Benvenuto Cellini' and 'Carnaval Romain,' both for the opera of 'Benvenuto Cellini' (1838); Nicolai's 'Merry Wives of Windsor'; Wagner's 'Flying Dutchman' (1843), 'Tannhauser' (1845), 'Lohengrin' (1850), 'Tristan and Isolde' (1865), 'Die Meistersinger' (1868), and 'Parsifal' (1882); Smetana's 'Die verkaufte Braut'; and Tschai-kowsky's 'Tempest,' 'Francesca di Rimini,' and 'Fatum' ('Destiny').

Symphonic Poems.—Symphonic poem is a name that Liszt invented for a new form of music that originated with him. In the symphonic poem the movements are not divided but lead continuously into one another and the music is descriptive of a place, a person, or a poetic idea. Liszt applies the title first to his 12 symphonic poems: 'Ce qu'on entend sur la montagne' (Victor Hugo), Tasso, 'Les Preludes,' 'Orpheus,' 'Prometheus,' 'Mazeppa,' 'Fest klinge,' 'Heroide fuæbre,' 'Hungaria,' 'Hamlet,' 'Hunnenschlacht' (Battle of the Huns), and 'Ideale.' Saint-Saëns followed with his Symphonic Poems: 'Le Rouet d'Omphale,' 'Phaeton,' 'Danse macabre,' and 'La jeunesse d'Hercule.' The form is very popular with modern composers and brilliant examples are Richard Strauss's 'Don Juan,' 'Macbeth,' 'Tod und Verklärung,' 'Till Eulenspiegel,' 'Also Sprach Zarathustra,' and 'Ein Heldenleben'; and César Franck's 'Le chasseur maudit' ('Wild Huntsman'). Loeffler's 'La mort de Tintagiles' also deserves mention.

Modern tendency is to escape from the shackles of form and to produce, as it were, impressionist studies in music. Hence the old Suite which once was composed of dance-forms of the strictest kind—allemandes, giques, sarabandes, courantes, minuets, pavaues, branles, gavottes and passepieds has been chosen for many imaginative flights on the part of modern composers. Among these should be mentioned Bizet's 'L'Arlésienne,' incidental music for Daudet's drama; Grieg's 'Peer Gynt' for Ibsen's drama; Charpentier's 'Impressions of Italy'; Tschai-kowsky's 'Mozartiana' and his celebrated 'Casse Noisette' (Nutcracker Suite), adapted from his music to Hoffman's fairy tale, consisting of 'Overture Miniature,' 'March,'

'Dance of the Sugar Plum Fairy,' 'Russian Dance,' 'Arab Dance,' 'Chinese Dance,' 'Mirliton' and 'Dance of the Flowers.' The 'Casse Noisette' suite is considered a masterpiece, exhibiting novelty of treatment, lovely melodies and quaint instrumentation. To this group of imaginative and poetic orchestral music belong Debussy's 'Prelude Symphonique' to Mallarmé's 'Après midi d'un Faune'; Maurice Ravel's 'Mother Goose,' a "toy suite"; Albert Roussel's 'Le festin de l'araignée' and 'Evocations,' inspired by a trip in the Far East; Rimsky-Korsakoff's 'Antar,' suite, and 'Scheherazade,' an Arabian Nights suite; Scriabine's 'Poem of Ecstasy,' and John Alden Carpenter's 'Adventures in a Perambulator,' suite.

The theme and variations reaches its highest development in Richard Strauss's 'Don Quixote,' which exhibits all the resources and peculiarities of modern instrumentation. Vincent D'Indy's 'Istar' (Variations) is also played frequently.

Ballet-music from classic operas holds a place in the modern orchestral repertory. Serenades, capriccios and such works as Debussy's 'La Mer' called "a symphonic sketch," Paul Dukas's 'L'apprenti sorcier,' called an "orchestral scherzo," and Granville Bantock's 'Pierrot of the Minute' show a tendency toward beautifully written orchestral works of light style but masterly in treatment and demanding the most finished work from all the performers in the orchestra. All of these are outgrowths of Liszt's innovation in the symphonic poem and that other form which he named so happily "Rhapsody." Liszt's 'Hungarian Rhapsodies' (orchestrated from his piano compositions) threw a new life and fire into orchestral composition.

One more form frequently appears on the programs of orchestral concerts—"The March." Among the best examples of marches are Tschai-kowsky's 'Slavic' and Liszt's 'Rakocsy.' The 'Rakocsy March' on the national Hungarian theme also occurs in the selections in Berlioz's 'Damnation of Faust,' selections from which are often played as a sort of suite including the 'Will o' the Wisp' and 'Dance of the Sylphs.' Berlioz's delicately orchestrated 'Queen Mab Scherzo' from the 'Romeo and Juliet' symphony is often performed independently.

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ESTHER SINGLETON,
Author of 'The Orchestra and Its Instruments.'

ORCHESTRION, ôr-kēs'trī-ôn, a mechanical musical instrument of the pipe-organ variety in which orchestral instruments are imitated and assimilated by skilful mechanism. Its invention by Michael Welte and its first exhibition at Karlsruhe dates from 1849. Since then considerable improvements have added to its usefulness as a substitute for an orchestra in places of amusement. Chief of these improvements was the substitution in 1887 by the inventor's son Emil of his patented perforated roll with pneumatic action for the original unwieldy and expensive wooden cylinders. In 1904 Emil's nephew Edwin exhibited the Welte-Mignon pianoforte with the pneumatic perforated roll attachment, autographically reproducing with perfect accuracy the technique of famous pianists. In 1912 the attachment to a pipe instrument produced the Philharmonic Organ. See MUSICAL INSTRUMENTS, MECHANICAL.

ORCHID, ôr'kîd, the name of a group of *monocotyledonous* plants (order *Orchidaceæ*) containing more than 12,000 known species and many thousands of varieties, many of which are highly valuable commercially. They are as a whole by far the most interesting order of plants of the entire vegetable kingdom, because of their extraordinary mode of growth and existence, their great age and endurance, their curious habits and the varied forms of their flowers, which are distinct from all other classes of plants, fine in texture and of glowing and exquisite colors. They are remarkable also because of their ready adaptability and free permission of cross-breeding or cross-fertilization, which also practically makes them more fascinating than all other orders or tribes of plants. This is true in their natural habitat, as well as under practical cultivation. This fact also accounts for the almost endless varieties of flowers and colors.

The flower of the orchid as a rule is made up of the following parts: sepals, petals, labellum or pouch, and column or crest, resting on the modified hollow ovary, and bearing the one or two stamens and the two or three stigmas. The pollen-grains are aggregated into peculiar pollen masses. The structure of the flower is a modification of the typical three-part pattern of the lilies. A secondary bilateral symmetry is imposed on the flower, and four or five out of the original six stamens and one of the stigmas are suppressed. Often the flower undergoes a secondary torsion, inverting its position. The labellum, which is a modified petal, is as a rule the most conspicuous part, and is the most wonderfully constructed, as well as the most important, organ of the flower, since through it insects, when in search of the sweet juices stored inside the spur or walls of the flower, are attracted and guided to the nectar and thus accomplish the benefits of cross-fertilization. It is in this way that so many new varieties are produced by the unconscious work of insects, and these are termed "natural hybrids" and are collected and brought to us from tropical wilds. But under cultivation this important work must be done by experts, using delicate camel's-hair brushes, and with a most careful eye and judgment as to the proper time. It is in this manner that the most beautiful

hybrids have been obtained, known as "garden hybrids."

Orchids are distributed over a large area of both the Eastern and Western hemispheres, and are divided into two general groups,— the East Indian and the South American. They are also classified according to their habit of growth and subsistence, as saprophytic, epiphytal and terrestrial. The first-named class includes species which grow mostly in wet and marshy places, and are of little value except for botanical purposes. The epiphytal group is by far the most valuable and most important of them all in every respect. The species of this section are often erroneously called "parasites," when it is a fact that not one of the whole orchid family is really a parasite. Nearly all the members of this class grow and thrive best upon the trunks and limbs of trees in mid air, simply clinging to a single stem or small limb, and, therefore, sometimes quite properly called air-plants. It is this group, too, which contains the most beautiful and most valuable species and varieties and the most varied colors. Their natural habitats are generally confined to tropical and subtropical climates in both hemispheres, where the moisture-laden and humid atmosphere affords the most congenial nourishment to these wonderful plants. Several epiphytal orchids are found in the extreme southern parts of the United States, some of which are highly interesting and fairly valuable.

The terrestrial orchids are such as grow upon the ground and, therefore, have no need of the pseudo-bulbs or hypertrophied stems, which are peculiarly characteristic of the epiphytal section.

Of the other two classes, saprophytes and terrestrial, many varieties are indigenous throughout the United States and even as far north as Canada. These are what are known as the hardy native varieties, which have their resting season during the winter months, while all the epiphytal (sometimes called celestial) orchids, which are found only in tropical climates, have their periods of rest during the dry season. Therefore the cultivator of these plants under glass must imitate nature as near as possible, giving them their season of rest after their new growth is finished, when water should be withheld gradually and only enough moisture applied to keep them alive until nature itself shows signs of fresh activity. This is the time the plants start in to develop and bring forth their flowers upon and from their previously matured and ripened growths or pseudo-bulbs, when moisture is again applied gradually, increasing the supply from day to day; and it is at this period that keen judgment must be exercised.

During the past 10 or 15 years orchids have become one of the most fashionable classes of plants—in fact no other flower has ranked so high in favor or is appreciated more to-day by the better and more highly cultured and æsthetic class of people both in Europe and America than is the orchid. From a commercial standpoint no flowers command the prices for floral decorations, both as plants in bloom and as cut flowers, equal to those of the many beautiful varieties of orchids which are now cultivated. Millions of dollars' worth of these plants are now in cultivation, both in commercial

as well as in private collections, although 25 years ago very few practical gardeners knew much about their cultivation; previous to 1880 it was a rare treat to see even a few of the very ordinary varieties in bloom, and then usually they were only found in private conservatories; scarcely any commercial collections existed. Every year the demand is increasing, and thousands of dollars' worth of these rare plants are imported annually from South American countries, the East Indies, the Philippines and even from Australia. To keep up the supply many practical and experienced collectors are sent out to these distant tropical countries to gather the plants, and the time is fast approaching when it will be almost impossible to collect any more plants within reasonable reach. In fact, so great has been the traffic that several South American governments have put an export duty upon the plants, while others have prohibited their further collection and exportation, entirely from fear of their total extinction.

This state of affairs has brought about the raising and cultivating of thousands of seedling orchids since 1895, and with it the crossing of desirable species and varieties in order to obtain a better and improved class of plants and more beautiful types of flowers. But this is a very slow process, and great patience and many years of time and labor are required to bring them to flowering maturity and size. Carnations and other flowers can be raised in a single year, and even roses in two or three years, but it requires from five, 10 or 15 years to raise orchid plants fit for blooming purposes, so that we may never expect to see orchids in overabundance.

Treatment and Culture.—It is by no means as difficult a task to grow and cultivate these interesting plants as was supposed when orchids were first introduced to the public in this country during the year 1887, when a prominent florist, who practically is the pioneer in orchid culture, gave the first exhibition of these plants in midwinter in the city of New York. This was followed by annual exhibitions for several years, and people became interested in these wonderful plants. It was then thought next to impossible for anyone except an experienced gardener to manage them, and also that it would require specially constructed greenhouses; but many fine flowers have been produced by laymen in ordinary greenhouses—even in light and sunny windows many varieties thrive so well that thousands of people are cultivating orchids there. They, like other tropical and semi-tropical plants, require plain but careful treatment. They can be grown in ordinary flower-pots in a compost of a certain fibrous peat. The lower half of the pot is to be filled with potsherds and pieces of charcoal intermixed; then place the roots and rhizome of the plant in the peat, and fasten and pack it well. These plants can also be grown in earthen pans or wooden cribs, so that the plants may be thus suspended from the ceiling or in the windows. They require a continuous temperature of from 55 to 70° F., not lowered during the night. Water should be applied sparingly at first, when the plants start into growth, and gradually increased as the plants require it. Frequent spraying or syringing, especially dur-

ing the spring and summer season, is highly beneficial. This should be done, however, in early morning or after three o'clock in the afternoon. In the winter or during their time of rest, when the recently made new growth is maturing, water must be given with judgment and only enough to keep them from shriveling.

Nearly all orchids delight in sunlight, but of course are not to be exposed to direct burning hot sunshine. A judicious shading is beneficial to their welfare. If such treatment is observed the plants, if healthy and thrifty to start with, will grow and flower as successfully as any other plants.

Following is a list of the most popular varieties of orchids named in the order of their commercial importance, with the countries from which they are obtained.

Cattleya.—The orchids of this genus undoubtedly rank as the most popular and most valuable among all orchids. They also contain more species and varieties than any other, and are confined entirely to South America, where they are known by their common name of "fleur de mayo," because the majority of these varieties produce their gorgeous flowers in the month of May, generally the beginning of the wet season. Following are the principal named varieties:

C. mossiae, *C. speciosissima*, *C. percevilliana*, and *C. lawrenciana*, all of Venezuela; *C. labiata*, *C. warnerii*, *C. schroederii*, *C. harrissonii*, *C. intermedia*, *C. gaskelliana* and *C. leopoldii*, each Brazilian, and several other kindred varieties; also *C. trianae* (and many varieties), *C. mendeli*, *C. gigas* and varieties, all of the Andes or New Grenada; *C. maxima*, of Peru; *C. dowiana*, one of the most valuable and richly colored species, of Costa Rica; *C. citrina*, of Mexico; *C. skinnerii*, of Guatemala and Costa Rica; and *C. bowringiana*, of Honduras.

Lælia.—This genus is closely allied to *Cattleya*, and includes the following species: *L. purpurata*, often called "queen of orchids," a native of Brazil; *L. elegans*, and its varieties; *L. harpophylla* and others, also of Brazil; *L. anceps* and its many varieties; *L. autumnalis*, *L. gouldiana*, *L. alba*, *L. albida*, *L. majollis*, *L. digbiana*, all of Mexico.

Oncidium.—This genus embraces many beautiful and valuable species and varieties, among which the following are most prominent: *O. varicosum* and *rogersii*, the golden butterfly orchid; *O. kramerii*, mottled butterfly; *O. sarcodes*, *O. macranthum*, *O. marshallianum* and many others, all of Brazil; *O. papilio*, the "butterfly" of the West Indies and South America; *O. splendidum* and *O. cavendishianum* of Mexico and Guatemala; *O. tigrinum* of Mexico, and many others.

Odontoglossum.—This genus includes some of the most beautiful and grandest orchids in existence, and the only difficulty is that up to the present time their successful cultivation under glass is still unsolved in this country, although they are very successfully grown in some sections of Europe, where they command a higher value than almost any other orchid. The most important varieties of this species are: *O. crispum*, *O. pescatorei*, *O. albobpurpurea*, *O. harryanum*, and kindred varieties, all of New Grenada or Colombia; *O. grande*, the "baby" orchid of Guatemala and Mexico; *O. citrosimum*,

ORCHIDS



2 Odontoglossum



1 Lady's Slipper

of Guatemala, and *O. inselexii leopardinum*, of Guatemala and the Pacific slope of Mexico.

Peristeria.—Flower of the Holy Ghost (*Peristeria elata*), of Central America.

Lycaste.—Several species of Guatemala and Mexico.

Catasetum.—These are South American and more interesting than beautiful, except *C. bungeothii*, which is ivory white and very fragrant.

Stanhopea.—A genus including one of the most curious of orchids, throwing its sweet-scented large flowers from the rhizome downward through its receptacle. Some six or seven varieties exist, natives of South and Central America.

Chysis.—Four or five species are found in Guatemala and Mexico. Very curious plants and flowers, one of which is the "laughing orchid."

Schomburgkia.—A genus of very large and curious plants with inconspicuous great flowers. *Schomburgkia crispum* and *S. undulatum* are well-known species of South America and the West Indies.

Masdevallia.—A very curious genus with numerous varieties, bearing highly interesting flowers.

Epidendrum.—A very large genus with many valuable and showy varieties, nearly all of which are highly epiphytal in character. Many of this group are not very desirable.

Of East Indian orchids, first in importance is the genus *Dendrobium*, a very large and valuable group, which includes a large number of species and varieties, all of which are found in the East Indies, Moulman, Assam and Burma, except two, found in Australia. The principal species are as follows: *D. nobilis* and its many sub-varieties; *D. wardianum*, *D. crassinoide*, *D. chrysotoxum*, *D. thyrsiflorum*, *D. densiflorum*, *D. devonianum*, *D. falconeri*, *D. farmerii*, *D. chrysanthum*, *D. dalhousieanum*, *D. formosum*, and many others of less importance, except *D. bigibbum* and *D. phalaenopsis* of Australia.

Phalaenopsis.—A genus of East Indian species called moth-orchids. This is one of the very rarest and most valuable genera and also the most difficult group to cultivate successfully, but their beautiful and really fantastic miniature bird-like flowers render them very desirable. Most of them are natives of and found in the Philippine Archipelago, and in Burma and Siam. Following are the most valuable varieties: *P. amabilis*, *P. grandiflora*, *P. schillerianum*, *P. sanderianum*, *P. luddemaniana*, *P. casta*, *P. stuartianum*, *P. violacea*.

Vanda.—This genus represents the tribe or order of *Vandaceae*, which includes the *Aerides*, *Saccolabium* and *Angraecum*. Prominent species are *Vanda cœrulea*, *V. tricolor* and its varieties; *V. insignis*, *V. lowii*, *V. batemanii*, *V. cathcartii*, *V. sanderiana*, *V. teras*, *V. kimbali*, *V. amesian*; *Aerides odorata*, *A. fieldingii*, *A. lobbii*, *A. virens* and many others; *Angraecum sesquipedale*, *A. eburneum-virens*; *A. articulatum*, *A. ellisii* and *A. leonii*; *Saccolabium giganteum*, *S. blumei*, *S. guttatum*, *S. ampulaceum* and others. Other semi-terrestrial forms are *Calanthe veitchii*, *C. vestita* (varieties *occulata* and *rubra*), *A. turnerii*, *A. regmerii*, *A. gigantea* and a few other hybrids; *Cymbidium lowianum*, *C. eburneum*, *C. gigan-*

tum, and *C. mastersii*; *Cælogyne cristata*, *C. alba* (rare), *C. lemoniana*, *C. flaccida*, *C. dayiana* and *C. pandurata*; *Phajus grandiflora*, *P. tuberculosa*, *P. wallichii*, *P. maculatus* and *P. humboldtii*.

Cypripedium.—This genus, embracing the ladies' slipper, or slipper orchids, is the most important group of terrestrial orchids, and includes a vast number of species from which have been raised a greater number of rare hybrid varieties than from any other class. While not as showy as many of other genera they are highly interesting to the hybridist, and from this standpoint are very valuable. Sometimes a single small plant of a new hybrid will sell for \$500.

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ORCHIL. See ARCHIL.

ORCHIS, the typical genus of the order *Orchidaceæ*. The roots of several species, as those of the *O. mascula* and *O. morio*, when dried, form the European or indigenous salep. That prepared from the first-named species is said to be the best. Salep (q.v.) contains the principle called bassorin and a little starch, possessing similar properties to those of starchy and mucilaginous substances generally.

ORCHOMENUS, ór-kom'-ē-nūs, Greece, (1) an ancient Bœotian city, capital of the kingdom of the Minyæ, situated at the north-western corner of Lake Copais (now Topolia) where it is joined by the Cephissus. The town extended from the marshy edges of the lake up the face of a steep rock hill, on which stood the acropolis. It sent 30 ships to the Trojan War, and at a later date became a member of the Bœotian confederacy. Its government was thoroughly aristocratic, and after the Peloponnesian War the jealous democratic Thebans destroyed it by fire, and sold its inhabitants as slaves 368 B.C. It was rebuilt in the reign of Philip of Macedon, but was again destroyed in 346, and never recovered its position. It was famous for its musical festival in honor of the Graces, who were specially worshipped in the city. In 1880-86 Schliemann excavated there a royal tomb or mausoleum, larger than the "Treasury of Atreus" at Mycenæ (q.v.). (2) A former city in Arcadia north of Tripolitza, on

a hill dominating the road to the north. During the wars of the Macedonians and Achæans it was a fortified post of considerable strategic value. Consult Leake, 'Travels in Northern Greece' (London 1835); Müller, K. O., 'Ochrogenos und die Minyer' (Breslau 1844); Schliemann, 'Ochrogenos' (Leipzig 1881).

ORCIN, ôr'sin, in chemistry, also called orcinol, $C_7H_5O_2$. It exists ready formed in some of the lichens which produce colorless matters themselves, but which yield coloring substances by reaction with water, ammonia or air. Orcin is also prepared artificially from orsellic acid by boiling in water, $C_8H_5O_4 = C_7H_5O_2$ (orcin) + CO_2 . On evaporation the orcin crystallizes in the form of colorless, six-sided, monoclinic prisms, which are soluble in water, alcohol and ether, and have a nauseous sweet taste, but no odor. In the hydrated state it melts at $57^\circ C$. and in the anhydrous state at $108^\circ C$. It is a di-hydroxy-toluene represented by the formula $C_6H_3(OH)_2$. It yields rhombic crystals and forms substitution products with bromine, chlorine and iodine. Orcin gradually turns red on exposure to the air.

ORCUS, ôr'kûs, the Latin name for Pluto, hades or the infernal regions. See PLUTO.

ORCUTT, William Dana, American author and typographic expert: b. West Lebanon, N. H., 18 April 1870. He is associated with the Plimpton Press, Norwood, Mass., and his published writings are 'Good Old Dorchester,' a narrative history (1893); 'Princess Kellisto,' fairy stories (1903); 'Robert Cavalier,' a novel (1904); 'The Flower of Destiny,' a novel (1905); 'The Spell,' a novel (1909); 'The Lever,' a novel (1910); 'The Moth,' a novel (1912); 'The Writer's Desk-Book' (1912); 'The Madonna of Sacrifice,' a Florentine story (1913); 'The Author's Desk-Book' (1914); 'The Bachelors,' a novel (1915).

ORCZY, ôr'chî, Baroness (MRS. MONTAGU BARSTOW), English novelist and dramatist: b. Tarnaörs, Hungary, 19th century. She was the eldest child of Baron Felix Orczy and studied painting at the Heatherly School of Art, London. She made several exhibits at the Royal Academy and in 1900 turned her attention to writing. She became a British subject through her marriage. She contributed a series of detective stories known as the 'Old Man in the Corner' series to the *Royal Magazine* and these were produced as a drama at the New Theatre, London, in 1905. Her other plays include 'The Scarlet Pimpernel,' co-author with her husband; 'The Sin of William Jackson'; 'Beau Brocade'; among her novels are 'The Scarlet Pimpernel' (1905); 'I Will Repay' (1906); 'The Tangled Skein' (1907); 'A True Woman' (1911); 'Eldorado' (1913); 'A Bride of the Plains' (1915); 'Leather Face' (1916); 'Lord Tony's Wife' (1917), etc.

ORD, ôrd, Edward Otho Cresap, American soldier: b. Cumberland, Md., 18 Oct. 1818; d. Havana, Cuba, 22 July 1883. He was graduated from West Point in 1839 and served in Florida and in California until the outbreak of the Civil War when he was promoted brigadier-general of volunteers and assigned to a command in the Army of the Potomac. In 1862 he was made major-general and transferred to

a command under General Halleck and distinguished himself under Grant at Corinth. He was present at the capture of Vicksburg and in 1865 was appointed to the command of the Army of the James and the Department of Virginia with which he was present at the capture of Richmond. Subsequently he was given charge of the Department of the Ohio and in 1866 he was mustered out of the volunteer service. He remained in the regular army in command of the Departments of Arkansas, California, Platte, and Texas successively and in 1881 was retired with the rank of major-general.

ORDEAL, certain acts which a person suspected of crime was made to perform solemnly and which would in the ordinary course of things be hurtful or fatal to him; if, however, he performed them without being injured, he was declared to be innocent. These tests were called ordeals or judgments of God. As the results of them often depended on those who made the preparations, there was abundant opportunity for deceit and malice.

The following ordeals were anciently in vogue throughout Europe: The duel or wager of battle (see COMBAT), in which the conquered was held guilty; the ordeal of fire; of water; the corsned; the trial of the eucharist; the test of the cross; and the judgment of the bier. In the ordeal of fire the accused walked barefooted over coals of fire, or over red-hot plowshares; or had to carry a red-hot iron in his hand; or was made to walk through fire; in the last case he was dressed in cloth covered with wax (the trial of the waxen shirt); if he was unhurt by the fire and the wax unmelted, he was considered innocent. In the trial by cold water (often applied to witches) the test would be whether the accused sank or floated; if the latter, he (or she) was guilty; or the suspected party had to put his hand into boiling water and lift something out. In the corsned trial a priest put the corsned, or halloved bread, into the mouth of the accused, with various imprecations. If the accused swallowed it he was freed from punishment. The test of the eucharist was applied chiefly among the clergy and monks. When they took the host it was believed that God would smite the guilty with sickness or death. In the trial of the cross, the accuser and the accused were placed under the cross with their arms extended or cross-wise and who first moved his hands or suffered them to fall was held to be guilty. Or the accused was placed before relics and two dice were then produced, one marked with a cross. Of these one was taken up at hazard. If it happened to bear the sign of the cross the accused was acquitted. Finally the judgment of the bier was used in the trial of murder; the murdered person was placed upon a bier and the accused made to touch the body. If blood flowed out, or foam appeared at the mouth, or the dead body changed its position, the suspected person was considered guilty. Superstition and artifice gave to these ceremonies the highest authority; and even the emperors were unable to abolish them. The papal chair restrained them by improving the judicial system; after the 14th century ordeals became uncommon and in the 15th they were superseded by the canon law, which invented the oath of purgation, by which the accused was acquitted

on a solemn declaration of his innocence. The universal use of the Roman law also tended to abolish trial by ordeal. In the 16th century only the trial of the bier survived, and this continued even to the 18th. Besides this ordeal of cold water for sorcery (found in Prussia in the 17th century and in the neighboring countries in the first half of the 18th), witches were weighed, and if found to be light they were pronounced guilty. These foolish customs were gradually done away, when Thomasius (See THOMASIVS, CHRISTIAN), succeeding in almost wholly annihilating the belief in witches. Yet as late as 1728 witches were weighed at Szegedin in Hungary. Roman law substituted in their place an equally cruel process, namely, the torture. Ordeals are still found among all the negro nations north of the Zambesi. When a man suspects that any of his wives have bewitched him, he sends for the witch doctor who makes an infusion of the plant called *goko*. His wives all drink it, each one holding up her hand to heaven, in attestation of her innocence. Those who vomit it are considered innocent, while those whom it purges are pronounced guilty and burned to death.

Some negroes on the coast of Guiana put into the hands of the accused herbs and barks of a peculiar character and suppose they have the property of burning the guilty. Ordeals of various kinds, but chiefly the trials by fire and by water, are found among the Chinese, the natives of Pegu, of Kongo, of the coast of Guinea and the tribes of Asiatic Russia. In Senegambia an application of red-hot iron is made to the tongue of the supposed criminal. In Siam the accuser and the accused were placed together in one spot and a tiger was let loose upon them. If one was spared, he was considered innocent; if both were destroyed, they were both deemed guilty; and if both were spared, they were compelled to undergo some more certain test. In eastern Africa, among the Wanaka tribe, are the ordeals of the hatchet, of the copper kettle, of the needle and of the piece of bread. The first two were analogous to the hot iron ordeal and the last to the corsned of Europe. In the ordeal of the needle, a red-hot needle was drawn through the lips of the alleged criminal and if blood flowed from the wound, he was deemed guilty; but if none, innocent. In Madagascar the trial by ordeal is still generally practised by legal authority. The supposed criminal is made to drink a decoction of a poisonous fruit called the *tangena*, a small dose of which acts as an emetic, while a large dose is fatal. By managing the size of the dose, those who administer it can decide the result. Consult Brunner, Heinrich, 'Deutsche Rechtsgeschichte' (Vol. I, Leipzig 1906); Lea, H. C., 'Superstition and Force' (Philadelphia 1892); 'Federico Patteta,' 'Le Ordalie' (Turin 1890); Schröder, Richard, 'Lehrbuch der deutschen Rechtsgeschichte' (Leipzig 1902); Thayer, J. B., 'Preliminary Treatise on Evidence' (Boston 1896.)

ORDEAL OF RICHARD FEVEREL. The (originally published in 1859) has its place in English literature not merely because it is a great novel, but because in writing it George Meredith charged the form of the novel with a higher spiritual and poetic intensity than had before seemed proper to it. In the hands of its greatest English masters, such as Fielding,

Scott, Dickens and Thackeray, it was essentially prose in quality. George Eliot, indeed, had made it the vehicle of thought and in the hands of Dickens and Reade it had been made the vehicle of a "purpose." But Meredith, alone among novelists at the time of the publication of 'Richard Feverel,' while retaining the traditional English form of the novel, its "humors," its broad and leisurely presentation of character, its manner of narration, lifted it into a sphere of imaginative and spiritual intensity, which had hitherto been reserved for the poetic drama. The prose in which 'Richard Feverel' is written is essentially different in quality from any prose previously employed on the novel; for, while it has all the virtues of prose as usually understood, equal to all the customary conditions of the novelist's art, it has a power of kindling and flowering, in dealing with the higher moments and issues of the story, into an impassioned beauty, a spiritual fervor, for parallels to which we must go to the great poets. There are many poignant love-scenes in English fiction, but no other lifts us into the pure ether, "enskied and sainted," of boy-and-girl first love as we are lifted in those rapt and radiant chapters in which Richard and Lucy meet by the river. And this poetic intensity gains in reality by the vitalizing presence everywhere in the book of an intellectual force equally unusual in a novel. A great poet and a great philosopher had, for the first time in literary history, chosen to express themselves in the form of the novel. The philosophic side in 'Richard Feverel' finds concrete, so to say "portable," expression in the constant lightning-play of the epigram. Sir Austin Feverel—Richard's father—keeps a private epigrammatic diary called "the Pilgrim's Ship"—and this device, in varying forms, Meredith employs to flash side-lights of interpretation on his characters and the progress of his story in all his novels. Among these epigrams, which are more highly charged with poetry and "spirituality" than the word epigram usually implies, two at least have passed into the language: "I expect that Woman will be the last thing civilized by Man"; and "Who rises from prayer a better man, his prayer is answered." 'Richard Feverel' is the one book in which all Meredith's powers meet in a fusion nearest harmony. The faults of his style are as yet only indicated and the cryptic euphuism, the harlequinade of verbiage, into which it was soon to degenerate do not cloud or deface it. 'The Ordeal of Richard Feverel' and one or two of his poems, such as 'Love in the Valley,' will probably be all that the future will care to, or be able to, read of George Meredith.

RICHARD LE GALLIENNE.

ORDER, in botany and zoology, a division in classification greater than a family and less than a class. It is based upon broad criteria of structure. The distinctive suffix for names of orders in botany is *-ales*, as in *Rosales*, the order containing the rose. No such suffix is used in zoology. The principal orders in the animal kingdom are enumerated in the Table of Classification in the article ANATOMY, COMPARATIVE.

ORDER OF BUCKS. See ODD FELLOW.

ORDER OF ODD FELLOWS. See ODD FELLOW.

ORDER OF PREACHERS. See DOMINICANS.

ORDER OF SAINT JOHN OF GOD. See ORDERS, RELIGIOUS.

ORDER OF SAINT JOSEPH. See ORDERS, RELIGIOUS.

ORDER OF THE SNARES OF LOVE. See ORDERS, ROYAL.

ORDER OF SOLOMON'S SEALS. See ORDERS, ROYAL, *Abyssinia*.

ORDER OF UNITED AMERICAN MECHANICS. See UNITED AMERICAN MECHANICS, ORDER OF.

ORDERS, Holy. See HOLY ORDERS.

ORDERS, Religious. The primary conception upon which the theory of the monastic life is based is an extremely old one, the belief that it was possible for man to perfect his moral nature and to attain the highest degree of spirituality by resorting to austere discipline and bodily mortification having been common among both Jews and Pagans long before the beginning of the Christian era. In fact, one has but to turn to the Essenes, the Stoics or the Therapeutæ to find the germ of thought that was not only to inspire the asceticism of the early Christian times, but that was to grow and expand into the more purposeful religious orders of our own day; for the ascetics, with their maceration of the flesh, and the anchorites, or hermits, who retired from the world to strive to find spiritual strength in desert places, were the forceful influences in religious life, the examples of spiritual contemplation, without which the great monastic orders could scarcely have been instituted. The first ascetics as a rule did not separate themselves from the world, but sought to find the spiritual perfection to which they aspired by means of prayer and mortification of the flesh, not by withdrawing from the company of men; and even when, in the 3d century, the more zealous Christians were driven by persecution to find a place of refuge in the desert, they lived apart, in separate cells, such an idea as that of a common life or community of interests being entirely foreign to their purpose. It was Saint Anthony who first gathered a class of disciples about his feet that he might teach them, from his own wisdom and experience, how best to attain the spiritual heights upon which their longing eyes were set, and yet Saint Anthony formulated no hide-bound rule of life and announced no principles that would lead one to imagine that he had thought of uniting his individual disciples into a formal congregation. Saint Pachomius, who about 315 A.D. built his first monastery in the Thebaid, had only a vague idea of the value of the community life, and not the least conception of the possibilities for which he was so firmly laying the foundation, the religious orders of the Middle Ages that were at last to become such a powerful influence in the evangelistic work of the world. Although the rule of Saint Benedict was practically the only one that had been adopted at the beginning of the 10th century, the monasteries up to that time had been under the control of bishops. In the 10th century, however, several separate communities formed themselves into congregations under the direction of a common superior, and it was then only that the word

"order" could be properly applied to any of the monastic institutions. This rule of Saint Benedict, which remained the popular monastic rule for centuries, provided a year's probation for novices, and bound each member after that period to constant residence within the monastery, unconditional surrender to the superior, canonical prayer, regular labor and lives of chastity and complete renunciation of the pleasures of the world. The rule of Saint Augustine, another formula for the religious life which was quite widely adopted during the early centuries, was at first intended exclusively for the clergy and was not adapted for the use of the monks, who were then reckoned among the laity. It was not until the 8th century, therefore, when monks came to be regarded as entitled to clerical rank, that it was assumed by other than the regular clergy. The desire to give more austerity to the religious life, a movement which began to be noticeable in the 11th century, resulted in the establishment of several new orders. In almost each instance, while the rule of Saint Benedict was adopted, it was made more strict by special statutes, and to those who aspired to great asceticism life in these congregations appealed strongly. On the other hand, institutions like that of the Trinitarians, the Order of Grace and others that mingled more freely with the world, were adopted by those who felt drawn to lives of action rather than to silent contemplation. To the mendicant orders, which appeared at about this time, many special immunities and privileges were given, and these were exercised everywhere without regard to parochial rights or jurisdictions.

From the beginning of the 10th century the multiplication of these religious associations of men bound together by vows to live devotional lives separated from the world has been almost continuous. Local prescriptions, like the Reformation in England, Germany and other parts of Europe, the Revolution and the later "Law of Associations" in France, the attacks of the Liberals in Spain and other forms of suppression have, from time to time, driven certain orders into extinction, but reorganization and rejuvenation, as well as the institution of new orders upon more modern rules of life, have tended to obliterate nearly all traces of the damage done by the passage and enforcement of such unfriendly statutes. The most numerous bodies of monks, of course, are those of the Roman Catholic Church. In the Eastern Church nearly all the orders follow the rule of Saint Basil, while the monastic orders in the Church of England or the Protestant Episcopal Church in the United States have either adapted old rules of living to their own use or have formulated rules suitable to themselves. In the Roman Catholic Church, however, monastic orders of men or women have been founded for almost every purpose. See also article THIRD ORDERS.

The following is a list of male orders and congregations that have attained any great degree of prominence in the religious world and that have houses in the United States:

ORDERS OF MEN.

AFRICAN MISSIONS, SOCIETY OF THE.—The Society of the African Missions was established in Lyons, France, where the mother house is located. In the United States, the fathers of this society are in charge of the Catholic negroes in the diocese of Savannah, Ga.

ALEXIAN BROTHERS.—A pious society founded in the beginning of the 14th century by one who is simply known as "Tobias." The end of the order is two-fold: The sanctification of the Brothers, and the active exercise of charity toward the neighbor. See **CELLITES**.

ATONEMENT, SOCIETY OF THE.—The Society of the Atonement was established, 3 Oct. 1899, by the Rev. Father Paul, as a religious congregation of the Protestant Episcopal Church. Ten years later, 30 Oct. 1909, the congregation of friars, as well as the sisters and the Society's third order, were received into the Roman Catholic Church. The Society observes the rule of Saint Francis and has for its purposes: "(1) the reconciliation of Anglicans and other non-Catholics to the Apostolic See; (2) the reconciliation of sinners to God through the ministry of penance and the preaching of the Atonement; (3) sending missionaries to the heathen." Located near Garrison, N. Y.

AUGUSTINIANS.—An order founded in Africa, in the 4th century, by Saint Augustine. It is devoted chiefly to intellectual and missionary works in America and Asia. In 1256 the various brotherhoods were united by Pope Alexander IV. See **AUGUSTINIANS**.

BARNABITES, OR REGULAR CLERKS OF THE CONGREGATION OF SAINT PAUL.—An order founded in 1533, by Saint Antonio Maria Zaccaria, for the purpose of combating the evil tendencies of the age by the organization of a congregation of secular clergy who should not retire from the world, but who should live in it and work for it, and diligently attend to their own sanctification while preaching reformation to others. Besides the usual three vows, its members took a fourth: Never to seek office or ecclesiastical dignity, nor to accept any post outside of their order, without the permission of the Pope. With headquarters at Rome it has colleges in various parts of Europe.

BASILIANS.—An order taking its name from Saint Basil, bishop of Cæsarea in Cappadocia. See **BASILIAN MONKS**.

BENEDICTINES.—An order established at Subiaco, in the 6th century, by Saint Benedict, the patriarch of monks in the West. See **BENEDICTINES**.

BERNARDINES, OR WHITE MONKS.—A particularly strict order of Cistercians instituted by Saint Bernard of Clairvaux, about 1115.

BLACK FRIARS. See **DOMINICANS**.

BLESSED SACRAMENT, CONGREGATION OF THE.—Founded by Pierre Julien Eymard, in 1856, as an effort to accentuate the honor paid to the Holy Eucharist, by the perpetual exposition and adoration of the Sacrament. The order has extended to all parts of the world.

BRIGITTINES, OR THE ORDER OF THE SAVIOUR.—Founded by Saint Bridget, about 1344, upon a constitution said to have been communicated by divine revelation. Its rule was that of Saint Austin. It is still represented throughout the European countries.

CAPUCHINS.—The shape of a cowl was the bone of contention that at one time threatened the stability of the Franciscan order and that finally resulted in the institution of the order of Capuchins. The reformer was Matteo di Bassi of Urbino, an Observantine friar, who, becoming convinced that the cowl worn by the friars of that day was not the cowl prescribed by Saint Francis, not only adopted a *capuche* of different shape, but, in 1526, obtained permission of Pope Clement VII for himself and his companions to wear this habit and also to adopt the life of hermits, preaching the gospel in all lands, under the provision that they should present themselves annually at a general chapter of the Observantines. Matteo began his preaching, and was so successful in arousing public interest that the provincial of his order had him arrested for apostasy. He was released from prison through the intervention of relatives of the Pope, and, shortly afterward (1528), a bull was obtained which authorized the union between the reformers and the Conventual branch of the Franciscans, allowed them to adopt the hermit life, sanctioned the wearing of beards and permitted the use of the long-pointed cowl. From that day the growth of the order was rapid. Although still subject to the Conventuals, and under the rule of a vicar-general, the order in 1859 adopted separate statutes in which all the hours for religious service, for mental prayer, for silence, for taking the discipline, etc., were clearly prescribed. It was also stipulated that the order should have no revenues, but should live by begging, and everything about its churches and convents should be as poor and mean as possible. As to food, the friars were permitted to eat one kind of meat a day and wine was not forbidden, but it was specified that nothing should be said to discourage any member who might desire to diet himself more rigorously. Under this rule the order has produced many men eminent for their eloquence, their learning or their Christian virtue, one of the most illustrious being Saint Fidelis of Sigmaringen, who was martyred in 1622. Strangely enough, however, the founder Matteo resigned from the order because the Pope had decreed that Capuchins who did not remain in their monasteries should not be permitted to wear the long cowl. In 1617 the Capuchins were made exempt from obedience to the Conventuals, and, under its present title, the order withstood the Revolution and other similar movements, and is widely represented to-day.

CARMELITES.—Founded in the middle of the 12th century by a Crusader named Berthold who vowed to embrace the religious life if God would make his side victorious in battle. See **CARMELITES**.

CARTHUSIANS.—The order of Carthusians was founded in the 11th century by Saint Bruno of Cologne, who resigned his position as scholasticus of the episcopal school of Rheims in order that he might retire from the world. The foundation of the new order was erected at Chartreuse, an upland valley, in the Alps, more than 4,000 feet above the sea. Although almost unapproachable, being surrounded on all sides by high crags, and while the soil was poor, the temperature low and the air charged with fog at almost all times, the site was gladly accepted, and here Bruno and his companions built their mother house, after the form adopted by the ancient Lauras of Palestine. In 1089 Bruno was summoned to Rome by Pope Urban II, who had been one of his pupils, and he never returned to Chartreuse, spending the remainder of his life in founding convents and promoting the interests of his order. Although it was many years before any statutes were framed for the Carthusians, and while the complete code was not arranged and approved by the Holy See until the latter part of the 17th century, the writings of Peter the Venerable, abbot of Cluny, prove that their life was one of great austerity even without a written rule. "Their dress," he says, "is meaner and poorer than that of other monks; so short and scanty and so rough, that the very sight affrights one. They wear coarse hair shirts next their skin and fast almost perpetually. Their constant occupation is praying, reading, and manual labor, which consists chiefly in transcribing books. In spite of this rule, a rule so strict that the Church permits members of other mendicant orders to exchange their vows for those of the Carthusians while the Carthusian can pass to no other order, the success of its members in their search for the perfect life has been marked by great success." Since 1508, in accordance with the decree of Pope Julius II, the Carthusian monasteries in every part of the world have been under obedience to the prior of the Grand Chartreuse and the chapter-general of the order.

CHARITY, BROTHERS OF.—The congregation of the Brothers of Charity, of Saint Vincent de Paul, was founded in Belgium, about 1809, by Rev. I. Triest, canon of Saint Bavon, Ghent. Founded for the purpose of procuring the sanctification of its members by the practice of the three simple vows and the observation of its constitution, its special object is the ministry of charity. 'His ministry, which the Congregation exercises in its several establishments, consists chiefly in maintaining and ministering to the aged, the sick and the insane; in sheltering poor workmen; in educating children of all classes, but principally the poor, the orphan, juvenile offenders and the deaf, dumb and blind, and by performing any other work of charity to which they may be called.

CHARITY, FATHERS OF THE INSTITUTE OF. See **ROSMINIANS**.

CHARTREUX. See **CARTHUSIANS**.

CHRISTIAN BROTHERS. See **BROTHERS OF THE CHRISTIAN SCHOOLS**.

CHRISTIAN BROTHERS, IRISH.—A religious congregation founded at Waterford, Ireland, in 1802, by Edmond Ignatius Rice, for the purpose of improving the education of the poor who were unable, under the penal laws, to procure Catholic education. The rules and system adopted were those of the institute founded by De la Salle, and the first school was opened at Mount Sion, in Waterford, 1 May 1804. The success of this venture was so great that similar establishments were opened in Dublin, Limerick and other cities, and the results were so satisfactory that on 5 Sept. 1820, Pope Pius VII, acting upon the memorial of the bishops of Ireland, confirmed the institute and granted it a constitution. At the time of the establishment of the system of national education, in 1831, the Brothers placed their schools under the direction of the board, but when it was found that its rules regarding the absolute separation of secular and religious teaching were tending to lead them from the spirit under which they had been founded, they withdrew their connection with the government and have since conducted their schools as an independent institute under the protection of the Church. The Brothers are bound by the usual religious vows and are under the direction of a superior-general.

CHRISTIAN DOCTRINE, FATHERS OF THE CONGREGATION OF.—The congregation of the Christian Doctrine is the outgrowth of a society which was founded by Marco Cusani for the purpose of adopting more systematic methods in the teaching of the doctrines of the Church. When organized in 1560, the membership was composed of a number of priests and laymen who confined their efforts to teaching the catechism to children on Sundays and to the ignorant peasantry on Church holidays and such other times as it was possible to reach them, but the influence of the association was so strongly for good that it attracted the attention and approbation of Saint Pius V. Both Clement VIII, in 1596, and Urban VIII, in 1627, made the confraternity the object of their favor, the latter issuing an order providing that members leaving the community should incur the penalty of apostasy, as if monks. Pope Paul V made the society an archconfraternity.

ternity, and as such it remained until modern times, when it assumed the title of Congregation.

CHRISTIAN INSTRUCTION, BROTHERS OF THE.—This institute, which has for its purpose the Christian education and instruction of youth, was founded at Saint Brice, France, by Abbé John Mary de la Mennais. In 1891 it was approved by the Holy See.

CHRISTIAN SCHOOLS, BROTHERS OF THE.—An educational institute founded by Abbé J. B. de la Salle in the 17th century. See **BROTHERS OF THE CHRISTIAN SCHOOLS.**

CISTERCIANS.—The order of Cîteaux, founded in 1098 by Saint Robert as an offshoot from the Benedictines, eventually became one of the most flourishing and illustrious of all the orders of the Church, but is now so nearly extinct that but few traces remain, the storms of the Reformation and Revolution leaving few of its convents in Europe. The order was founded in 1098 in the desert at Cîteaux, near Dijon, by Saint Robert, who had gathered some 20 zealous hermits about him. Together they entered upon a most austere rule of life, for never was the rule of Saint Benedict followed more rigorously. There was fasting from 14 September until Easter, little sleep and much hard labor, with prayer and religious contemplation as the only relaxation. This was Saint Robert's ideal of the religious life, but he was not permitted to follow it for long, being commanded by the Pope to return to Molesme, his former charge. He obeyed the order promptly, leaving Alberic as his successor at Cîteaux, and it was he who drew up the first statutes of the order, and who changed the color of the habit from brown to white. During more modern times there have been several reforms of the order, the most celebrated being that which was instituted at La Trappe. See **TRAPPISTS.**

CONGREGATION OF JESUS AND MARY. See **EUDISTS.**

CONVENTUALS. See **FRANCISCANS.**

CORDELIERS. See **FRANCISCANS.**

CROSIER FATHERS. See **HOLY CROSS, CANONS OF THE.**

DIVINE LOVE OF JESUS, MISSIONARIES OF THE.—A missionary congregation, with mother house in Rome and a scholasticate at Saint John Kentius College, Washington, D. C.

DIVINE SAVIOUR, SOCIETY OF THE.—Originally organized at Rome (8 Dec. 1881) as the "Society of Catholic Instruction," the name of the Congregation was subsequently changed to the present title, and papal approbation was granted 27 May 1905. In addition to the three vows, members take a fourth, of apostolic mission work. In the United States, the Society has representation in the diocese of Green Bay.

DIVINE WORD, SOCIETY OF THE.—The Society of the Divine Word was founded by Rev. Arnoldus Janssen in 1875. Its object is the promotion of missionary work among the heathen and the education of youth of all races.

DOMINICANS, or ORDER OF PREACHERS.—An order founded in the 13th century by Saint Dominic. See **DOMINICANS.**

EUDISTS.—A congregation of secular priests founded by Père Eudes of Normandy, in 1601. Established under the names of Jesus and Mary, the Congregation had for its object the training of the clergy and the giving of missions. The Eudists make no vows and wear the ordinary dress of the secular clergy.

FEUILLANTS. See **CISTERCIANS.**

FRANCISCANS.—The order founded by Saint Francis of Assisi in the early part of the 13th century. See **FRANCISCANS.**

FRIARS MINOR. See **STRICT OBSERVANCE**, in this article.

GREY FRIARS. See **FRANCISCANS.**

HOLY CROSS, CANONS OF THE.—A religious order with mother house in Holland; represented in the diocese of Saint Cloud.

HOLY CROSS, CONGREGATION OF THE.—The Congregation of the Holy Cross was founded in Le Mans, France, 1793, by Rev. James F. Dujarie. Its object was the rehabilitation of the Christian schools then almost destroyed by the Revolution. At first it was composed only of Brothers, but, in 1837, candidates for the priesthood were admitted under the Rev. B. Moreau, who became the first superior-general. The Congregation received the approval of the Holy See 13 May 1857, as a religious society of priests and brothers, devoting their lives to educational work in universities, colleges and schools, and missionary work at home and in foreign countries. The Congregation was introduced into the United States in 1841 when the Rev. E. Sorin, afterward to become the head of the Society throughout the world, established a college in the primeval forest of northern Indiana and called the place Notre Dame. From this humble beginning grew the University of Notre Dame, one of the largest and most advanced Roman Catholic educational institutions in America. The original band of 11 has developed into a community of 275 priests and brothers, conducting colleges in various parts of the United States and Canada. Its members also have charge of large missions in India, and the Congregation is noted for its progressive spirit and the zealous work and scholarly attainments of its members.

HOLY CROSS OF WESTMINSTER, ORDER OF THE.—A religious order for priests and laymen of the Protestant Episcopal Church. It was founded in New York City in 1881, but was removed to Westminster, Md., in 1892. Its

objects are the cultivation of the spiritual life of its members and the performance of good works, especially those connected with missions, retreats, etc.

HOLY GHOST, CONGREGATION OF THE.—The Congregation of the Holy Ghost, otherwise known as the Missioners of the Immaculate Heart of Mary, is the result of the union, in 1848, of these two societies. The Congregation of the Holy Ghost, had been founded in Paris, in 1703, by Claude Desplaces, a Breton, while the Missioners were organized by Francis M. P. Liebermann, about 1841. Finding that the two organizations were working along practically similar lines, it was decided to effect a fusion, the rule of the Fathers of the Holy Ghost, which had already been confirmed at Rome, being retained, while the constitution adopted should be that of the Missioners. Its objects remained the same: The perfection of its members and the evangelization of the blacks, especially the negroes of Africa. Since 1848 many educational institutions have been founded, and all have been conducted with skill and ability, the most important being the French Seminary at Rome. The Society is governed by a superior-general elected for life, while the missions are conducted under the direction of bishops or vicars-apostolic chosen from the general body. Members take the three ordinary vows of religion, and bind themselves to the Congregation, first temporarily, but afterward perpetually.

HOLY INFANCY, BROTHERS OF THE.—The Brothers of the Holy Infancy consecrate themselves to the care of children, the education of the young and the reformation of juvenile criminals. They direct a Roman Catholic protectory at West Seneca, N. Y.

HOLY SAVIOUR, COMPANIONS OF THE.—A congregation in the Protestant Episcopal Church established for clergymen and such laymen as may be preparing for holy orders. Its members pledge themselves that, while in the Congregation, they will keep a simple rule of prayer, meditation and study in divine things.

IMMACULATE CONCEPTION, REGULAR CANONS OF THE.—Its object is the education of the clergy for parish work as well as the education of seminarians, and yet with many houses in Europe and 16 in Canada, the institute is not represented in the United States.

JESUITS, or SOCIETY OF JESUS.—An order founded by Saint Ignatius Loyola in the early part of the 16th century. See **JESUITS.**

JOSEPHITE FATHERS.—The Josephites, or Sons of Saint Joseph, a congregation founded in Belgium (1817) and devoted to the Christian education of youth. The title is also applied to the members of Saint Joseph's Society of the Sacred Heart for Colored Missions, a society which was established in Baltimore in 1871 and which now has charge of negro missions in many parts of the South and conducts several educational institutions for colored men and boys.

LA SALETTE, MISSIONARY FATHERS OF.—A congregation founded at the shrine of Our Lady of La Salette, by Philibert de Bruillard, bishop of Grenoble, in 1852, in commemoration of the apparition which had made the shrine so famous (19 Sept. 1846). The purpose of the Congregation is based upon the teachings of "Our Lady in her Apparition," and is (1) to labor for the conversion of sinners by the preaching of missions and retreats, and (2) to devote special attention to combating the crimes of the age that were "recalled by the sorrowful voice of the Mother of God at La Salette."

LAZARISTS.—The Congregation of the Priests of the Mission, founded in 1624 by Saint Vincent de Paul, have always been popularly known as Lazarists, probably because of the fact that they were early located at the College of Saint Lazare in Paris. The institution was founded for the direct purpose of preaching missions in country districts in order that the peasantry might be awakened to the danger of making bad confessions, but the avowed object of its members as specified in its constitution, confirmed by Urban VIII in 1632, is (1) the sanctifications of its own members, (2) the work of preaching missions and (3) the training of an exemplary clergy. At the present time the Congregation has houses in almost every part of the world, many Asiatic missions having been placed in their charge at the suppression of the Jesuits, in 1773.

MARIAN FATHERS.—An Italian congregation which has an American representation in the archdiocese of Chicago.

MARIST BROTHERS, or LITTLE BROTHERS OF MARY.—An order founded at Laval, France, in 1817, by the Venerable Joseph Benoit Marcellin Champagnat. The object is the education of youth.

MARIST FATHERS.—The Marists, otherwise known as the Society of Mary, is a religious order founded, about 1816, by Very Rev. Father Colin, who desired to establish an association which should unite the work of education with that of preaching missions. In 1818 Pope Pius VII expressed his approval of the project, and, thus encouraged, Father Colin proceeded with his work of organization. From the beginning the Society has devoted itself to the foreign missionary field. In 1836, the Congregation of the Propaganda entrusted the organization with the work of spreading the faith in western Oceania, and while no Catholic priest had ever visited the islands, the Marist Fathers penetrated even to the most savage tribes and everywhere succeeded in making converts

to Christianity. Many missionaries were martyred by the cannibals, but, never discouraged, the Fathers returned to the work of civilization and salvation. The order is now represented in nearly every part of the world.

MARY OF MONTFORT, COMPANY OF.—Founded by Blessed Louis Marie Grignon de Montfort in 1713, to preach missions and retreats and do missionary work. In the United States the Society has a house in the diocese of Brooklyn.

MARY OF PARIS, SOCIETY OF.—Founded for the purpose of educational and missionary work, the Society is extensively represented in all countries. The members are also known as "Brothers of Mary."

MAURISTS.—The popular name for the members of the Congregation of Saint Maur, that offshoot from the Benedictine order which became so famous during the 18th century, especially for its literary achievements. Founded, in 1618, by Dom Benard, as a more austere branch of Benedictines, it immediately received the support of high ecclesiastical authorities, and its influence extended throughout the country. While its early history was marked by its fervor for the religious life, its later record was not so brilliant. Infected by Jansenism; overrun by a demand for a relaxation of almost every rule; tainted by the pseudo-philosophic spirit of the age, and, in some places, even by Freemasonry, the dissensions which were awakened by the opposing factions would have been sufficient to have wrecked the order ultimately even if the suppression of 1792 had not come to put an end to its existence.

MECHITARISTS.—A congregation founded by Mechitar, an Armenian youth of an ancient Catholic family, in the early part of the 18th century. While a firm adherent of his Church, his love for his nation was so great that he determined to devote his life to the instruction and improvement of his people. From the time of his ordination as priest, in 1699, it was his ambition to found a convent from which his educational work might be conducted; but while he made several unsuccessful efforts, it was not until about 1717, when he obtained the right to the island of San Lazzaro, from the government of Venice, that he was able to see his hopes realized. There he founded the great Armenian convent from which the works of the Mechitarist presses go forth to all parts of the world in which there are Armenians to read them.

MERCY, FATHERS OF.—An order founded in 1808 by Very Rev. Jean Baptiste Rauzon, vicar-general of Bordeaux, for the restoration of religion in France after the Revolution. At that time the Fathers were known as "Missionnaires de France." In 1834 the Society now called Fathers of Mercy was formed, its object being to give missions and retreats, to assist the parochial clergy in preaching and to conduct colleges, seminaries and other educational institutions.

MINORITES. See FRANCISCANS.

MISSIONS, CONGREGATION OF THE. See LAZARISTS.

MOST PRECIOUS BLOOD, CONGREGATION OF THE.—The Congregation of the Most Precious Blood, otherwise known as Sanguinist Fathers, was founded in 1823 by the Venerable Caspar del Bufalo. The object of the new congregation was to counteract the evil effect that the French Revolution and the subsequent wars throughout Europe had had over the minds of the people. By preaching missions and giving retreats the Fathers called attention to the Precious Blood, and their efforts succeeded in arousing such a spirit of devotion that by 1840 the community had spread over the whole of Italy and into other parts of Europe. In 1843 the order reached the United States and established communities throughout the Middle and Western States.

NAZARETH, BROTHERS OF.—A religious order for laymen in the Protestant Episcopal Church. Founded in 1886, its objects are "prayer and manual work."

OBlates.—A congregation of secular priests who, as their name implies, "offer themselves" to perform any duty that a bishop may assign. The first institution of this character was founded in 1578, when Saint Charles Borromeo, archbishop of Milan, organized a band of zealous priests as the congregation of "Oblates of the Blessed Virgin of Saint Ambrose." The experiment proved so satisfactory that several other congregations have since been organized, conspicuous among which are the Oblates of Italy, an association founded in 1816 to assume control of the missions of eastern Burma; the Oblates of Mary Immaculate, founded in 1816, and now represented by two provinces in the United States; the Oblates of the Sacred Heart, established in 1857, and the Oblates of Saint Francis de Sales, a congregation of priests with mother house in Rome and an American novitiate established in Wilmington, Del., in 1903, and transferred to Childs, Md., in 1907.

OBSERVANTINES. See FRANCISCANS.

OUR LADY OF LOURDES, BROTHERS OF.—A congregation founded in 1830 by Rev. S. M. Glorieux, who desired to institute an order whose duty it should be to care for the orphan, to promote the Christian education of the young, especially in the case of the poor, and to nurse and care for the sick and aged. By a decree dated 18 July 1892, Pope Leo XIII gave his full approbation to the order, which is widely represented both in this country and in Europe.

PASSIONISTS, or the DISCALCED CLERKS OF THE MOST HOLY CROSS AND PASSION OF OUR LORD JESUS CHRIST.—

An order founded by Saint Paul of the Cross, who assumed the habit of the order with the sanction of the bishop of Alessandria, in 1720. A year later, having formulated his rule of life, he went to Rome seeking permission to found his order. Although he was not looked upon with disfavor it was 1737 before the last obstacle was removed and the first monastery established. In 1746 the rules of the order were confirmed by Benedict XIV and, shortly afterward, Clement XIV favored the Fathers by conferring upon them the church of Saints John and Paul, on the Caelian Hill. From that day the Congregation rapidly extended, first throughout Italy, and, afterward, into other parts of Europe, even obtaining a good foothold in England by 1842. Ten years later the order was introduced into the United States by Bishop O'Connor of Pittsburgh. There are few orders that follow a more austere rule, for the Passionists fast three days in each week, as well as through Advent and Lent, and sleep little, rising to say all the offices in choir at the canonical hours. Their habit is simple, if not mean, nothing being worn on the feet but sandals, and all the time not given to the work of giving or preparing for missions or retreats is devoted to contemplation. Beside the three usual vows, members of this order take a fourth, that they will at all times do their utmost to keep the memory of the Lord's passion ever alive in the hearts of the faithful.

PAULISTS. See PAULISTS.

PICPUS.—There have been two congregations of Picpus, the first a reform of the Third Order of Saint Francis, which was instituted by Vincent Mussart in 1594; the second, a congregation founded by Pierre Coudrin, in the latter part of the 18th century. Having, like other seminaries, been dispersed by the French government, Coudrin formulated the plan for the organization of the Congregation which should not only undertake to prepare candidates for the priesthood and the missionary field, but should protest against the infidelity of the times by maintaining a perpetual adoration of the Blessed Sacrament. So well did he plead his cause that he aroused the sympathies of high ecclesiastics, and, in 1805, he was able to open the first house of his Congregation in the Faubourg Saint Antoine, Paris. By 1817, when the full approbation of the Holy See was obtained, the Fathers of Picpus were in control of several important educational institutions, and, in 1825, a company of the priests of the order were sent to the Pacific islands by Leo XII, in the hope that they might convert the savage natives to Christianity. From that time most of their activity has been devoted to missionary endeavors, and the fact that their membership has included such men as Father Damien, whose work among the lepers will never be forgotten, explains the reason for their great success in the mission fields.

PIOUS SOCIETY OF MISSIONS.—Founded in 1835 by Venerable Vincent Mary Pallotti, its object being to preserve the faith among Catholic emigrants and to propagate the faith among non-Catholics and infidels. The Fathers started their first American Italian mission in New York City in 1883 and the society has since extended its influence throughout the United States.

PREACHERS, ORDER OF. See DOMINICANS.

PREMONSTRATENSIA NS.—An order of regular canons founded by Saint Norbert at Premontre, near Laon, in 1119. The rule of the order is that of Saint Austin, its habit white, whence its members have frequently been known as "White Canons." While its founder imposed perpetual fasting and an entire abstinence from meat as an inviolable rule, a gradual relaxation occurred, and from time to time the order was threatened first by one then by another of the several reform movements which were instituted. In spite of this it flourished and, at one time, there were more than a thousand Premonstratensian houses in various parts of Europe. Then came the religious disturbances in England, the Reformation, and, finally, the Revolution, at the close of which only eight houses remained undisturbed. Since that time a few more houses have been opened, especially in England, but there is no comparison between the present almost impoverished institutions and the order which was once such a powerful influence in the religious life of Europe.

RECOLLECTS.—A branch of the Franciscan order which has been in existence for more than three centuries. Although originally (1597) the French branch of the reform movement led by the friars of the Strict Observance its members have guarded the austerity of their rule so zealously and have kept so free of any taint of Jansenism that many favors have been shown them, one being the order which placed them in charge of the convent at Jerusalem.

REDEMPTORISTS, or CONGREGATION OF THE MOST HOLY REDEEMER.—A congregation founded by Saint Alphonsus Maria de Liguori at Scala, in 1732, as the result of his experience in evangelistic work among the poor. Both in the great cities like Naples and in the rural districts which he had visited for the purpose of giving missions Alphonsus had found a moral and spiritual destitution which appealed to him as most pitiable, and it was his desire to institute an order of zealous men who should be willing to strive to copy the life of Jesus Christ in all things, especially in following His example of evangelistic work among the poor and needy, that led to the formation of this congregation. Beset

by many obstacles and hindered by opposition from strong political sources Saint Alphonsus persisted in his work. One by one houses were founded in different parts of the papal states, gradually they spread beyond the Alps, and when, in 1749, Pope Benedict XIV approved its rule the Congregation was in a most prosperous condition. Originally called the Congregation of the Most Holy Saviour, the name was changed to that of the Most Holy Redeemer, by order of the Pope, but its rule remained unchanged. The members not only take the three simple vows but make a fourth, a vow of perseverance until death in the institute, and their vow of poverty binds them to refuse all dignities and offices that may be tendered them outside the Congregation. The chief occupation of the Redemptorists is the preaching of missions and retreats to persons of all classes, but especially to those who are most neglected by other clergy. In fact so anxious was the founder that the Congregation would pursue this principle, that he forbade its members to undertake any educational work that might distract their minds from the neglected poor to whom he desired them to devote their lives. The order, which still flourishes, is under the direction of a superior called the Rector Major who is elected for life.

RESURRECTION, CONGREGATION OF THE.—Founded in Paris in 1836 and devoted to educational and missionary work; represented in the United States in Illinois and Kentucky.

ROSMINIANS, or FATHERS OF CHARITY.—A congregation founded in 1828, by Antonio Rosmini, for the purpose of promoting works of charity of every sort, an aim which was fully realized, for during the first 10 years of its existence its members were engaged in preaching and teaching, in giving retreats, in visiting the sick, in missionary work at home and abroad, in caring for prisons and hospitals, in almsgiving and in general literary labors. During this period the order had extended to England and it is now represented by houses in almost every part of the world.

SACRED HEART, BROTHERS OF THE.—A congregation founded at Lyons, France, in 1820, by Père André Coindre, a member of the Society of Missions. The two objects of the institution are (1) self-sanctification by devotion to the Sacred Heart, and (2) the Christian education of youth in schools, asylums and colleges. In September 1900, at a general chapter held in France, two new provinces were established, one for the United States and the other for Canada. A novitiate house for the United States was opened at Metuchen, N. J., in June 1901, and this is now the official residence of the provincial of the order.

SACRED HEARTS OF JESUS AND MARY, CONGREGATION OF THE.—Also known as the "Congregation of Picpus"; founded in France in 1769, for the perpetual adoration of the Blessed Sacrament and the promotion of devotion to the sacred hearts of Jesus and Mary. In 1825 the evangelization of the Sandwich Islands was entrusted to the Society. The congregation is represented in California, Texas and Massachusetts. See also PICPUS in this article.

SAINT CHARLES BORROMEO, CONGREGATION OF THE MISSIONARIES OF.—A congregation founded by Bishop Scalabrini at Piacenza, Italy, in 1887, its object being to provide missionaries to the Italian emigrants to North and South America. Although the scope of work and aim of the Congregation is restricted to this field, the institution of the order met with the warmest approval of Pope Leo XIII, and his letter of 1888, addressed to the archbishops and bishops of America, in which he expressed his interest in the purpose of the new organization, did much to further its work in this country.

SAINT EDMUND, SOCIETY OF.—An English congregation with an American house at Swanton, Vt.

SAINT FRANCIS SERAPHICUS, POOR BROTHERS OF.—An institute founded 24 Dec. 1857 by Philip Hoefer, principal of Saint Peter's Parish School, Aix-la-Chapelle, Germany. Its object is the promotion of the Christian education of youth.

SAINT GABRIEL, BROTHERS OF.—An institute founded in 1705 by the Blessed Louis Marie Grignon de Montfort. Its object is the education and Christian instruction of youth as well as the care of deaf, dumb and blind institutions and orphan asylums.

SAINT JOHN THE EVANGELIST, SOCIETY OF MISSION PRIESTS OF.—Founded by several ritualistic clergymen of the Church of England, at Cowley, England, in 1865, the objects of this society are to assist its members in striving after Christian perfection and to work for the advancement of God's glory by conducting missions and retreats, and by such other methods as He may suggest. The first company of Fathers arrived in the United States in 1872, and they are now extremely influential, especially in High Church circles.

SAINT JOSEPH, ORDER OF.—A title that has been borne by two communities: (1) the Order of Priests of the Mission of Saint Joseph, a congregation founded by Jacques Cretenet, at Lyons, in 1640. Its purpose was devotion to foreign missions. It was suppressed by the Revolution. The present bearer of the name is the Order of Saint Joseph, a teaching order founded at Grammont, Belgium, in 1817, by Canon Van Crombrughe, its purpose being the improvement of the education given the children of persons of the commercial and industrial classes.

SAINT JOSEPH'S SOCIETY OF THE SACRED HEART.—See JOSEPHITE FATHERS, in this article.

SAINT VIATEUR, CLERICS OF.—The community of the Clerics of Saint Viateur was founded in 1835 by Very Rev. F. L. M. J. Querbes, pastor of Vouries, near Lyons. Its objects are educational.

SALESIAN FATHERS.—The order of Salesians is a society of priests and lay brothers founded by Don Bosco, a priest of Turin, Italy, in 1864. In 1874 the order received the approval of Pope Pius IX. Its primary object is the rescuing of poor, homeless boys from the street, providing them with food and shelter in the institute of the Society.

SANGUINISTS. See MOST PRECIOUS BLOOD, CONGREGATION OF THE, in this article.

SERVITES (also known as Servants of Mary), a mendicant order founded in 1233 by seven pious merchants of Florence, who sold their property, distributed the money among the poor, and, taking up their abode in a small house, lived according to a rule of great austerity, supporting themselves by begging in the streets. Innocent III, in 1487, placed the Servites upon a plane of equality with the other mendicant orders. The order suffered greatly during the Reformation and the Revolution, but many of its houses have been rebuilt and there are now flourishing Servite establishments in many parts of the world.

STRICT OBSERVANCE, PRIARS OF THE.—An austere branch of the Franciscans established by Blessed John de Puebla, on the Sierra Morena, in Spain, 1489. The branch became a separate congregation and so remained until 1897.

SULPICIAN.—A society of priests founded in 1642 by Abbé Jean Jacques Olier at the seminary of Saint Sulpice in Paris. The members devote themselves to the direction of theological seminaries.

SYLVESTINE BENEDICTINES. See BENEDICTINES.

THERESIANS.—A name applied to those Discalced Carmelites who live under the reform rule of Saint Theresa.

TRAPPISTS.—A reform of the Cistercian order instituted in 1662 by Armand Jean le Bouthillier de Rance. Assuming control of the abbey of La Trappe, in 1660, he found it in a most deplorable condition. The Cistercian rule had been so far relaxed that many of the members had ceased to live in community, and de Rance devoted all his efforts to the restoration of regularity and order. Establishing what he called the "Strict Observance of the Cistercian Order," he succeeded in persuading some monks of the Strict Observance to come to his assistance, and together they completely restored the discipline of the monastery. From La Trappe this austere rule spread into other parts of Europe where it met with such instant favor that some of the most flourishing monastic houses in the world are now those of the Trappist reformers.

VINCENTIAN PRIARS. See LAZARISTS.

WHITE PRIARS. See CARMELITES.

XAVERIAN BROTHERS.—A teaching institute founded at Bruges, Belgium, by Theodore James Ryken, in 1846. The purpose of the founder was to organize "a congregation of men who would willingly sacrifice their lives to the Christian education of youth," an object which has been adhered to so closely that the order has long been regarded as one of the most successful teaching institutes of the Church.

ORATORIES.

The Oratory which has been such an important factor in the evangelistic work of the Roman Catholic Church, especially in England, had its inception in the mind of Saint Philip Neri, a native of Florence in the 16th century. Always conspicuous for the purity of his life and the desire to do good for young men, he early gathered about him a number of sympathetic souls who were ready to follow his guidance in order that they might lead a life of greater religious regularity. Although still a layman he preached to them in private, teaching them how to show more zeal for God, without retiring from the world. In 1551, upon the advice of his confessor, Philip received holy orders, but even then he continued to receive his congregation in private, either in his own room or in a larger chamber, and it was from these daily colloquies that he evolved the system of evening exercises which has always been maintained by his Congregation. This consists of a popular devotional exercise, a few hymns and a plain sermon preached, somewhat conversationally, directly at the hearts of the people. These exercises, which were held on every week-day evening except Saturday, became so popular that, in 1558, he obtained permission to build a chapel in the church of Saint Jerome. He called it an "oratory," and it was from this that his Congregation obtained its name. It was at about this time that Philip's work attracted the attention of some of the most zealous churchmen in Europe, and so many of them joined him that, in 1564, he felt justified in assuming charge of the church of Saint John the Baptist which had just been completed at Rome. In 1575 the Congregation had so increased in numbers that it was deemed necessary that they should have an establishment of their own, and the old church of the Valli-cellì being ceded to them, Philip began the erection of the

present edifice, called the "Chiesa Nuova," on the old site. At its completion he rejoined his Congregation, the constitution of which had already been approved by Pope Gregory XIII, and remained in Rome until his death, in 1595. The conception which was the basis upon which Saint Philip founded his Congregation was that there were people in the world who were not in sympathy with the work of the monastic orders but who might be reached if sought in another way. He proposed, therefore, that his Congregation should be composed of simple priests. They should take no vows, and while they should be bound by a certain rule of life while associated with the community, they might withdraw without reproach at any time. To his followers he taught his methods, imbuing them so zealously with the spirit of his work that it is still conducted as if he himself were present to direct it. Instead of taking a combative position he assumed one of tranquillity. Instead of going out in search of sinners he sat in his own room and let them come to him. He abhorred all that savored of the systematic; he made few attempts at the exposition of doctrine, and he avoided the catechetical schools. Instead he accepted the inevitable, the conditions which he knew he could not change, and simply tried, as Cardinal Newman said, "to sweeten and sanctify what God had made very good and man had spoiled." With unaffected humility and love he gathered "his family" around him, and they, convinced by the eloquence of his personal character, took up his work and followed him. For nearly three centuries the work of the Oratory was confined to Italy, but, in 1847, Dr. Newman introduced it into England. The first house was instituted at Mary Vale, or Old Oscott, but, in January 1849 it was transferred to Alcastre street, Birmingham. A few months later Father Frederick Faber, one of the most eloquent of the Oratory has ever produced, opened another house at King William street, Strand, London, where, assisted by several of the priests from Birmingham, he soon gathered a large congregation of listeners. For about a year the London house was in affiliation and under the direction of the house at Birmingham, but as such a system was not entirely in keeping with the spirit of the constitution, which provided that each house should be independent, the London Oratory was released from its obedience to the older oratory in 1850, and, shortly afterward, it was transferred to Brompton, from which place it has exerted a wide influence over Catholic thought in England. During the history of the Roman Catholic Church other congregations have adopted the title of "The Oratory." In 1611 Cardinal de Berull of Paris organized a society of priests under this name, which, in 1614, was changed, by Pope Paul V, to "The Congregation of the Oratory of Our Lord Jesus Christ in France." Like the Italian Oratory of Saint Philip, the members of the French society were simple priests. As Bossuet says, its founder "preferred to give no other spirit to his company but the spirit of the Church itself, no other rule than her canons, no other superiors than her bishops, no other bond but charity, and no vows but those of baptism and ordination." The object of this organization was chiefly to promote the spirit of devotion among the secular clergy, a work which was partly conducted by the institution of seminaries for the education of candidates for the priesthood. At the death of the founder, in 1629, the Congregation was represented by more than 50 seminaries, colleges and houses of retreat, while it was generally admitted that the Society had been the means of deepening the ecclesiastical devotion and strengthening its discipline, an influence which was already making itself apparent throughout the entire population. After the death of the cardinal the work was continued under the direction of Père de Condren, who was followed by other good men and strong leaders, and while for a time its usefulness as a Church organization was threatened by the influence of Jansenism, which found many converts among its members, the orthodox section finally proved the stronger, and the bull was accepted by the vote of the Congregation in 1746. When other orders were immediately suppressed by the Revolution the Congregation's valuable work in the cause of education saved it for a time and it might have passed through those troublous times without molestation if the Fathers themselves had not resisted the authorities by refusing to be present at certain services appointed to be held in their own church. Later a few of the members took the oath required, but the Congregation never regained its influence. In 1852 a congregation known as the "Oratory of the Immaculate Conception" was instituted at Paris by the Abbé Gratry and M. Petetot, curé of Saint Roch. Later this organization adopted the rule of the French Oratory.

ORDERS OF WOMEN.

The following is a list of the most prominent orders of women that have been or are now in existence in the Roman Catholic and Protestant Episcopal churches and that have houses in the United States:

ALL ANGELS, COMMUNITY OF.—A sisterhood in the Protestant Episcopal Church. Founded by the bishop of

Delaware and incorporated in 1895, its members are engaged in all kinds of educational and charitable work, including the care of a day nursery and orphanage for factory children. The order is under the direction of the bishop of Alabama.

ALL SAINTS' SISTERS OF THE POOR.—An order established in the Church of England in 1851 by Rev. W. Upton Richards, and introduced into the United States by the bishop of Maryland in 1890. Its members have undertaken all kinds of charitable and educational works, ranging from fashionable boarding schools for young ladies to day mission schools for colored children.

ANGELICALS.—An order of nuns, followers of the rule of Saint Augustine, founded by the Countess of Guastalla, in 1530.

ANNUNCIATION OF THE BLESSED VIRGIN MARY, SISTERS OF.—A society incorporated in 1893 to receive and care for incurable and crippled girls between the ages of 4 and 16 years.

APOSTOLINE SISTERS.—An order founded at Loda, Ill., 15 Aug. 1884, by Rev. Louis Heidemann. Its object is the education of youth.

ASSUMPTION, SISTERS OF THE.—An order founded by Monsignor Affre, archbishop of Paris, in 1839. It is chiefly an educational order. The Little Sisters of the Assumption nurse the sick poor in their own homes night and day; caring for the children and the house in order that the home may not be broken up during the illness of some of its members. For these services they accept no pay, not even food.

ATONEMENT, SISTERS OF THE SOCIETY OF THE.—Founded as a Protestant Episcopal religious order for women and received into the Roman Catholic Church, with the other branches of the Society of the Atonement, 30 Oct. 1909.

BAPTISTINE SISTERS.—The Baptistines were founded in 1730 and the mother house, in Rome, was established in 1755. In the United States, the Sisters conduct orphan asylums and day nurseries in New Jersey and New York.

BERNADINE SISTERS.—An order of women devoted to educational work. The Bernadine Sisters of Esquermes conduct an academy in Nebraska. The Polish order of Bernadine Sisters of Saint Francis conducts both schools and orphanages in several cities of Pennsylvania, the mother house being at Reading.

BETHANY, SISTERS OF.—An order founded in New Orleans, La., and now under the pastoral care of the Episcopal bishop of that diocese. Its object is the care of neglected children.

BON SECOURS, SISTERS OF.—Instituted by Monsignor de Quelen, archbishop of Paris, 1822, for the purpose of caring for the sick in their homes and for the orphans in asylums provided for them. The Sisters of Notre Dame de Bon Secours, founded in 1840, by Rev. Paul Sebastian Millet of Troyes, France, has practically the same object.

BLESSED SACRAMENT SISTERHOODS.—The orders of Blessed Sacrament nuns are of recent origin. Those of the Perpetual Adoration, as their name implies, devote their constant attention upon the devotions to the Holy Eucharist. The Sisters of the Blessed Sacrament for Indians and Colored People is an American order, founded in 1889, by Mother Mary Katherine. Its purpose is the elevation, education and christianization of the two races.

BLESSED VIRGIN MARY, INSTITUTE OF.—One of the few Roman Catholic orders of English origin instituted since the Reformation, it was founded by Mary Ward, the daughter of a gentleman of large estate, in 1611. A teaching order of the highest class, it prospered from the first, and it is still a flourishing religious institute, being popularly known as "the Institute of the English Virgins." The rule of the order has always been practically the same as that of the Society of Jesus.

CARMELITES.—The female branch of the Carmelites, founded in 1452 and reformed by Saint Theresa in 1562. It is largely represented in the United States, with mother house at Baltimore and 10 monasteries. (See CARMELITES). The Carmelite Sisters of the Divine Heart of Jesus came to America in 1912 and now have houses in Indiana and Texas.

CENACLE, LADIES OF THE.—An order founded in France in 1826, the Sisters devoting themselves to the perpetual adoration of the Blessed Sacrament and to spiritual works, especially in giving retreats and teaching Christian doctrine. The Society now has several houses in the United States, the first having been established in 1892.

CHARITY, SISTERS OF.—There are many orders and branches of orders in the Roman Catholic Church which bear the name of Sisters of Charity. Some of them are also called "Gray Sisters," or "Gray Nuns," "Daughters of Charity," "Sisters of Saint Vincent de Paul," etc. The oldest order was founded in Paris in 1634, by Saint Vincent de Paul, assisted by Mlle. Louise le Gras, and its constitution has never been changed. Instead of making perpetual vows the Sisters take the simple vows, which are renewed annually, when they also add a fourth vow, binding themselves to care for the sick. The order of Sisters of Charity in the United States was founded by Mother Seton, who, after her conversion to the Roman Catholic faith, devoted her life to the charitable works of the Church. Her first

community, which was known as the Sisters of Charity of Saint Joseph, was established at Emmitsburg, Md., 31 July 1809. The Sisters of Charity of Cincinnati, Ohio, are a branch of the order founded by Mother Seton. The Sisters of Charity of Saint Paul are a congregation largely devoted to teaching. It was founded in 1704 by M. Chauvet, a French curé, assisted by Mlle. de Tilly. The Sisters of Charity (Irish) are an order which is very similar in purpose to that founded by Saint Vincent de Paul. Its members minister to the sick and poor in hospitals and at their own homes. It was founded in 1815 by Mrs. Mary Frances Aikenhead. The congregation of Sisters of Charity of the Blessed Virgin Mary devote themselves exclusively to the education of youth. The order was founded in Philadelphia, Pa., by Very Rev. Terence James Donoghoe, assisted by Mother Mary Francis Clarke, its first superior-general, on 1 Nov. 1833. The Sisters of Christian Charity devote themselves to educational work and to the care of poor and orphaned children. The Sisters of Charity of Nazareth are an American community, founded in 1812. The founders of Nazareth were Rt. Rev. J. B. M. David of Bardstown and Catherine Spalding. Branch houses were established in Bardstown in 1818 and at Saint Vincent's, Union County, Ky., in 1820, and in 1829 the Congregation was incorporated by the legislature of Kentucky under the title, "Nazareth Literary and Benevolent Institution." On many occasions since their foundation the Sisters have performed heroic service, notably during the cholera epidemic, 1832-33, caring for the soldiers during the Civil War, in the yellow fever epidemic of 1878 and in other visitations of contagious disease. Out of the cholera epidemic of 1833 grew their first orphan asylum, Saint Vincent's, in Louisville. The Sisters of Charity of Our Lady, Mother of Mercy, are a congregation founded by the Most Rev. John Zwyzyn, archbishop of Utrecht, in 1832. Its purpose is the education of youth, as well as the care of the sick, aged and orphaned. The latest work undertaken by these Sisters is the care of the lepers at Paramaribo, Dutch Guiana. The order of Sisters of Charity of Providence was founded in Montreal 25 March 1843. Its work is educational and charitable, including the care of hospitals. The Sisters of Charity of Saint Elizabeth, the Sisters of Charity of Palletine, the Sisters of Charity of Saint Augustine and the Sisters of Charity of Our Lady, Mother of Mercy, are devoted to charitable and educational work. The Sisters of Charity, Servants of the Poor; Sisters of Charity of the Cross (Gray Nuns); the Sisters of Charity of the General Hospital of Montreal, the Sisters of Charity of Saint Louis and the Sisters of Charity of the Hospital of Saint Hyacinthe, are Canadian orders devoted to the care and education of the sick and poor.

CHARITY OF SAINT VINCENT DE PAUL, DAUGHTERS OF.—A society founded in 1633. The members are not bound by perpetual vows but take the simple vows of religion on the 25th of March of each year. The mother house is in Paris. There are two provinces in the United States where the Sisters conduct hospitals, insane asylums, orphanages, day nurseries, industrial schools and other establishments.

CISTERCIANS.—The female branch of the order of Cistercian monks.

CROSS, DAUGHTERS OF THE. See **GREY NUNS OF THE CROSS**, in this article.

CROSS AND PASSION, DAUGHTERS OF THE. See **PASSIONIST NUNS**, in this article.

DISCALCED CARMELITES. See **CARMELITES**.

DIVINE COMPASSION, SISTERS OF THE.—A congregation founded in 1873 by Rt. Rev. Mgr. Preston. Its object is the mental and moral training of young girls.

DIVINE SAVIOUR, SOCIETY OF.—A congregation instituted in Italy for the purpose of caring for the sick in their homes.

EPIPHANY, SOCIETY OF THE.—A Protestant Episcopal sisterhood, established in 1897 by the bishop of Washington, D. C. Its objects are the protection and training of the young, and the giving of spiritual assistance to women living in the world by providing retreats and religious instruction for them.

FAITHFUL VIRGIN, SISTERS OF THE.—An order founded in Normandy, about 1840. Its purpose is the care of orphans.

FELICIAN SISTERS.—Founded in Poland, in 1855. When suppressed by the Russian government, in 1864, the mother house was transferred to Cracow, Austria, where it is now located. The Congregation established its first house in the United States in 1874. It now has three provinces and conducts about 90 schools as well as orphanages, homes for the aged, day nurseries and homes for emigrants and working girls.

GOOD SHEPHERD.—There are several sisterhoods of the Good Shepherd. The oldest order, the Sisters of the Good Shepherd, was founded by Père Eudes, of the Eudist Fathers, assisted by Marguerite l'Ami, in 1641. The Sisters of Our Lady of Charity of the Good Shepherd of Angers are a community founded by Mother Mary of Saint Euphrasia Pelletier, in 1827. The Sisters of Our Lady of Charity of Refuge were also founded by Père Eudes (1651) and were

introduced in America by Rt. Rev. John Timon, bishop of Buffalo, N. Y., in 1855. Each of these orders has for its objects the training of young girls to virtue, and the reformation of fallen women.

GOOD SHEPHERD SISTERS.—There are now two branches of the sisterhood of the Good Shepherd in the Protestant Episcopal Church in the United States. The Saint Louis branch, incorporated in 1867, has charge over Bishop Robertson Hall, the diocesan school for girls; the California branch, Sisters of the Order of the Good Shepherd, has charge over the Old Ladies' Home, the Sheltering Arms, three hospital missions and the parish visiting.

GREY NUNS OF THE CROSS.—A community, founded in 1745, which takes its title from the color of the habit worn by the Sisters. For more than a century the activities of the community were confined to Canada but in 1857, a school was opened in Buffalo, N. Y., and 18 establishments are now conducted in the United States, including academies and other schools, hospitals, orphanages and homes for the aged.

HELPERS OF THE HOLY SOULS, SOCIETY OF.—A congregation which, instituted in Paris, France, was established in New York City in 1892. Its purpose is to visit and nurse the sick poor in their homes, and to provide religious instruction to children and adults, all its work being undertaken with the view of helping the souls in purgatory.

HOLY CHILD JESUS, SISTERS OF.—A cloistered sisterhood devoted to the care and education of children.

HOLY CHILD JESUS, SISTERHOOD OF THE.—An order established by the Protestant Episcopal bishop of Albany, for the purpose of conducting educational and charitable works in his diocese.

HOLY COMMUNION SISTERS.—There are two branches of the Sisterhood of the Holy Communion in the Episcopal Church, and both are established in New York City. The older branch, which was organized by Rev. Dr. Muhlenberg in 1852, was the first order of Episcopal Sisters to be established in America. Its members are engaged in parish visiting, nursing, the care of the altar service and clerical vestments, and in various kinds of educational and charitable work. The younger sisterhood conducts a shelter for respectable girls.

HOLY CROSS, SISTERS OF THE.—A congregation founded at La Mans, France, in 1839. Its objects are educational and the care of hospitals and orphanages. The first American novitiate was opened at Bertrand, Mich., in 1844, and this was rapidly followed by schools for Indians and other foundations. During the Civil War, about 70 of the Sisters were in charge of several important military and naval hospitals. The Congregation now conducts more than 60 institutions, including one college, schools, hospitals and orphanages. The Congregation of the Sisters Marianites of the Holy Cross was founded in France in 1841, and established its first American mission in Canada in 1843 and in the United States, at New Orleans, in 1851. In 1861 the Sisters opened the asylum of Saint Vincent de Paul, in New York City. The members of the Congregation take only simple vows and devote themselves to the care of the sick, the charge of orphans and the education of youth.

HOLY FAMILY.—There are several sisterhoods of the Holy Family. The oldest, the Congregation of the Sisters of the Holy Family, a colored sisterhood, was founded in 1842. The Sisters conduct educational and charitable establishments in the archdiocese of New Orleans. The Sisters of the Holy Family of Nazareth was founded in 1874 by Frances Siedliske, a noble Polish lady. The Sisters of the Holy Family in California devote themselves to the relief of the sick and the poor, caring for and educating very young children whose mothers are obliged to work. The Little Sisters of the Holy Family is a community founded at Memramcook, New Brunswick, in 1874. Its one purpose is the temporal care of educational institutions.

HOLY GHOST, SISTERS OF.—An order founded in 1850 by the late Archbishop Hennessy of Dubuque, Iowa. Its objects are: (1) The glory of the Holy Ghost, and (2) the promotion of Christian education. The order of the Sister-Servants of the Holy Ghost was founded in Stell, Holland, in 1889. There is no affiliation between these orders. The Congregation of the Daughters of the Holy Ghost was founded in Brittany in 1706, its members being known as the "White Sisters," from the color of their habit. When driven from France, in 1902, they were invited to the diocese of Hartford, by the late Bishop Tierney, and they now have about 25 houses in several dioceses. The Sisters of the Holy Ghost (for colored people) is an American society, established in 1886, and now conducts several houses in Texas.

HOLY HEART OF MARY, SISTER-SERVANTS OF.—An order founded by Rev. Father Delaplace of Paris, France, in 1860. Its members conduct all kinds of works of charity.

HOLY HUMILITY OF MARY, SISTERS OF THE.—A community founded in France, in 1854, by Rev. John Joseph Begel, assisted by Miss Antoinette Poitiers. In 1864 the entire community, with its founder, immigrated to the United States, and settled near the village of New Bedford, Lawrence County, Pa. The works of the Sisters include

teaching, the care of the sick, the education of orphans and the decoration of altars. The Sisters of the Humility of Mary, with mother house at Goldfield, Nev., conducts a school and hospital in the diocese of Sacramento.

HOLY NAMES OF JESUS AND MARY, SISTERS OF THE.—A community founded at Longueuil, Canada, in 1843. Its objects are educational.

HOLY NATIVITY, SISTERHOOD OF THE.—An order established in 1833, by Rt. Rev. C. C. Grafton, Protestant Episcopal bishop of Fond du Lac. Its members are engaged in various kinds of missionary and parochial work.

IMMACULATE CONCEPTION, SISTERS OF THE.—Founded in France in 1820 as a branch of the Institute of the Holy Family, the members devote themselves to educational work and visiting the poor. The Congregation conducts schools in the diocese of New Orleans.

IMMACULATE HEART OF MARY, SISTER-SERVANTS OF THE.—A congregation founded in Quebec, in 1850, by Most Rev. P. F. Turgeon, archbishop of Quebec, assisted by Mr. George M. Muir and Mrs. Mary Fitzback, who became Mother Mary of the Sacred Heart, the first superior of the order. The objects of the Congregation are two-fold: (1) The reformation of fallen women, and (2) the education of children. The Daughters of the Immaculate Heart of Mary, instituted in France, perform all kinds of charitable works, conducting academies, orphanages, female industrial schools, kindergartens, homes for working girls, mental and training schools for deaf-mutes, night refuges for homeless women, Indian missions, etc.

INCARNATE WORD AND BLESSED SACRAMENT, SISTERS OF THE.—An order founded at Lyons, France, by Venerable Jane Chezard de Matel, in 1625. The American foundation was made at Brownsville, Tex., in 1852. Although the order has many houses in various parts of the world they are independent of each other. The Sisters of Charity of the Incarnate Word are an American offshoot of the French community, having been founded by Rt. Rev. C. M. Dubois, bishop of Texas, in 1866.

INFANT JESUS, SISTERS OF THE.—A congregation devoted to the nursing of the sick poor in their homes without compensation. The mother house and novitiate is in Brooklyn.

JESUS, DAUGHTERS OF.—A congregation founded for the care of the sick poor and the education of girls. In 1893 Sisters were sent from France to open the first provincial house in America, at Three Rivers, Canada, and a few years later they came to the United States, where they have several establishments devoted to the education of youth and the care of the sick and orphans.

JESUS, SOCIETY OF THE FAITHFUL COMPANIONS OF.—A congregation instituted at Amiens, France, in 1820, by Mme. de Bonnault d'Houet (*née* de Bengy). While its main objects were and are the sanctification of souls and the improvement of female education, the order has been engaged in parochial school work for many years.

JESUS-MARY, RELIGIOUS OF.—A congregation founded at Lyons, France, in 1811, by the Abbé Coindre. Its purpose is the care of orphan asylums and the education of young girls, especially in boarding schools.

LA SAGESSE, SISTERS OF.—An order founded in 1703 by the Blessed Louis M. Grignon de Montfort, assisted by Miss Louise Trichet, afterward Sister Mary Louise of Jesus. Its works are educational and charitable.

LITTLE COMPANY OF MARY.—An order founded about 1870 in Nottingham, England. Its purpose is the care of the sick in their homes and in hospitals.

LITTLE SISTERS OF THE POOR.—An institute established in 1840 by M. la Pailleur, the curé of Saint Servan, in Brittany, and formally approved by the Holy See in 1854. Its object is the establishment of permanent homes for the aged and infirm of both sexes without distinction of creed or nationality. The Sisters of the Poor of Nazareth is an English offshoot from the Little Sisters.

LORETO NUNS.—There are several orders of Loreto Nuns, the oldest being that of the Ladies of Loreto, founded at Munich, Bavaria, by Mme. Maire, in 1650. Its first American house was established at Toronto in 1847.—The Society of Sisters of Loreto, or Friends of Mary at the Foot of the Cross, was founded by Rev. Charles Nerinckz, a Flemish missionary, in 1812. Another branch of the Sisters of Our Lady of Loreto was established by Mrs. Mary Teresa Ball, at Rathfarnham, near Dublin, Ireland, in 1822. It was from this foundation that have sprung the many convents of Loreto nuns in Ireland. Although not affiliated, the objects of the orders are very similar. Their work is educational and missionary.

MANTELLATE SISTERS.—A small congregation conducting a school in the diocese of Superior, Wis.

MARIST SISTERS.—An order founded by Father Colin of the Marist Order, in 1817. Its objects are educational.

MERCY, SISTERS OF.—An order founded in Dublin, Ireland, in 1827 by Miss Catherine McAuley, afterward mother superior. Besides the three vows the Sisters took a fourth to devote their lives to the service of the poor, the sick and the ignorant, an obligation which has been observed so zealously that the order has become one of the most important communities in the world. The sisterhood was introduced into the United States in December 1843, when

seven Sisters came from Carlow, Ireland, to establish a convent at Pittsburgh, Pa.

MERCY, SISTERS OF.—The Church of England order of Sisters of Mercy was founded about 1845 by Miss Lydia Sellon at Devonport. The only vow exacted is that of obedience during community life, and members are permitted to withdraw from the convents at will.

MERCY OF THE HOLY CROSS, SISTERS OF. See **HOLY CROSS, SISTERS OF THE**, in this article.

MISERICORDIE, SISTERS OF.—An order founded in 1848 by Monsignor Bourget, assisted by Mme. Roselle Jette, afterward Mother Saint Lucie, superior-general. Its objects are the care of the sick and of homeless infants.

MISSION HELPERS, INSTITUTE OF.—Founded at Baltimore, Md., in 1888, its Sisters visit the sick and poor in their homes and give religious instruction to children and adults. The direct object of the community is to advance the perfection and assist in the sanctification of the priesthood.

MOST HOLY CROSS AND PASSION, SISTERS OF THE. See **PASSIONIST NUNS**, in this article.

NOSTRA DOMINA, SCHOOL SISTERS DE.—A congregation established in Bohemia to conduct establishments for the care and education of youth. It has several houses of this character in the United States.

NOTRE DAME SISTERS.—There are several orders of the Sisters of Notre Dame. That of the School-Sisters of Notre Dame was founded in 1803 by the Venerable Julie Billiart, assisted by her friend, the Viscountess de Gezaincourt. Its object is the salvation of the souls of poor children. The Sisters of Notre Dame are a community founded at Montreal, Canada, in 1657, by the Venerable Mother Marguerite Bourgeoise. Its object is the instruction of youth. The Congregation of Notre Dame de Sion was founded at Paris in 1843; the Sisters of Notre Dame de Namur, in 1803.

OUR LADY OF CHARITY OF THE GOOD SHEPHERD, SISTERS OF. See **GOOD SHEPHERD SISTERS** in this article.

OUR LADY OF GOOD COUNSEL, SISTERS OF.—A community founded in 1894 by Bishop Labrecque of Chicoutimi. Its objects are solely educational.

OUR LADY OF THE HOLY ROSARY, CONGREGATION OF.—Founded at Rimouski, province of Quebec, Canada, 12 Sept. 1879, its object is the Christian instruction and education of the poor.

OUR LADY OF LOURDES.—The order of Our Lady of Lourdes was founded by Archbishop Perche of New Orleans, on 25 Feb. 1883.

OUR LADY OF MOUNT CARMEL, SISTERS OF THE CONGREGATION OF. See **CARMELITES**.

OUR LADY OF PERPETUAL HELP, SISTERS OF.—An order founded at Saint Damien, province of Quebec, Canada, by Rev. J. O. Brousseau, assisted by Mlle. Virginia Fournier, afterward Sister Saint Bernard, the first superioress of the community. Its objects are educational.

OUR LADY OF SION, CONGREGATION OF.—Founded at Strassburg, in 1842, by M. Alphonse Ratisbonne, of a wealthy Jewish family, in commemoration of an apparition of the Blessed Virgin Mary with which he claimed he was favored, and which had resulted in his conversion. The rule of the Congregation aims at the union of the active with the contemplative life, and its object, which has never changed, is the care and education of converts from Judaism. The most important houses of the Congregation are located in Palestine and Syria.

OUR SAVIOUR, REGULAR CANONASSES OF THE FIVE WOUNDS OF.—A congregation founded at Lyons, France. Its purposes are both educational and charitable.

PASSIONIST NUNS.—The first convent of Passionist nuns was established in Coronato, in 1771, by Mother Mary of Jesus Crucified, and several convents have since been opened in other parts of Europe. In May 1910, five Passionist nuns from Italy established their work in Pennsylvania. The Sisters of the Most Holy Cross and Passion is a second Order of Passionist nuns.

PERPETUAL ADORATION, RELIGIOUS OF.—The Congregation was founded at Brussels in 1857, and the members devote themselves, not only to the adoration but to all that tends to increase the devotion to the Blessed Sacrament. A foundation of the Congregation was established in Washington, D. C., in 1900. Among other congregations in the United States devoted to these purposes are: Benedictine Sisters of the Perpetual Adoration, with mother house at Clyde, Mo.; Franciscan Sisters of the Perpetual Adoration, mother house at LaCrosse, Wis.; Sisters of the Perpetual Adoration, in the diocese of New Orleans, and the Sisters of the Sacred Heart and of Perpetual Adoration, a French order with a convent at Fairhaven, Mass. The Perpetual Adorers of the Blessed Sacrament are also termed Sacramentine Nuns.

PIOUS SOCIETY OF MISSIONS, SISTERS OF THE.—A congregation founded to assist the priests of the Pious Society of Missions in their work by acting as teachers and catechists.

POOR CLARES. See **SAINT FRANCIS, SISTERS OF**.
POOR HANDMAIDS OF JESUS CHRIST.—A congregation of Sisters founded at Dernbach, Germany, in 1851, by

Miss Catherine Kaspers. Its rule, which was compiled by Rt. Rev. J. P. Blum, bishop of Limberg, and its objects, which are in the highest sense charitable, were approved by the Holy See in 1870. The order was introduced into the United States in 1868, by Rt. Rev. J. H. Luers, bishop of Fort Wayne, Ind.

PRESENTATION OF THE BLESSED VIRGIN MARY, ORDER OF THE.—An order founded in Ireland, 1777, by Miss Namo Nagle. At first there was no enclosure and members took simple vows only, which were renewed annually, but, in 1805, Pope Pius VII raised it to the rank of a religious order with solemn vows and strict enclosure. A fourth vow was then added by which the members bound themselves to devote their lives to the work of instructing poor girls in the precepts of the Christian faith.

PROVIDENCE, SISTERS OF.—The Sisters of Providence, who also devote themselves to the instruction of young girls, were founded in Lorraine, in 1762, by the Venerable Jean Martin Moye. The first institution of the order in America was opened at Saint Mary's, near Terre Haute, Ind., 22 Oct. 1840. There are several branches of the Sisters of Providence, including the Oblate Sisters of Providence, the Sisters of Divine Providence and the Sisters of Providence of Kentucky.

REDEMPTORISTS.—The Sisters of the Order of the Most Holy Redeemer are affiliated with the Redemptorist order of monks. They are strictly enclosed and contemplative and assist the missionaries by their prayers.

RESURRECTION SISTERS.—There are two orders of Resurrection Sisters in the Episcopal Church of the United States. The Sisters of the Resurrection were instituted by the bishop of Florida in 1891. Its members conduct an educational and industrial school for orphans. The Sisters of the Order of the Holy Resurrection were founded by the bishop of Georgia in 1894. The work of the members is of a charitable character.

SACRAMENTINE NUNS. See PERPETUAL ADORATION, RELIGIOUS OF, in this article.

SACRED HEART, LADIES OF THE.—The Society of Ladies of the Sacred Heart was founded at Amiens, France, by Père Joseph Varin, S.J., assisted by Mlle. Madeleine Sophie Barat, in 1800. The community, which is semi-cloistered and follows the rule of the Society of Jesus, has for its object the Christian education of youth in boarding and parochial schools. The Missionary Sisters of the Sacred Heart devote themselves to the care of the sick and the orphan as well as to general educational work. The Sisters of the Holy Union of the Sacred Hearts, a congregation founded at Douai, France, in 1828, by the Abbé Debrabant, restricts its efforts to works of an educational character. Its rule and constitution were arranged from the somewhat mild rule prescribed for the Visitation Nuns by Saint Francis de Sales. The Mission Helpers of the Sacred Heart conduct classes in rural districts and immigrant settlements, visit the poor and sick in their homes, instruct women and children in penal institutions and conduct schools for the deaf and dumb, industrial schools for indigent girls and orphanages. The mother house is in Baltimore.

SACRED HEART OF SAINT JACUT, SISTERS OF THE.—A French congregation in charge of domestic departments at seminaries and rectories.

SAINT AGNES.—The Sisters of Saint Agnes were founded at Fond du Lac, Wis., 1 Aug. 1870. Its objects are both charitable and educational.

SAINT ANN, THE SISTERS OF. were founded at Vaudreuil, province of Quebec, Canada, by Monsignor Ignace Bourget, in 1850. Its objects are chiefly educational.

SAINT AUGUSTINE, THE SISTERS OF. correspond to the Augustinian monks. While very old and widely represented in Europe there are but two branches of the order in America; the Sisters of Charity of Saint Augustine, established at Cleveland, Ohio, in 1850, by Sisters from Boulogne, France, and the Sisters of the Order of Saint Augustine now in charge of the Hospital of the Precious Blood, founded at Quebec in 1637, by Sisters from Dieppe, France.

SAINT BASIL THE GREAT, SISTERS OF THE ORDER OF.—A congregation under the Ruthenian Greek rite, the members of which conduct schools and orphanages. The mother house is at Philadelphia.

SAINT BENEDICT.—The order of Sisters, corresponding to the monks of Saint Benedict, was introduced into the United States by Rt. Rev. Boniface Wimmer in 1846. The first colony of Benedictine Sisters came from Eichstätt, Bavaria, and established their convent at Saint Mary's, Elk County, Pa. Many other convents have since been established in various parts of the country, including houses of the orders of the Benedictine Sisters of Perpetual Adoration, and the Oblate Sisters of Saint Benedict (Olivetans). In 1906 Benedictine nuns from Besses, Pyrenees, France, established a house at Saint Benedict, La., and are known as the French Benedictine Sisters.

SAINT BRIDGET.—The Sisters of Saint Bridget, or the Order of the Holy Faith, was founded in Dublin, Ireland, in 1857. Its purpose is the care over the religious education of poor girls and boys.

SAINTS CYRIL AND METHODIUS.—A congregation estab-

lished to conduct schools and orphanages. The mother house is at Plymouth, Pa.

SAINT CASIMIR, SISTERS OF.—The Institute of the Sisters of Saint Casimir was founded in 1908 and has for its purpose the education of children of Lithuanian birth or descent. The mother house is at Chicago.

SAINT CHRETIENNE, SISTERS OF.—A congregation which conducts schools in several New England sections. The provincial house is at Salem, Mass.

SAINT DOMINIC.—The order of Sisters, corresponding to the monks of Saint Dominic, was introduced into the United States by Rev. Thomas Wilson in 1822. The first convent was established at Springfield, Ky., from which mother house convents have been established throughout the country. Their objects are educational and charitable. The Dominican Nuns of the Second Order are strictly cloistered and have perpetual adoration of the Blessed Sacrament. The Dominican Sisters of the Third Order of Saint Dominic were brought to this country in 1876, by Rev. J. Rochford, O. P., then provincial of the order. The Sisters conduct parochial schools and institutions for destitute children of both sexes. The community of Dominican Sisters known as the Congregation of Saint Catherine de Ricci, was founded by Rt. Rev. Bishop McNeirney of Albany, N. Y., in 1880. Their objects are to give retreats for women and young girls, to prepare candidates for the sacraments, and to offer prayers and penance for the conversion of sinners, especially drunkards and blasphemers. The Dominican Sisters of the Perpetual Rosary, as the name implies, are in charge of the management of the Perpetual Rosary in America. Their house at West Hoboken, N. J., was established in 1891 by Sisters from Bon Secours, France. The Dominican Sisters of the Sick Poor, are founded for the purpose of caring for the sick poor in their homes free of charge. The Sisters of Saint Dominic of the Congregation of Saint Rose of Lima is a congregation founded by Mother Mary Alphonsa Lathrop, the daughter of Nathaniel Hawthorne, and has for its object the care of those who are suffering from incurable cases of cancer.

SAINT DOROTHY, SISTERS OF.—A small congregation with mother house in Rome. It has three establishments in the United States.

SAINT FRANCIS.—The first mother house of the Franciscan Sisters to be instituted in this country was that of the Third Order of Saint Francis established by the late Bishop Neumann at Glen Riddle, Pa., in 1855. At the present time the following orders of Saint Francis are represented in the United States: The Little Franciscan Sisters of Mary, founded at La Bait Saint Paul, Canada, 1891; the Franciscan Missionaries of Mary, founded in British India about 1850; the Sisters of Saint Francis, founded by Very Rev. Pamfilo di Magliano, O.F.M., the Sisters of Saint Francis of Mary Immaculate, founded in 1865; the Sisters of Saint Francis, established at Buffalo, N. Y., in 1874; the Sisters of the Third Order of Saint Francis, founded by Rev. J. L. Bihn in 1869; the Sisters of the Third Order Regular of Saint Francis, incorporated as the Sisters of Saint Francis of Oldenburg in 1885; the Sisters of Saint Francis of the Sacred Heart; the Franciscan Sisters, founded in 1872; the Sisters of the Third Order of Saint Francis of Assisi, M.C.; the Sisters of Saint Francis, founded in 1875; the School-Sisters of Saint Francis; the Franciscan Sisters for Colored Missions, established in 1881; the Franciscan Sisters of the Perpetual Adoration, founded by Rt. Rev. M. Heiss in 1864; Franciscan Sisters of Christian Charity, founded in Wisconsin 9 Nov. 1869; Franciscan Sisters of the Sacred Heart, established in 1876; the Hospital Sisters of Saint Francis, founded in 1875; the Poor Sisters of Saint Francis of the Perpetual Adoration, established in 1875; the Sisters of the Poor of Saint Francis; the Sisters of Saint Francis, founded in 1890; the Franciscan Sisters of the Immaculate Conception, established 1891; the Missionary Franciscan Sisters of the Immaculate Conception; the Felician Sisters, O.S.F.; the Sisters of the Third Order of Saint Francis, under the protection of Saint Kune-gunda, Polish; the Polish Franciscan School Sisters; the Sisters of the Third Order of Saint Francis of the Congregation of Our Lady of Lourdes, established 1877, and others. The Order of the Poor Clares is also well represented in the United States, the first Sisters having come from Rome, Italy, to open a house in Cleveland, Ohio, in 1875. As the Second Order of Saint Francis, the Clares are the oldest of the Franciscan orders for women, its founder, the virgin Saint Clare, having been received by Saint Francis in 1212.

SAINT JOHN THE BAPTIST, SISTERHOOD OF.—An order in the Church of England, founded at Clewer, England, in 1851, and introduced into the United States in 1881. The work of its members is chiefly educational.

SAINT JOHN THE EVANGELIST, SISTERS OF.—The sisterhood of Saint John the Evangelist of the diocese of Long Island is an American order in the Episcopal Church. Its work is chiefly charitable.

SAINT JOSEPH.—There have been several sisterhoods of Saint Joseph, some of which have attained important positions in the religious world. The Lay Hospitaliers, Daughters of Saint Joseph, was once one of the great orders of France. It was founded by Marie Delpuch, at Bordeaux, in 1638, for the purpose of educating orphan girls, but it did not

survive the Revolution.—The Nun Hospitallers of Saint Joseph, an order that also became practically extinct at the time of the Revolution, was founded by Mlle. de la Farre at La Flèche in Anjou in 1643. In addition to the three vows of religion these nuns bound themselves to devote their lives to the service of the poor. At present they are represented by several houses in Canada, one, the Hospital of Saint Joseph of Ville Marie, having been founded by Mlle. Jeanne Mance in 1644.—The Sisters of Saint Joseph of the Good Shepherd is a congregation founded by Henri de Maupas, bishop of Puy, in 1650. Dispersed by the Revolution, it was reorganized in 1811. In 1836 six Sisters from Lyons came to the United States at the request of Bishop Rosati of Saint Louis, and they established a house of their order at Carondelet. The Sisters have always conducted all kinds of charitable work, including the gratuitous instruction of poor children and the care of such establishments as orphanages, institutions for the deaf and dumb, Indian and negro missions and Magdalen asylums. The Sisters of Saint Joseph, an offshoot from the Sisters of Saint Joseph of the Good Shepherd, were established at Toronto, Canada, in 1850 by Bishop Charbonnel.—The Sisters of Saint Joseph of Bourg were founded by Monsignor Devie, bishop of Belley, in 1828. Its members are engaged in teaching and works of charity.—The Congregation of Sisters of Saint Joseph of the Apparition was founded in France by Mme. de Vialard, in 1833. Its members are employed in teaching and in nursing the sick. The Sisters of Saint Joseph of Cluny are a community founded by Anne Marie Javouhey in 1807, although its first house was not formally recognized until 1819. Mother Javouhey was its first superior, and, as soon as possible, she established her Sisters in all the French colonies, where they devoted themselves to the education, the conversion and the civilization of the negro and other aboriginal races. The Sisters of Saint Joseph of Peace, a community founded in England, devote themselves to the training of girls for domestic service. In 1885 a branch of the sisterhood was established in Jersey City, N. J., by Bishop Wigger, and since that time the American house has extended the scope of its work until it now includes the care of the sick in their own homes, the care of a home and school for the blind, a hospital and a convalescent and summer home for poor working girls. The Hospital Sisters of Saint Joseph conduct hospitals in Chicago and Winoski, Vt. The Polish Sisters of Saint Joseph have a novitiate at Stevens Point, Wis.

SAINT JOSEPH OF NAZARETH, SISTERHOOD OF.—An order in the Protestant Episcopal Church established in 1892. Its objects are "the mutual improvement in religious knowledge of its members, and the furtherance of religious belief by means of the religious and community life, and afterward the exercise of charity in teaching and training the young."

SAINT MARGARET, SISTERS OF.—An order of missionary and nursing sisters, established in the Church of England, at East Grinstead, England, by Rev. J. M. Neale, D.D., in 1855. In 1873 an affiliated house was opened at Boston, Mass., and the American members of the order are engaged in conducting all kinds of hospitals, sanitariums and homes for incurables in various parts of the United States and Canada. Much of the work of the order is devoted to needy colored people.

SAINT MARTHE, SISTER SERVANTS OF.—The community of the Sister Servants of Saint Marthe was founded at Saint Hyacinthe, Canada, in 1890. Its members perform the housework for the diocesan seminary.

SAINT MARY, SISTERS OF.—The Institute of the Sisters of Saint Mary was founded by Rev. Dom Jerome N. J. Minsart at Namur, Belgium, in 1834, its object being the education of girls. In 1863 the order was introduced into the United States by Rt. Rev. John Timon, bishop of Buffalo, N. Y.

SAINT MARY, SISTERHOOD OF.—Incorporated in New York in 1865, the Sisterhood of Saint Mary is one of the largest orders of the Protestant Episcopal Church. Its members conduct hospitals, sanitariums and various other charitable and educational institutions in many parts of the United States.

SAINT MARY AND ALL SAINTS, SISTERS OF.—An order of colored women trained for work among their own people by the Protestant Episcopal Sisters of All Saints.

SAINT MARY AND LADIES CATECHISTS, MISSIONARIES OF.—A congregation founded to work among the Indians and the poor. The mother house is at Mission, Wash.

SAINT MONICA, SISTERS OF.—An order established by the Episcopal bishop of Springfield, Ill., for the purpose of instituting an association of widows "for intercessory prayer and the restoration to the Church of the primitive vocation of consecrated widowhood." The members are engaged in charitable works.

SAINT SAVIOUR, SISTERS OF.—An order in the Protestant Episcopal Church in California. Its members are engaged in the education of young girls.

SAINT THERESA OF JESUS, SISTERS OF.—Also known as Theresian Sisters, a teaching congregation with mother house in Spain and several establishments in Louisiana and Texas.

SALESIAN SISTERS OF THE HOLY EUCHARIST.—A congregation engaged in educational work in Baltimore and Pittsburgh.

SORROWFUL MOTHER, SISTERS OF THE.—A charitable and nursing order founded in Italy and introduced into the United States in 1889, its first house being established at Wichita, Kan.

TRANSFIGURATION, SISTERS OF THE.—A Protestant Episcopal sisterhood engaged in the care of homeless children and old ladies. Its labors are confined to Cincinnati, Ohio.

URSULINE NUNS.—The teaching order of the Ursulines was founded by Saint Angela Merici of Brescia, in 1537. Organized in Angela's kitchen as "The Company of Saint Ursula," its first objects were the nursing of the sick, the teaching of young girls and the sanctification of their own lives. At this time the members remained in the world, took no vows and received communion in common once each month. The conversion of the Society into a religious order was chiefly the work of Mme. de Sainte Beuve, a French woman, who built and endowed a convent for the congregation at Paris in 1610. Two years later Pope Paul V enclosed the nuns, placed them under the rule of Saint Austin, with solemn vows, including a fourth, binding them to devote their lives to the instruction of the young. The Irish Ursulines were established at Cork in 1771, by Miss Namo Nagle, and the first Ursuline convent instituted in the United States was founded by nuns from France at New Orleans 7 Aug. 1727. The Ursuline Sisters, a German congregation, conduct schools in the diocese of Bismarck.

VENERINI SISTERS.—An Italian congregation, with mother house in Rome, which conducts a school at Lawrence, Mass.

VISITATION NUNS.—The Order of the Visitation was founded at Annecy in 1610 by Saint Francis de Sales, assisted by Saint Jane Frances, Mme. de Chantai, their object being to found a retreat for persons desirous of the religious life, but who were too weak, or otherwise undispensed, to enter an austere order. As the result there were few corporal austerities, and little confinement, although the employment of time was minutely provided for. In 1618 the rule of the enclosure was adopted, and, although teaching was not a part of the founder's plan, all the American convents have devoted their attention closely to educational work. The first Visitation convent in the United States was established at Georgetown, D. C., in 1799.

WISDOM, DAUGHTERS OF.—A congregation founded in France. In the United States, the Sisters conduct several educational establishments, a hospital and a home for cripples and defectives.

DEACONESSSES.

The office of deaconess was one that was well recognized in the Apostolic Church, for while it may be questioned whether the certain references in the New Testament which have so generally been associated with the government of deaconesses really applied to them or not, the fact remains that some of the earliest writers of the Church recognized their usefulness and formulated rules of conduct for them. According to these rules it was necessary that a woman, to be a deaconess, should have been the widow of but one husband and that she should have borne children. It is true that exceptions were sometimes made and that virgins were occasionally admitted to these organizations, but this was a rare honor, it being the opinion of the Church authorities that no woman who had not been a wife and a mother would be able to feel that sympathetic devotion to her work which was so necessary to its success. As that was the time prior to the institution of sisterhoods and as the deaconesses were the only women who were officially authorized to assume Church work, there were many duties to which they were called. Among these was the care of the sick and poor, the ministering to those who were confined in prisons for conscience sake, the instruction of catechumens in the principles of their faith, assistance at the baptism of women, in addition to which they were supposed to exercise a general oversight over the female members of the congregations, both in public and in private, and were obliged to make regular reports that the bishops and elders might not be uninformed as to the conditions existing among their people. The work of the deaconesses continued until the middle of the 5th century. In the Greek Church such orders existed until the 12th century. Gradually, however, the sisterhoods took their place in the Church, and it was not until the 19th century that they were again revived, this time by the Protestant churches, who felt the need of the assistance of women in conducting their religious work. The first order of deaconesses to be instituted in the modern Church was in 1835 when Pastor Fliedner of Kaiserswerth, Prussia, established such a society in order that he might have an organized corps of nurses at his new infirmary, and the experiment was so successful that it was immediately copied by the Lutheran bodies in other parts of Europe. As instituted by Pastor Fliedner the "Order of Deaconesses of the Rhenish Province of Westphalia" was composed of three classes of members. The first class devoted themselves to the care of the sick poor and the rescue of fallen women by the means of Magdalen homes; the second class were engaged in teaching; while the third class, or visitation deaconesses, assumed the responsi-

bilities of the regular parochial work. The members took no vows and, while plainly dressed, wore no distinctive habit. In 1849, at the request of the American Church authorities, Pastor Fliedner brought four nurses to the United States where he established a home in Pittsburgh. In the Episcopal Church the work of the deaconesses is almost as important as that of the sisterhoods, it being of very much the same character. It is largely represented in the South, the branches in Georgia, Alabama, Kentucky and Louisiana being important factors in the religious work of the denomination. The revival of deaconess work in the Methodist Church dates from about 1870, when the Bethany Society was organized in Germany. Like the Order of Deaconesses established by Pastor Fliedner, its members were devoted chiefly to nursing, a work which they conducted so successfully that there are now more than 200 of them engaged in the various German hospitals. The first effort to introduce the order into the United States was in 1886, when Rev. J. M. Thoburn, at a conference held at Bellefontaine, Ohio, urged the advantage that the Methodists of this country would gain from the institution of a deaconess home or training school. As the result, Miss Jane M. Bancroft, later Mrs. Robinson, was sent to Germany to acquaint herself with the work of the organization and, in October 1887, a Deaconess Home was opened in Chicago. The next session of the General Conference signified its full approval of the movement and, in 1888, the present system of permanent deaconess work was inaugurated under the direction of the Woman's Home Missionary Society. According to the rules of conduct the purposes of the deaconesses are "to act as pastors' assistants; to visit from house to house; to assist in evangelistic work; to conduct meetings, especially those for women and children; to conduct kindergartens, kitchengartens; and other industrial and educational schools; to visit in prisons and police stations; to conduct orphanages, hospitals and other institutions of mercy; to nurse among the sick poor, etc., and to assist in office and clerical work." The Deaconess Society of the Methodist Episcopal Church was organized in 1895. It conducts hospitals, orphanages and schools, as well as other charitable works under the direction of its licensed deaconesses. The German Methodist deaconess homes and hospitals are under the control of the German Central Deaconess Board. The work of its deaconesses comprises, beside hospital service, nursing in private families, parish work, free dispensaries, kindergartens, industrial and sewing schools, etc. It has 78 deaconesses who operate five hospitals. The "Martha-Maria" Deaconess Society in Germany, which now operates in association with the Bethany Society, was originally organized by the Wesleyan Church. While now in perfect harmony with the sister institutions it still maintains its distinctive organization. Except in some few instances in the Protestant Episcopal Church the present-day deaconesses take no vows and may withdraw from the service of the Church at any time without reproach to themselves. They are usually disciplined during two probationary years, and, while they are unsalaried, they are assured of ample support, with a good home and tender care during sickness or old age. It is now customary in the United States for deaconesses to wear a habit, chiefly for purposes of recognition and protection, and, generally, they now live in communities or homes.

JOHN R. MEADER.

ORDERS OF ARCHITECTURE, the different styles of classic architecture as distinguished by the character of the column, its base, shaft, capital and the superimposed entablature. These elements constituting the unit of a colonnade are taken account of in distinguishing the various orders, of which there are five, the Doric, Ionic, Corinthian, Tuscan and Composite. Each type of the column seems to have persisted in its main characteristics from the earliest times while undergoing minor modifications in the way of refinement in proportions and details.

The column of the Doric order presents a tapering shaft resting upon the stylobate or platform. The shaft generally consisted of several parts called drums but in rare instances it was monolithic. It was grooved with semi-elliptical channels meeting in a sharp edge or arris. Surmounting the shaft the capital consisted of a circular cushion or echinus, so named from the sea-egg from which its curve was derived, and a square flat stone called the abacus. The capital formed the support for the entablature, comprising the architrave, frieze and the cornice. The architrave or epistyle was the first series of horizontal stones, usually unorn-

namented, and forming a solid basis for the frieze above, which was divided by alternating parts called triglyphs and metopes. The triglyphs were blocks, slightly projecting, carved with two vertical grooves and chamfered edges. These, save the two end ones, were placed above the centre of the columns and in the space midway between. The metopes were intervening square panels, often carved with architectural sculpture. Resting on the frieze was the cornice, consisting of a series of projecting moldings, the under side of the bed-molding being ornamented with square mutules having each 18 guttæ depending from its under side. The gutter molding above protected the sculptured metopes from water.

The Ionic order, a development of the 5th century B.C., was characterized by greater slenderness of proportion. The shaft was placed upon a base composed of one concave and two convex moldings of semi-circular profile; these in turn sometimes rested upon a square base block or plinth. The fluting of the shaft was semi-circular, consequently deeper than the Doric, and was separated by fillets. The capital comprised a bead, an echinus and an upper and characteristic band ending on both sides in a volute or scroll. The entablature was formed by an architrave of two or three flat faces and a frieze without triglyphs. The superimposed molding introduced a new feature in the row of narrow blocks or dentals under the corona.

The Corinthian order was a late development of the Ionic, resembling it in base and shaft, but differing in the form of the capital, which was ornamented with circlets of acanthus leaves surmounted by branching scrolls meeting at the corners in spiral volutes.

These three orders were invented by the Greeks, but were appropriated by the Romans who modified them in certain unessential details into types that pass as Roman Doric, Roman Ionic and Roman Corinthian. The latter, however, was the favorite order of Roman architecture. To the Romans belong, in addition, two other orders; the Tuscan, resembling the Doric, but without flutings in the column or triglyphs in the cornice; and the Composite, whose capital consisted of volutes modified from the Ionic and a lower circle of acanthus leaves derived from the Corinthian. This order admitted a great variety of ornamentation.

ORDERS IN COUNCIL, orders issued by the English sovereign in accordance with the advice of the Privy Council, a body which has no legislative power, excepting so far as Parliament may grant it. In times of emergency, however, the Privy Council has issued orders of a legislative character. Those instrumental in issuing such orders or carrying them out are generally relieved from all liability by a subsequent act of indemnity. It was by orders in council that Napoleon's famous continental system was met. See **CONTINENTAL SYSTEM**; **BERLIN DECREE**.

ORDERS (ROYAL) AND DECORATIONS. The love of personal decoration is one of the fundamental instincts of human nature. Carlyle observes in 'Sartor Resartus' that "among wild people we find tattooing and painting even prior to Clothes. The first spiritual want of a barbarous man is Decoration,

as indeed we still see among the barbarous classes in civilized countries." The ambition to wear some mark that shall distinguish the bearer among his fellows is perhaps as strong to-day as it was in the romantic period of chivalry from which practically all the more venerable orders and decorations of Europe took their rise. Yet in this respect, as in so many others, Europe merely borrowed from the East, for though there may have been no regular institution of knighthood or orders as we understand the terms, among the nations of antiquity, nevertheless the same law of honorary selection was recognized among the Egyptians, Assyrians and Persians. In the old days, including those of Greece and Rome, rings, gold chains, belts, "triumphal gifts," etc., conferred a distinction on personal merit, as discriminated from official rank and hereditary nobility, and were common to all classes. Furthermore, there are many Oriental titles that seem to illustrate the same general connection of ideas, as, for instance, the badges of great Japanese families, which bear a striking resemblance to the heraldry of Europe, while the peculiar and distinguishing marks of the various grades of the Chinese aristocracy, the so-called "buttons," are analogous to the "pearls" that adorn the coronets of the hereditary nobility of the West. It is supposed that among the prehistoric Pelasgians a "sash" indicated the same distinction as the torques and golden chains or collars of the Gauls, Celts and Teutons. Coming to later centuries, even our own times, we find that ribbons, chains and jeweled badges convey similar evidences of distinction and that the privilege of wearing them is still highly prized. Notwithstanding the fact that orders and decorations are frequently ridiculed by democratic peoples as "mediæval relics of monarchy" and denounced as "obsolete grewwaws of vanity," it is interesting to note how firmly that alleged "antiquated custom" has taken root in other guises in the greatest of all democracies—the United States. We may call it habit, fashion or human nature. Just as the two buttons on the back of a man's coat are a reminiscence of the civilian sword belt, so the wearing of innumerable "badges" in everyday life is in reality a survival—or revival—of the time-honored system of orders and decorations, an outward expression of the inherent desire for such distinctions. All kinds of associations have their badges, which their respective members proudly expose on their coat-lapels or watch-chains. The European War especially gave occasion for the exhibition in public of many and varied decorations, conferred by authority or self-adopted. In a class apart, soldiers and marines display their medals, crosses and chevrons indicating active service, conspicuous gallantry or wounds. Among civilians, the golden star on the service flag at home is a true decoration of honor; the purchaser of Liberty Bonds wore his decoration; the little Red Cross badge denoted that the wearer had subscribed to that beneficent institution; the college student wears the badge of his Greek letter society; the trade unions, clubs, boys' and girls' schools, etc., have their distinctive badges. Examples of this type could be multiplied *ad infinitum*; they serve to illustrate that decorations, as such, are by no

means despised. So far from being a modern invention or of recent development, the fundamentals of this remarkable manifestation lie buried in antiquity. It is safe to assume that if the wearers of these multifarious decorations did not regard them as honors, they would not so willingly exhibit them on their persons, for a decoration is essentially a reward for service rendered to a cause or a community. That a money gift can be no substitute for a decoration of honor is exemplified by the reverence with which the orders and medals of ancestors are treasured as family heirlooms: their value and glory only appreciate with time. While it is undoubtedly true that in Europe high decorations are frequently conferred as acknowledgments rather of social position than special merit, it has become a custom during comparatively recent years to affiliate to nobility the most distinguished among the aristocracy of art, science, literature, music and philanthropy, thereby honoring those who have largely contributed to human progress. For many centuries the highest honors were reserved exclusively for the profession of arms; there was literally no limit to the rank to which a successful warrior might not aspire, from knight to emperor. Carlyle satirized this exclusiveness so long ago as 1833, when he looked forward to the day when "communities discover, not without surprise, that fashioning the souls of a generation by Knowledge (i.e., teaching) can rank on a level with blowing their bodies to pieces by Gunpowder." Not reckoning Switzerland, the United States appears to be the only great country wherein the services of civilians, however meritorious, pass unrewarded, except for the Gold and Silver life-saving medals issued by the Treasury Department; decorations are conferred only on the army, navy, police and fire departments. France has her Academy of "Forty Immortals" and the Legion of Honor; Great Britain the Order of Merit and various other decorations for civilians; the Swedish Nobel Prize is international in its scope and has been awarded to several Americans, including the late President Roosevelt.

From a purely sentimental point of view, decorations possess a value that cannot be computed in terms of cash; money cannot buy true honors—they must be earned. It was the recognition of this sentiment that influenced Napoleon in the institution of the "Arms of Honor." In vain did old republicans, jealous of their new prerogatives, protest against the reintroduction of such "baubles" as unworthy of the citizens of a new republic. The consul, however, was not to be dissuaded. "You call them toys?" he answered, "Well, learn that it is through such toys that men are led!"

A distinction must be drawn between the "knights" of ancient Rome and the mediæval institution of chivalry; the former represented a class with variable rank, whereas the knight of chivalry preserved his distinction as such, even on the throne. There were also many other differences which distinguished the almost sacerdotal character of the latter from the simple social grade of the former. Yet the Roman equestrians may in some respects have formed the model on which the Chivalric Order was founded. That order may be described as

of two kinds, the religious, or hierarchical, and the secular or military. The two classes of organized and duly constituted bodies of knighthood are: (1) the associations or fraternities possessing property and rights of their own as independent bodies, and (2) honorary associations established for specified purposes by sovereigns within their respective dominions. To the former belong the three great religious orders created during the Crusades, the Templars, the Hospitallers and the Teutonic Knights. (See *ORDERS, RELIGIOUS*). While the strictly religious orders are now comparatively extinct, the more secular orders which they inspired exist under almost every flag, though it is not improbable that many will automatically become obsolete owing to the dynastic upheavals following the European War.

The Knights Hospitallers of Saint John the Baptist in Jerusalem, afterward known as the Order of Saint John of Malta, formed the most powerful of all the religious orders, originating about the middle of the 11th century by the erection of a hospital on the spot where, according to tradition, the "Last Supper" had been held. The founders were Italians. The Pilgrims of the hospital were constituted knights by Baldwin I in 1104 and their rule was confirmed by Pope Pascal II in 1113. Driven from Jerusalem, and afterward from place to place by the martial vicissitudes of the times, they finally seized upon the island of Rhodes, which they retained until 1522, when, upon being expelled, they went to Malta, which, with Gozo and Tripoli, was granted to them in fee by Emperor Charles V in 1530. During the period of the Reformation, as well as in subsequent years, the Order was abolished in some portions of the country, and, in 1798, having been dispossessed from Malta by Napoleon, the Knights settled in the papal states, from which headquarters the Order has been to some extent revived. Originally the Order maintained a class for women, "The Ladies of the Order of Saint John," which was founded by Agnes, abbess of the house of Saint Mary Magdalen, in 1099. So recently as February 1918 the Roman civil courts decided a lawsuit involving property vested in the Knights of Malta which had been wrongly held for 100 years.

The Order of the Holy Sepulchre was one of the most ancient of the early fraternities. Though attributed to Saint Helena, it is believed to have been instituted by Baldwin I, king of Jerusalem, about A.D. 1110. As originally founded it was restricted to the priesthood and this restriction was not removed until 1484, when Pope Innocent VIII incorporated it with the Order of the Knights of Saint John of Jerusalem. Two ineffectual attempts were made to sever the bond of union, but in 1496 Pope Alexander VI, who took so much interest in the Order that he may almost be regarded as its real founder, transferred the power of admitting knights to the Holy See, and, from that time, the Order was changed from a religious association to a fraternity of chivalric character.

The Templars originated about 1120, under Baldwin II, when nine gentlemen and two nobles appeared as Pilgrims at Jerusalem. Adopting the rule of Saint Augustine they took up their abode in the Holy City, and gradually extended their influence until they became one

of the most powerful confraternities, under the name of "Brethren of the Militia of the Temple." In an evil hour, however, they incurred the animosity of Philip le Bel and of Pope Clement V, and, in the year 1312, the latter announced the suppression of the Order in France. Although it is still doubtful whether the action of Pope Clement was just or unjust, his example was followed by the whole of Europe, and the final blow was struck when the last grand master, Jacques de Molay (q.v.), was executed at the stake, in France, in 1313. The Order has never been revived.

The Teutonic Order, the last of the great religious fraternities, was founded at Acre in 1190. Prior to its organization German pilgrims had received scant attention at the Holy City. Needy pilgrims from France and Italy found the Templars and the Hospitallers ready to receive them, so this new Order was formed with the object of attending to sick and wounded Germans. In 1191 Frederick of Swabia gave the Order a constitution which established the rule of Saint Augustine and adopted regulations governing the practice of all duties. Regarding the treatment of the sick and the poor the regulations were similar to those of the Knights of Saint John, while the regulations respecting peace and war were identical with those of the Templars. With the sanction of Pope Celestine III, Frederick gave the association the name of "The Order of the German House of the Holy Virgin at Jerusalem." The Order attained the height of its power in the 13th century, but this period of luxury was followed by one of anarchy. In the 15th century, after the Twelve-Years' War, it became feudatory to Poland. The original Order was abolished after the Peace of Cracow 1525, and its territories handed as fief of Poland to the Grand Master Albert, Margrave of Brandenburg, who took the title of "Administrator in Prussia and Grand Master of the Teutonic Order in Germany." With various interruptions this condition existed till 1805, when the dignity was vested in the emperor of Austria. Napoleon abolished the Order in the Rhenish province in 1809 and apportioned all its lands among the neighboring princes. The Congress of Vienna restored most of the property and in 1840 it was declared an independent fief of the Austrian Empire.

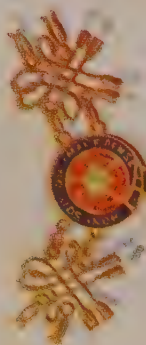
At the head of the great secular orders which still maintain their pristine reputation stands the British Order of the Garter. Next in rank and antiquity is the Order of the Golden Fleece, which was not only the most important order of the Austrian Empire, but is also the principal decoration of the Spanish Crown. Founded in 1429 by Duke Philip of Burgundy, the grand mastership was held by his house until Charles the Bold died without male issue in 1477, when it passed to his son-in-law the Emperor Maximilian of Germany. When the Hapsburg rule ceased in Spain at the beginning of the 18th century, the Golden Fleece became the subject of a violent quarrel. Spain and Austria each claimed the order, with the result that both countries retained it.

The third of the great mediæval orders is that of the most sacred Annunziata, the principal order of Italy, founded in 1362 by Amadeo of Savoy. Called by Favin, "the Order of the Snares of Love," and known at various periods

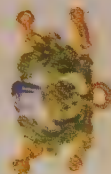
BADGES AND DECORATIONS OF HONOR — PLATE I.



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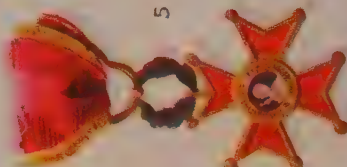
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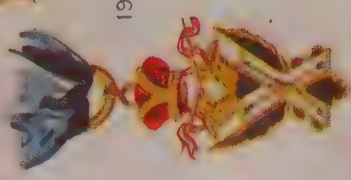
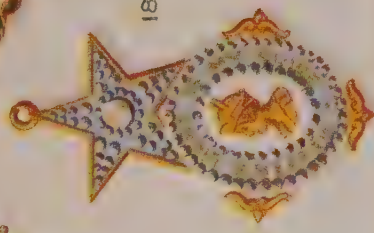
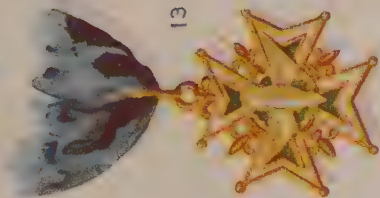
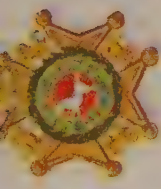
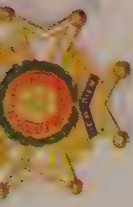
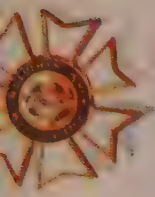
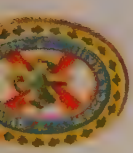
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- 1 ORDER OF CHRIST (Portugal).
- 2 SOCIETY OF THE CINCINNATI (United States).
- 3 ORDER OF THE THISTLE, with Collar Attachment (Great Britain, Scotland).
- 4 ORDER OF THE GARTER, with Collar Attachment (Great Britain).
- 5 ORDER OF ST. GREGORY THE GREAT (Pontifical).
- 6 ORDER OF THE GOLDEN FLEECE (Spain).

- 7 GUELPHIC ORDER OF HANOVER.
- 8 ORDER OF THE BATH, Military Class (Great Britain).
- 9 GRAND ARMY OF THE REPUBLIC (United States).
- 10 ORDER OF ST. MICHAEL AND ST. GEORGE (Great Britain).
- 11 ORDER OF THE ROSE (Prussia).



13 ORDER OF THE HOLY GHOST (France).

14 ORDER OF THE TOWER AND SWORD (Portugal).

15 ORDER OF THE HOLY SEPULCHRE (Pontifical).

16 LEGION OF HONOR (France).

17 LOYAL LEGION (United States).

18 ORDER OF THE STAR OF INDIA (England, India).

19 ORDER OF ST. ANDREW (Russia).

as "the Collar" and "Loveknots," for the reasons for which one must turn to tradition, its importance is indicated by the fact, that its chevaliers are styled "cousins of the King," all of whom, with their wives, participate in the honor of this relationship to royalty.

The only insignia of distinction ever authorized by the Congress of the United States are the medals of honor for exceptional bravery in war and for life saving, which from time to time have been sanctioned by the government. France, too, continues to show a distaste to chivalric orders and remains satisfied with its republican decoration, the Legion of Honor, which, however, is not so closely restricted as are the awards of honor made by the United States.

The following list with dates of institution shows the principal orders and other decorations existing in the various countries. With the collapse of the Russian Empire in 1917 and the introduction of republican forms of government in the German and Austro-Hungarian empires at the close of 1918, the data shown under those countries may possess only a historical interest:

ABYSSINIA.—The Order of Solomon's Seals or Order of Saint George (1874); Order of the Star.

AUSTRIA-HUNGARY.—The Order of the Golden Fleece, the wearers of which took precedence over all others at court functions; the military Order of Maria-Theresa (1757); the Order of Saint Stephen of Hungary (1767) for civil merit; the Order of the Iron Cross, founded by Napoleon in 1805, was extinguished in 1814 but re-established in 1816 by the Emperor Francis I as an Austrian order; the Order of Leopold (1808), a distinction for personal merit; the Order of Francis Joseph, for distinguished merit in all classes (1849); the Military Foundation of Elizabeth Theresa, rejuvenated in 1771; and two decorations for women, the Order of the Starry Cross (1668) and the Order of Elizabeth (1898). The Cross of Merit for officers (1849) and for ordinary soldiers (1801); the Medal of Honor of Austria-Hungary (1877) was bestowed upon those who excelled in the arts and sciences; and the Souvenir Medal of the Jubilee (1898), a civilian decoration.

BELGIUM.—The Order of Leopold, civil and military (1832); the Order of the Iron Cross, a civil decoration (1867), took its rise from the Order of Civil Merit instituted in 1830; and the Military Cross of two classes (1885).

BOLIVIA.—The Order of the Cross of Christopher Columbus, of which there are three classes, is no longer conferred.

BRAZIL.—The constitution of 1891 suppressed all decorations except two medals of merit. The extinct orders were the Imperial Order of the Southern Cross (1822), the Order of Pedro I (1826), the Imperial Order of the Rose (1829), the Order of Christopher Columbus (1890) and the Medal of Merit (1889).

BULGARIA.—The Military Order of Bulgaria (1879) includes a grand cross and four classes each for officers and private soldiers; the Order of Alexander, to which is added the Medal of Merit (1881); the Civil Merit Order (1891) is for distinction in the arts and sciences, and the Military Cross is awarded for 20 years' service.

CHINA.—The only order bestowed under the Empire was that of the Imperial Dragon (1862). After 1882 it became the Order of the Double Dragon, divided into five classes.

DENMARK.—The Order of the Elephant is so ancient that its origin is lost in tradition. Originally a religious society, it was re-organized in 1693 and received its present name. The Order of the Dannebrog, which is conferred only upon natives, is also of great antiquity; it is said to have been founded by Waldemar II in 1219 in commemoration of a miraculous intervention in battle. In 1808 it was changed from a court honor to an honor of merit. Denmark also bestows medals for lifesavings, military service and inventions.

FRANCE.—In addition to the Order of the Legion of Honor, which was founded by Napoleon 19 May 1802, France has the following medals of decoration: The Military Medal, founded by Napoleon III; the Medal of Honor, founded by President McMahon; the Medal of Merit, founded by President Grévy; the Colonial Medal, founded in 1893 for military services in the colonies and countries under French protection; the Medal of Honor, created by decree in 1897; the bronze Medal of Reward for bravery in the performance of duty, founded in 1899, and the Medal of Honor in silver, for commercial workmen, founded by decree in 1900. The highly-prized Croix de Guerre was created for the European War, as was also the Medal of French Gratitude (1916),

awarded to those who have aided wounded men, the sick, the families of killed or those driven from their homes by invasion.

GERMANY.—There were numerous orders and decorations in the former German Empire, every kingdom, principality and duchy of the Reich possessing its own distinctions. In Prussia, the Order of the Black Eagle (1701) was one of the most important; the Order of the Red Eagle (1705) was organized in 1712 as an order of the House of Hohenzollern; the Order of Civil and Military Merit dates back to 1667, was reorganized in 1840 as the Order for Merit and was later extended to the civil class for arts and science, to include 30 Germans and an equal number of foreigners. The "Ordre Pour le Merite" was the highest military service medal within the gift of the Emperor. The Royal Order of the House of Hohenzollern (1841); the Order of the Crown of Prussia (1901); the Royal Order of the Crown (1861); the Order of the Iron Cross originated in 1813, and the Order of William (Wilhelms-Orden) was founded by the last Kaiser in 1896. The Order of Louise, for women's service in war, was founded in 1814, and the Cross of Merit for women was created in 1871. There were other decorations for benevolence, Red Cross, etc.

GREAT BRITAIN.—The highest distinction is the Most Noble Order of the Garter, established by King Edward III in 1348. It is now limited to the sovereign and such other descendants of George I as may be elected and to 25 Knights Companions; but sovereigns and princes of other countries, and extra Knights Companions, may be admitted by special statutes. Its abbreviation is "K.G.", and it is the highest order of knighthood. Its insignia and habit include the George—a gold medallion of Saint George and the Dragon, suspended from a blue ribbon; the Garter, which is worn below the knee of the left leg, and is made of dark blue velvet edged with gold, bearing the motto, *Honi soit qui mal y pense* ("Evil be to him who evil thinks"); a mantle of blue velvet lined with taffeta, with the star of the order embroidered on the left breast; a hood and surcoat of crimson velvet and a hat of black velvet; a gold collar weighing 30 ounces, and the star with the cross of Saint George in the centre, encircled by the Garter. The reigning Queen is Lady of the Order.

The Most Ancient and Most Noble Order of the Thistle dates to 1540, was remodelled in 1687 and again in 1703. The order consists of the King and 16 knights. Its abbreviation is K.T., and the badge, the gold Saint Andrew, is suspended from a green ribbon; its motto is, *Nemo me impune lacessit*.

The Most Illustrious Order of Saint Patrick was created in 1783 and revised in 1905. It consists of the King, a Grand Master, who is the Lord-Lieutenant of Ireland for the time being, and 22 knights. Its abbreviation is K.P., its badge, on a sky-blue ribbon, bears the motto, *Quis separabit?*

The Most Honorable Order of the Bath was originally established by King Henry IV in 1399. It fell into neglect during the 17th century but was revived in 1725. Remodelled in 1815 and enlarged in 1845, it is now divided into three classes—Knight Grand Cross (A.C.B.), Knight Commander (K.C.B.) and Companion (C.B.). Exclusive of the King and princes of the blood, the first class is limited to 57 members for military service and 27 for civil service, besides distinguished foreigners who may be awarded the honorary degree. The second class is limited to 150 for military and 114 for civil service; while the third, the Companions, may number 1,056, of whom 732 may be for military and 324 for civil service. The badge, suspended from a crimson ribbon, bears the motto, *Tria juncta in uno*.

The Most Distinguished Order of Saint Michael and Saint George was created in 1818 and is generally bestowed on those who have rendered meritorious service in colonial or foreign affairs. Its motto is *Auspiciis melioris avi*; it is divided into three classes, Knight Grand Cross (G.C.M.G.), Knight Commander (K.C.M.G.) and Companion (C.M.G.); the first class is limited to 100 members, the second to 300, and the third to 725.

The Most Exalted Order of the Star of India was established in 1861 and frequently enlarged until 1911. Bestowed for services rendered to the Indian Empire, the badge bears the motto, *Heaven's Light our Guide*. It has three classes, Knight Grand Commander (G.C.S.I.), Knight Commander (K.C.S.I.) and Companion (C.S.I.), and is limited to the sovereign, a Grand Master (the Viceroy of India for the time being) and 44 members of the first class, 100 of the second and 200 of the third.

The Most Eminent Order of the Indian Empire (1877) is similarly bestowed as the foregoing order; it has also three classes but is less limited in number of membership. The abbreviations are, G.C.I.E., K.C.I.E. and C.I.E.

The Royal Victoria Order, founded by Queen Victoria in 1896, is restricted to British subjects who have rendered meritorious personal services to the sovereign; when conferred upon foreigners it is an honorary rank. There are five classes, G.C.V.O., K.C.V.O., C.V.O. and M.V.O. for the fourth and fifth classes.

The Order of the British Empire, created by King George in 1917, consists of five classes each for men and women, conferred for services rendered to the Empire at home or abroad.

The Order of Merit, established by King Edward VII in

1902, is bestowed for conspicuous distinction in army, navy, government, art, science, literature, music, etc. The late Miss Florence Nightingale was one of the recipients of this order.

The Order of the Companions of Honour, founded by King George 21 June 1917, consists of one class, to which both men and women are eligible, and is closely limited as to number of recipients. It is a very special distinction.

The Distinguished Service Order (D.S.O.) was created by Queen Victoria as a reward for officers in the army and navy. Foreign officers who have been associated in naval and military operations with the British are eligible as honorary members.

The Imperial Service Order (1902) is a decoration for members of the Civil Service of the Empire. No others are eligible. Women are included. Companions of the order add I.S.O. after their names.

The Imperial Order of the Crown of India (1877) is limited to those who have held office under the Indian government; it includes native princes with their wives and other female relatives.

The Order of the Hospital of Saint John of Jerusalem in England is a modern creation dating from 1888. It concerns itself with hospital, ambulance and other charitable works, consists of Knights and Ladies of Justice, Chaplains, Knights and Ladies of Grace and Esquires. Appointments to this order carry no rank nor title.

The Victoria Cross, the most highly-prized of all British awards, is dealt with elsewhere. (See VICTORIA CROSS). The following decorations were created during the European War: The Military Cross (1915), conferred on captains, commissioned officers of a lower grade and Indian and Colonial military forces. The Military Medal (1916), conferred on non-commissioned officers and men and women "for individual or associated acts of bravery on the recommendation of a commander-in-chief on the field." The Distinguished Service Cross (formerly the Conspicuous Service Cross) was renamed in 1915 for "distinguished service before the enemy," and extends to all naval officers below the rank of lieutenant-commander. The Distinguished Service Medal (1915) is a naval decoration.

The Albert Medal (1866) is a reward for acts of heroism performed by civilians at sea or on land. There are two grades—gold and bronze. The Edward Medal (1907) is awarded for heroism in life-saving in industrial employment. The Kaisar-i-Hind Medal (1900) is bestowed for services rendered in India, without distinction of race or sex.

GREECE.—The Royal Order of the Redeemer, founded by the General Assembly of the Hellenes in 1829, is conferred for both military and civil distinctions.

HAWAII.—The orders formerly existing but now no longer conferred were the Order of Kamehameha I (1865), the Order of Kalakaua I (1875), the Order of the Royal Crown of Hawaii (1882), an Order and a Medal of Kapiolani (1880) and the Order of the Star of the Ocean (1866).

ITALY.—The Order of the Annunziata, already referred to, consists of but one grade. It was revived by Charles III in 1815 and again modified by Victor Emmanuel II in 1869, who restricted the number of knights to 20 in addition to the sovereign, the princes and some others. The Order of Saint Maurice and Saint Lazare was formed by uniting two orders, the first dating back to 1434 and the latter, it is said, to the 10th century. New statutes were made in 1816 and limitations withdrawn. Other Italian orders are the military Order of Savoy (1815), the Civil Order of Savoy (1831), the Order of the Crown of Italy (1868) and the Order of Agricultural Merit (1901).

JAPAN.—The Supreme Order of the Chrysanthemum (1877) is conferred almost exclusively upon princes of the blood and foreign sovereigns; the Order of the Sun of Paulownia (1888) and the Eastern Sun (1875); the Military Order of the Golden Kite (1890), the Order of the Sacred Treasure (1888), the Order of the Crown, for women (1888) and the Medal for life-saving (1881).

LIBERIA.—The Order of the Beneficence of Liberia (1879); the Gold Medal of the Lone Star and the Order of Merit, bestowed for service in the civilization of Africa.

LUXEMBURG.—The Order of the Golden Lion of the House of Nassau (1858); the Order of the Oaken Crown (1849) and an order of Civil and Military Merit.

MEXICO.—The Mexican orders no longer conferred were the Order of Our Lady of Guadalupe (1852); the Order of the Mexican Eagle (1865), a Medal for Bravery and the Order of Saint Charles, for women (1865).

MONACO.—The Order of Saint Charles (1858).

MONTENEGRO.—The Order of Independence (1855); the Order of Saint Peter (1851); a gold Medal for Bravery (1841) and a Medal of Devotion for patriotic service (1895).

NETHERLANDS.—The Order of Willem (1815) is a military distinction, and the Order of the Netherlands Lion (1815) is a recompense for civil merit. The Order of Orang-Nassau (1892); the Teutonic Order, the Commandery of Utrecht and the Order of the Golden Lion.

PERSIA.—The Order of the Sun and the Lion (1808); the Order of the Sun, for women (1873), and a Medal for the arts and sciences (1851).

PONTIFICAL.—Several orders of importance are still con-

ferred by the Holy See. The doubtful Order of the Golden Spur, now the Order of Saint Sylvester, claims greater antiquity than any other Knightly Order on the presumption that it was instituted by Constantine the Great and confirmed by Saint Sylvester. Many reliable authorities, however, attribute its origin to Pope Pius IV in 1559. On 31 Oct. 1841 Pope Gregory XVI decreed new statutes restricting its applications to zeal in the cause of the church and civil virtues and dividing it into two classes, Commanders and Knights. The Order of the Holy Sepulchre, which is attributed to Pope Alexander VI and Godfrey of Bouillon was created with about the same motives as the Order of Saint John of Jerusalem. It was confirmed by Pope Benedict XIV in 1746, and the decorations of its three classes are now conferred in the name of the Holy See by the Latin Patriarch at Jerusalem. The Order of Christ as conferred at Rome closely resembles the Portuguese order of the same name. In Rome, however, noble birth is not a requisite to admission. Other Pontifical orders are the Order of Pius IX, founded by Pope Pius IX 17 June 1847; the Order of Saint Gregory the Great, founded by Gregory XVI 1 Sept. 1831; the Order of the Moor, an art distinction, founded by Pope Pius VII 23 Sept. 1806; and the Order of Saint Cecilia, a musical distinction, founded 17 June 1847. The Golden Rose is sent occasionally to high dignitaries, and sometimes to cities or churches, in recognition of high type of character. It originated in the 13th century, and of late years it has been bestowed chiefly upon women of royal blood.

RUMANIA.—The Order of the Star of Rumania (1877); the Order of the Crown of Rumania (1881); a Medal of Military Virtue (1872); a Medal of Merit for arts and sciences (1876) and a Medal for faithful service (1878).

RUSSIA.—Under the old régime the conferring of an order by the Tsar carried with it a patent of nobility. The most important were the Order of Saint Andrew (1698); the Order of Saint Catherine, for women (1714); Order of Saint Alexander-Nevski (1725); Military Order of Saint George (1769); Order of Saint Vladimir (1782); Order of Saint Anne (1735); three Polish decorations: Order of the White Eagle; Order of Saint Stanislas and the Order of Military Merit.

SAN MARINO.—The chivalric Order of San Marino (1860).

SERBIA.—The Order of Saint Lazare; Order of the White Eagle (1883); Order of the Cross of Takovo (1865); Order of Saint Sava (1883) and Order of Milosh the Great (1898). New military decorations were created during the European War.

SIAM.—The Order of the Nine-Pointed Star (1869) is a religious decoration conferred only upon Buddhists; Order of the Great Crown (1884) is conferred only on royalties; Order of the White Elephant of Siam (1861) is the highest national honor; Order of the Siamese Crown (1869) and a Sacred Order containing a portrait of the king.

SPAIN.—In addition to the Golden Fleece, which Spain shared with the former Austrian Empire, and the Military Order of Malta, which is the Spanish branch of the Order of Saint John of Jerusalem, Spain has several ancient decorations. Chief among these are the Military Order of Calatrava (1158); the Military Order of Saint Ferdinand (1811); the Military Order of Our Lady of Montesa (1319); the Military Order of Saint Hermenegilde (1814); the Royal American Order of Isabella the Catholic (1815); the Order Isabella II (1833); the Illustrious Royal Order of Charles III (1771); the Order of Military Merit (1866); Order of Marie-Victoria (1871); Order of the Beneficencia, for humane and useful public service (1856); Military Order of Marie-Christine (1890) and the Order of Marie-Louise, for women only (1792).

SWEDEN AND NORWAY.—Sweden possesses the only Masonic order in the world, the Order of Charles XIII. founded by that monarch in 1811. It is bestowed only upon Freemasons of high rank. The late King Edward VII, as Grand Master of England, was a member of this order. The Order of the Seraphim dates from the 13th century; the Order of the Sword, or the Yellow Ribbon, originated in 1522; while the Order of the Pole Star was founded in 1748. Since the separation of the two kingdoms of Sweden and Norway in 1905 the orders remained with Sweden.

TURKEY.—The principal Turkish orders are those of the Medjidieh (1851); the Nishan-i-Shefkat (1878), for women, and the Osmanieh, for distinguished civil or military service (1862). There are several minor Turkish decorations.

VENEZUELA.—The Order of Bolivar (1825); Order of Merit (1861) and a Medal of Public Instruction.

ZANZIBAR.—The Order of the Jeweled Star (1875) is the only decoration issued by the Sultan of this British protectorate.

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BADGES AND DECORATIONS OF HONOR — PLATE II.



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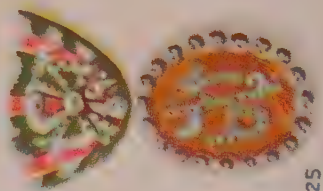
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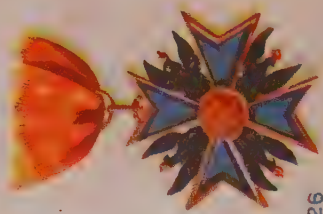
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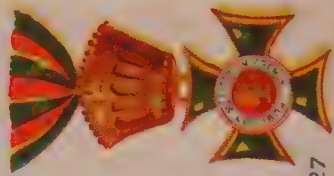
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20 ORDER OF THE OAK CROWN (Luxembourg).
21 ORDER OF THE CROWN OF WURTEMBERG.
22 ORDER OF ST. JOHN OF JERUSALEM.
23 ORDER OF THE ELEPHANT (Denmark).
24 THE IRON CROSS (Prussia).

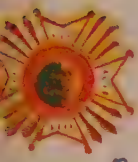
25 THE NICHAN BADGE (Tunis).
26 ORDER OF THE BLACK EAGLE (Prussia).
27 APOSTOLIC ORDER OF ST. STEPHEN (Austria, Hungary).
28 MILITARY ORDER OF WILLIAM (Netherlands).
29 ORDER OF THE SUN AND LION (Persia).

30 ORDER OF ST. OLAF (Sweden).
31 ORDER OF THE AUSTRIAN-NEDERLANDS.
32 ORDER OF THE AUSTRIAN-NEDERLANDS.
33 ORDER OF THE AUSTRIAN-NEDERLANDS.

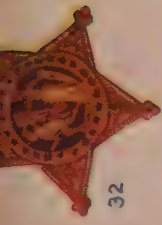
- 33 KNIGHTLY ORDER OF ST. HUBERT (Bavaria).
 34 FAMILY ORDER OF LOYALTY OF BADEN (Germany).
 35 ORDER OF LEOPOLD (Belgium).
 36 ORDER OF THE BUST OF BOLIVAR (Venezuela).
 37 ROYAL AMERICAN ORDER OF ISABELLA THE CATHOLIC (Spain).
 38 ORDER OF THE RED-DEMIER OR SAVEDER (Sweden, Norway).
 39 ORDER OF THE SERAPHIM (Sweden, Norway).
 40 ORDER OF THE GOLDEN FLEUR (Austria, Hungary).
 41 ORDER OF THE EASTERN RISING SUN (Japan).
 42 THE VICTORIA CROSS (Great Britain).
 43 ORDER OF THE GARTER, PRINCE OF WALES (Great Britain).
 44 ORDER OF THE RUE CROWN (Saxony).



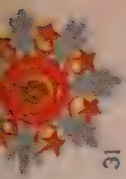
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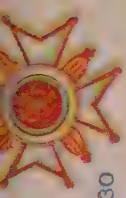
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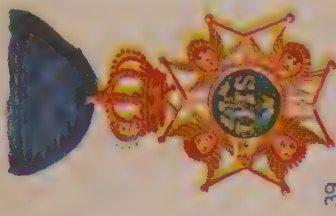
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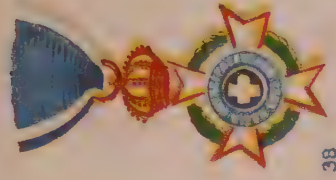
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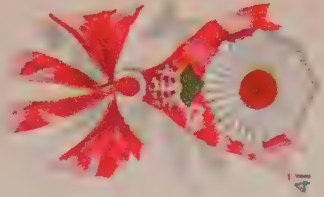
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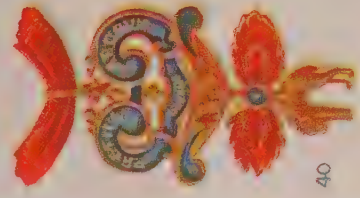
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John of Jerusalem 1014-1914' (London 1914).

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ORDINAL, that portion of the Anglican Book of Common Prayer (q.v.) which contains the offices for the consecration of bishops and the ordination of priests and deacons. So far it corresponds with certain offices in the Pontifical of the Roman Catholic Church. A. commission appointed by the Crown in the year 1550, with the approval of parliament, prepared the original form which was amended two years later and again in 1562. Since the former date (1552) the Anglican Ordinal always appears under one cover with the Book of Common Prayer. The American Ordinal dates from 1792. Consult Proctor and Frere, 'A New History of the Book of Common Prayer' (London 1905).

ORDINANCE, (1) a law or order of a municipal governing body. (2) In England, an order or regulation issued by a power inferior to the sovereign. (3) Formerly, in England, a species of legislation issued by the sovereign, but not sanctioned by Parliament. In the United States the term is almost unknown in any sense except definition one, although in England the term by-law is used with this meaning. It has been held (99 Pa. 330) that a resolution of a council is but another name for an ordinance, and if it is a legislative act it is immaterial whether it is called a resolution or an ordinance, so long as the requirements essential to the validity of an ordinance be observed.

ORDINANCE OF 1784. See BOUNDARIES OF THE UNITED STATES.

ORDINANCE OF 1787, in American history, an act of Congress passed in July 1787, to regulate the government of the western lands granted to the Ohio Company. The ordinance has been called "the most notable law ever enacted by the representatives of the American people." It marks the beginning of one of the most remarkable growths ever known in territorial expansion, and it has furnished the bases for the constitutions of several States. It is especially noted for three great provisions of all good government, its guaranty of entire freedom of worship, its perpetual prohibition of human slavery and the great prominence given to the matter of schools and education in the words "Religion, morality and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged." The "Ordinance of 1787" says: "Be it ordained by the United States in Congress assembled that said territory, for the purposes of temporary government, be one district, subject, however, to be divided into two districts, as future circumstances may, in the opinion of Congress, make it expedient." This declaration is followed by 13 other sections, the first 12 of which provide for the management of affairs under a temporary government of the Northwest Territory. The purpose of this paper is set forth as follows:

"And, for extending the fundamental principles of civil and religious liberty, which form the basis whereon these republics, their laws and constitutions, are erected to fix and establish these principles as the basis of all laws, constitutions, and governments, which forever hereafter shall be formed in said territory to provide also for the establishment of states, and permanent government therein, and for

their admission to a share in the federal councils on an equal footing with the original states, at as early periods as may be consistent with the general interest:—It is hereby ordained and declared by the authority aforesaid (United States), That the articles shall be considered as articles of compact between the original states and the people and states in the said territory and forever remain unalterable, unless by common consent."

The articles referred to are six in number and form a definite compact between the United States as it then existed and the people of the Northwest Territory and the States that might afterward be formed from it. See **BOUNDARIES OF THE UNITED STATES**.

ORDINANCE POWER. See **MUNICIPALITIES**.

ORDINATION, the ceremony by which bishops, priests and deacons, candidates for the minor orders and ministers of any denomination are admitted to their specific office in the church. The Roman Catholic doctrine of ordination is confirmed by John xx, 21, 22, and the power of ordination is believed to be descended from the apostles through the bishops. Ordination is reckoned one of the seven sacraments of the Catholic Church. Orders in the Roman Catholic Church are normally conferred by bishops and the higher orders can be conferred by no other functionary. Holy orders are conferred normally on the Saturdays in any of the four Ember weeks, on the fifth Saturday in Lent, on Holy Saturday; but two grades cannot be conferred the same day on the same person. A bishop is normally ordained on a Sunday or on the festival of an apostle. The English Church also considers ordination as a real consecration, the power of communicating which has descended from Christ through the apostles and bishops. (See **APOSTOLIC SUCCESSION**). There is, however, a diversity of opinion on this point, the high-church party maintaining the dogma, the broad and some of the low-church party denying it. For ordination in the English Church subscription to the 39 articles and the declaration that the Book of Common Prayer contains nothing contrary to Scripture are required. The ceremony of ordination is performed by the bishop with the imposition of hands on the person to be ordained. In the English Church ordination is a requisite to the exercise of a ministerial office; but in some denominations ordination is not necessary for that purpose. In the Presbyterian Church ordination means the act of settling or establishing a licensed preacher over a congregation, with pastoral charge and authority, or the act of conferring on a licensed preacher the powers of a settled minister of the gospel without the charge of a particular church, but with general power wherever he may be called upon to officiate. The Congregationalists believe that the call of a congregation gives ministerial authority to a preacher. In the Methodist Episcopal churches the form of ordination closely follows that of the Protestant Episcopal Church, with omission of every form of expression which may appear to favor sacerdotalism.

ORDNANCE (variant of ordinance, from Latin, *ordinare*, to order). The word owes its application to military machines to an ordinance of Henry VIII of England, regulating the manufacture of cannon, and establishing a board charged with the care of the Crown fortifications. In time cannon manufactured according

to the specifications of the decree came to be known as ordinance or ordnance. In its present usage, the term comprehends all machines designed to hurl projectiles of any kind, shape or size by the agency of explosives. More particularly, it is understood to refer to mounted cannon as distinguished from those pieces such as rifles, pistols or other small arms usually held in the hand while being fired. In the modern system the term "gun" has come into general use for all forms, regardless of their power or of the uses for which they are designed. Mounted cannon to-day includes very many types differing one from another according to the use for which they are intended. In this work many ordnance types are treated under their own heads. See **ARMOR PLATE**; **ARTILLERY**; **COAST DEFENSE**; **FORTIFICATIONS**; **GUNS, HISTORY AND DEVELOPMENT OF**; **GUNS, LAND**; **GUNS, NAVAL**; **GUNNERY**; **MACHINE GUN**; **SMALL ARMS**.

ORDNANCE, Department of, in the United States War Department, staff corps which superintends the design, production and supply of arms, ammunition and personal military equipment of the soldier and of certain other related military supplies. It is under the direction of the chief of ordnance and contains an establishment of 132 ordnance officers commissioned as such in the regular army, together with 30 officers detailed for instruction each year, reserve officers and enlisted men. The Ordnance Department has charge of all arsenals, ordnance depots and proving grounds. The employees at these are mostly civilians. See **UNITED STATES, ARMY OF THE**; **ARMY ORGANIZATION**.

ORDÓÑEZ DE MONTALVO, Garcí, Spanish writer, father of the novel of knightly adventure. He was born probably about the middle of the 15th century and he was very active at the close of it. He retold the old semi-mythological, semi-caballeresque stories of 'Amadís de Gaula,' recasting them in the Spanish of his day; and to the three books thus reformed he added a fourth which, it is generally conceded, was his own invention. The proofs of this are that the style, material and manner of treatment in the fourth volume are very different from those of the other three. A fifth book, 'Las Sergas de Espandián,' by Ordóñez de Montalvo, is a continuation of the Amadís stories. Ordóñez de Montalvo was a soldier who saw many wars and finally became governor of the city of Medina del Campo. But nothing is known of his life except such information as incidentally appears in his works. Even his birthplace is in doubt. He seems to have taken his original version of the 'Amadís' from the Portuguese, where the stories had long been popular; but in working it over to have added much from his own vivid imagination and experience. In the fifth book, already cited, he continues the series with the adventures of the son of Amadís. These Amadís stories of Ordóñez de Montalvo were immensely popular in their day and had countless imitators, not in Spain alone, but in all the Latin countries (more especially in France) and in England. They created a new and freer literature, imaginative and bombastic and generally untrue to human nature. Yet they formed the delight of Spanish readers for a whole cen-

tury; and they only disappeared with the breaking up of chivalry and before the ridicule of them so persistently carried out in 'Don Quixote.' Though the Amadis stories disappeared they left their broad trail on the succeeding literature of Europe; and 'Don Quixote' itself owes its form to the constructive ability shown in the work of Ordóñez de Montalvo. See CERVANTES; AMADIS DE GAULA; CHIVALRY.

ORDOVICIAN, ôr-dô-vîsh'ân, in geology, a term introduced in 1879 by Lapworth for what Murchison had called the Lower Silurian as early as 1835; the term Silurian being used thereafter for the most part only of the Upper Silurian in Murchison's nomenclature. Hence the Ordovician system may be defined as the rocks of the period after the Cambrian (q.v.) and before the Silurian (q.v.), the latter term being used in the sense explained above. The name Ordovician is derived from a Welsh tribe. The system in America has been variously subdivided. The following units are now generally recognized, Lower or Canadian, Middle or Mohawkian and Upper or Cincinnati. These names are not used in other countries. The Cambrian passed without notable change into the Ordovician. The period was one of shallow but widespread epicontinental seas with local emergences and erosion. The water areas reached a maximum near the middle of the period, when more of North America was under water than at any other known time in its history. Sandstones and shales were deposited in places, but it was notably a time of limestone formation, the Trenton being a very extensive limestone of mid-Ordovician age. In North America the period was brought to a close by folding disturbances which have been called the Taconic Revolution, producing a range of mountains on the present site of the Green Mountains. Simultaneous folding took place in the British Isles. This folding was accompanied by rather general emergence of eastern United States, and the Cincinnati Arch took form about this time. Wide spread outcrops of Ordovician rocks occur in the Appalachian Mountains, in southern Wisconsin, in the Ozarks and at many other points. In many places the rocks of the system lie deeply buried by younger sediments. Europe was also widely submerged in Ordovician time, and there was extensive volcanism in the British Isles. Much of the oil and gas of Ohio comes from rocks of Ordovician age.

The life of the Ordovician showed marked advance over that of the Cambrian. Brachio-pods and Trilobites were very abundant. The long straight Orthoceras type of Cephalopods became numerous and were the largest animals in the Ordovician seas, attaining to lengths of over 10 feet. Fish remains, the oldest vertebrates known, are doubtfully reported from Ordovician rocks. Evidences of plant life are very uncertain. See CANADIAN SERIES; CHAZY STAGE; CINCINNATI ANTICLINE; TRENTON STAGE, etc.

ORDWAY, John Morse, American educator and chemist; b. Amesbury, Mass., 23 April 1823; d. 3 July 1909. He was graduated from Dartmouth College in 1844 and engaged in chemical work. In 1847 he was superintendent of the Roxbury Color and Chemical Company's works at Roxbury, and in 1850 accepted a pro-

fessorship in Grand River College, Trenton, Mo. After 1854 he re-engaged in chemical work; in 1869 was appointed professor of industrial chemistry and metallurgy at the Massachusetts Institute of Technology, and in 1884 became a professor at Tulane University and its branch for women, Newcomb College.

ORE. An ore may be defined as any mineral or aggregation of minerals from which a metal or metals can be extracted at a profit. This definition is not exact, but is one often used by geologists and mining engineers. Since the prospect of profitable extraction is involved it follows that mineral containing a certain per cent of a metal may be considered an ore in one region and not an ore in another. Thus pyrrhotite containing 2 per cent copper would be called copper ore if situated where it could be worked to advantage, and would not be called a copper ore if situated, say, in Tibet. Again certain minerals formerly not considered as ores are not now, and other minerals not ores now will be considered such in the future. Bauxite is an ore of aluminum, but aluminum was not known a century ago. Similarly clay will be an ore of aluminum with the progress of metallurgy. Ores containing a relatively small proportion of the metal sought are termed lean or low grade, those containing a high per cent rich or high grade; the relative percentages depend on the value of the metal. Ore containing 1 per cent of gold would be extremely rich. In the Lake Superior country iron ores containing less than 50 per cent iron are low grade. Metals may be disseminated through a rock in the native state or as chemical compounds of sulphur, oxygen, carbonic acid, etc. Gold and silver, the noble metals, occur native as does copper. An ore carrying native gold is called free-milling. In general it may be said that nine-tenths of the commercially important ores are sulphides, oxides, hydroxides, carbonates and native metals. For information on methods of extracting metals from their ores see METALLURGY, also COPPER; GOLD; IRON, etc. For a discussion of methods of occurrence of ores see ORE DEPOSITS and ECONOMIC GEOLOGY.

ORE CRUSHING. See GOLD MINING.

ORE DEPOSITS. It is impossible to draw a fixed boundary between those occurrences of metalliferous minerals that are to be regarded as ore deposits and those that are not. Generally speaking an ore deposit is any occurrence of metalliferous minerals, large enough and rich enough to be worked at a profit. It thus appears that a body of mineral might be properly regarded as an ore deposit under some conditions and not under others. Magnetite, which in places is an important ore of iron, is often found scattered through granite, yet no one would regard a granite ledge as an iron ore deposit. The exact point at which rocks containing iron oxides become iron ore bodies is determined by the factor of cost of extraction. A ledge containing a small percentage of iron favorably situated might be profitably worked, whereas if situated in some remote locality it could not.

Whatever theory as to the origin of the earth may be held, it is certain that the useful metals were once original constituents of the rocks, either finely disseminated, or perhaps, as some

hold, concentrated as a heavier central core within the earth. In any case, these metals have been later concentrated into our present ore deposits, by a complex series of processes to be outlined very briefly below.

In a molten magma slowly cooling at great depths as the minerals crystallize out they may collect in aggregates, either from unequal cooling of the magma or from what we may call mineral attraction. It is fairly certain that bodies of chrome iron ore, of nickel-copper sulphides, of magnetite and possibly platinum have formed by cooling from fusion. The nickel deposits of Sudbury, Ontario, and much of the magnetic iron ore of the Adirondack region of New York are believed to be of this origin. The process by which these ores have been formed is known as magmatic segregation. Again supposing the minerals distributed thinly through a cooled magma—an igneous rock—they may be concentrated into workable ore bodies, (1) by the decay of the rock when, after overlying strata have been uplifted and eroded, its constituent minerals are broken up and removed by air and water and only the more resistant are left. Thus are formed the so-called *placer* deposits, whence has come much of the world's supply of gold, also the principal tin deposits. The minerals removed in suspension or solution in surface water and the contained metals may be precipitated chemically, or by some form of organic life. Thus have beds containing various iron compounds been formed, the bog iron ores, and those carbonates and silicates which after partial solution and leaching out of silica are now represented by the Lake Superior iron ore deposits.

Slowly circulating meteoric waters in their passage through the rocks may take into solution metallic compounds which they encounter, and may deposit them in fissures as veins, or in irregular shaped caves as large masses of ore. Sometimes the waters slowly dissolve away limestone and replace it particle by particle with metallic minerals forming what are known as replacement deposits. Such is the origin of the well-known lead and zinc deposits of Missouri and Wisconsin.

In regions of igneous activity, particularly in mountainous areas, large masses of molten rock (magma) force their way into the adjacent rocks. These contain much water (magmatic water) which they give off as they cool and solidify, and this water sometimes carries away with it in solution metallic compounds. As the waters rise toward the surface along fractures they cool and deposit much of their load as veins. By replacing the wall rock they may also form large irregular replacement deposits. Many of the great gold, silver and copper deposits of western United States have been thus formed by hot waters of magmatic origin, for example, those of Butte, Tonopah and Cripple Creek.

Classification.—Many attempts at classifying ore deposits were based on form and mode of occurrence. Lately geologists have realized that the form of a deposit was from a scientific standpoint less important than its origin. Schemes of classification have been devised which take into consideration both form and mode of origin, but the latest classifications are based wholly on origin. The following scheme is that proposed for metallic ore deposits by C. R. Van Hise:

1. Sedimentary
 - (a) Chemical precipitates
 - (1) Residual deposits
 - (2) Stream deposits
 - (3) Beach deposits
 - (b) Mechanical concentrates
2. Igneous
 - (a) Magmatic secretions
3. Metamorphic
 - (a) Deposited from gaseous solution
 - (1) Ascending waters
 - (2) Descending waters
 - (3) Ascending and descending waters
 - (b) Deposited from aqueous solution

Many other and more elaborate schemes have also been proposed.

See GEOLOGY and ECONOMIC GEOLOGY. For bibliography see ECONOMIC GEOLOGY.

Revised by PROF. C. L. DAKE.

OREADS, in Greek mythology, a name given to various nymphs of the mountains.

ÖREBRO, é-rë-broo, Sweden, (1) a town, capital of the län of same name, on the Svart-Elf, near the western extremity of Lake Hjelmar, 101 miles west of Stockholm. Its buildings are almost entirely modern, having been erected after the great fire of 1854. One of these is a handsome Gothic town-hall. The only ancient buildings are the castle, on an island in the river, now used for public offices, and the church, which contains some interesting monuments. The manufactures comprise machinery, chemicals, matches, etc., and there is a good trade. Örebro was the first Swedish town in which the Reformation was formally established (1529), and it was for a long time, of very considerable importance as the meeting place of the diet. Pop. about 25,000. (2) The län consists generally of undulating plains, watered by numerous streams, and containing many lakes. The only hilly district is in the north where there are several forests and valuable iron and other mines. The pastures rear fine cattle. The only exports of consequence are iron and timber, transmitted to Stockholm or Gottenburg.

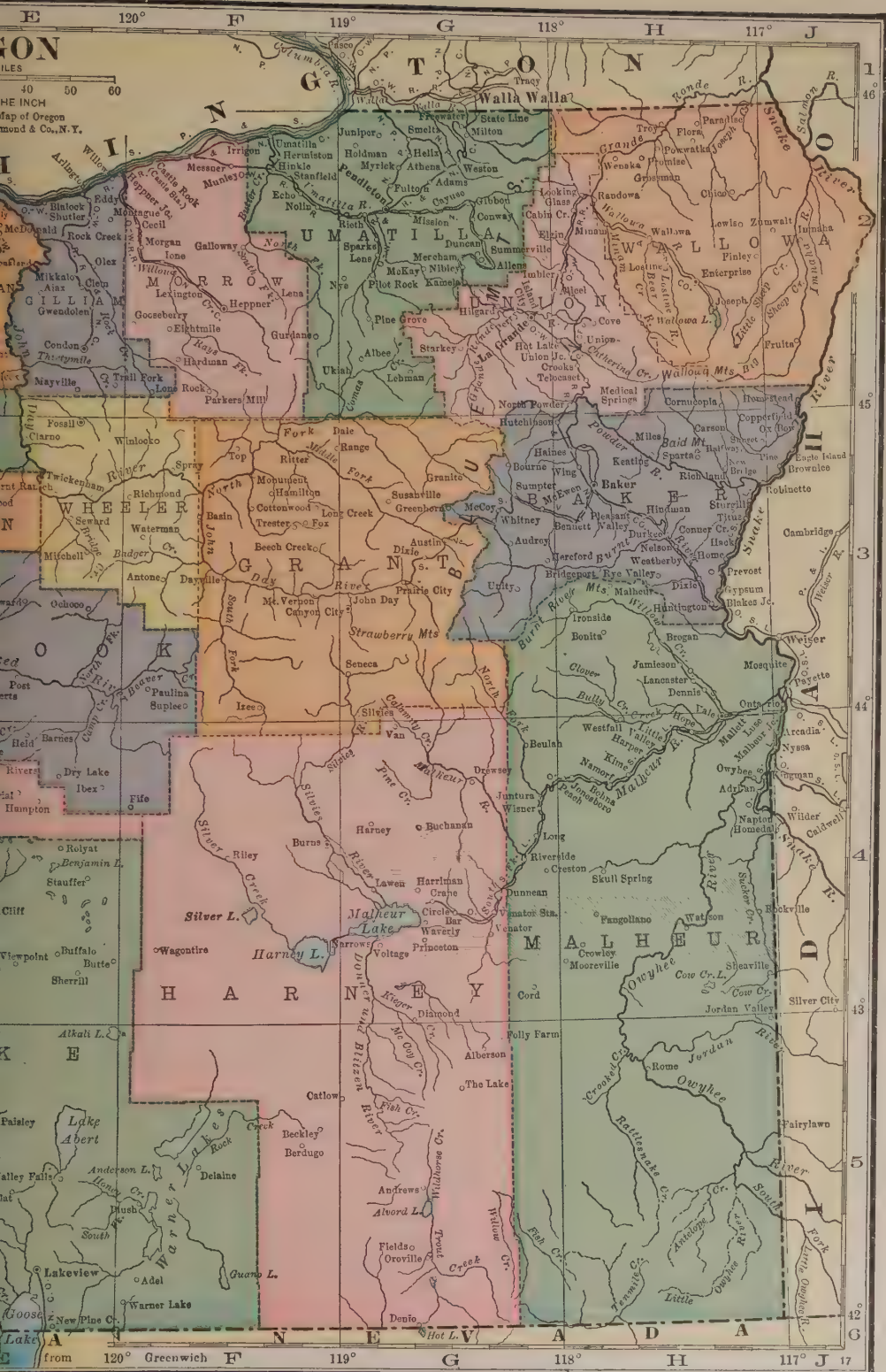
OREGON, one of the United States, on the Pacific Coast, bounded north by the State of Washington, from which it is separated principally by the Columbia River; east by the State of Idaho; south by Nevada and California, and west by the North Pacific Ocean. The State lies between lat. 42° and 46° 18' N. and between long. 116° 33' and 124° 25' W. Its extreme length from east to west is 395 miles, and from north to south 295 miles. Its area is 94,500 square miles of land surface and 1,092 square miles of water surface, divided (1917) as follows:

	Acreage	Per cent of total acreage
In national forest reserves.....	13,470,248	22.014
Indian reserves.....	1,825,987	2.984
National park reserves.....	164,040	0.268
Public lands open to entry.....	15,969,846	26.099
Not patented or otherwise classified as to ownership.....	3,152,993	5.153
Carey act lands.....	360,382	0.589
Carey act lands pending.....	62,152	0.102
State school lands.....	624,210	1.020
In cities and towns.....	134,496	0.220
Cultivated lands.....	4,930,396	8.058
Commercial timber.....	9,547,116	15.603
Tillable lands (uncultivated).....	5,084,858	8.310
Non-tillable lands.....	5,826,200	9.522
Railroad right of way.....	35,556	0.058
Total area.....	61,188,480	100.000

OREGON

Adams, (G2).....	198	Carlton, (B2).....	552	Echo, (F2).....	501	Halfway, (H3)....	324
Airlie, (B3).....	100	Carson, (H3).....	200	Eddyville, (B3)...	100	Halsey, (B3).....	339
Albany, (C3).....	4,840	Cascade Locks, (D2)	280	Elgin, (G2).....	1,043	Hamilton, (F3)...	100
Albee, (G2).....	130	Centralpoint, (C5)	582	Elkhead, (B4)....	100	Hammond, (A1)...	547
Alsea, (B3).....	130	Champoeg, (C2)...	100	Elkton, (B4)....	150	Hardman, (F2)...	193
Amity, (B2).....	522	Chemawa, (C3)...	600	Elmira, (B3)....	110	Harney, (G4)....	23
Antelope, (E3)...	199	Clackamas, (C2)...	100	Empire, (A4)....	182	Harrisburg, (B3)..	573
Arlington, (E2)...	529	Clatskanie, (B1)...	1,171	Enterprise, (H2)...	1,895	Helix, (G2).....	290
Ashland, (E3)...	4,283	Clatsop, (B1)....	220	Estacada, (C2)...	483	Heppner, (F2)...	1,324
Ashwood, (D3)...	26	Clifton, (B1)....	130	Eugene, (B3)....	10,593	Hermiston, (F2)...	655
Astoria, (B1)....	14,027	Cloverdale, (B2)...	200	Fairview, (C2)...	184	Hilgard, (G2)....	190
Athena, (G2).....	621	Coburg, (B3).....	270	Falls City, (B3)...	994	Hillsboro, (B2)...	2,468
Aumsville, (C3)...	171	Condon, (E2).....	1,127	Floca, (H2).....	100	Hillsdale, (C2)...	100
Aurora, (C2).....	229	Copperfield, (J3)...	155	Florence, (A4)....	317	Hood River, (D2)	3,195
Austin, (G3).....	149	Conville, (A4)....	1,642	Forestgrove, (B2)	1,915	Hubbard, (C2)....	320
Baker City, (H3)	7,729	Cornelius, (B2)...	494	Fort Klamath, (C5)	200	Hugo, (B5).....	100
Ballston, (B2)...	100	Cornucopia, (H2)...	150	Fort Stevens, (A1)	150	Huntington, (H3)...	666
Bandon, (A4).....	1,440	Corvallis, (B3)...	5,752	Fossil, (E3).....	519	Imbler, (G2)....	206
Banks, (B2).....	300	Cottagegrove, (B4)	1,919	Freewater, (G2)...	664	Independence, (B3)	1,143
Barlow, (C2).....	42	Cove, (H2).....	399	Friend, (D2).....	35	Ione, (F2).....	439
Bay City, (B2)...	511	Crawfordsville, (C3)	130	Galescreek, (B2)...	120	Irrigon, (F2)....	100
Beaver Hill, (A4)	143	Creswell, (B4)....	273	Gardiner, (A4)....	391	Irving, (B3)....	105
Beaverton, (C2)...	580	Culver, (D3).....	200	Garibaldi, (B2)...	200	Island City, (H2)	141
Bend, (D3).....	5,415	Cushman, (A4)....	150	Gaston, (B2)....	221	Jacksonville, (B5)	489
Bonanza, (D5)....	77	Dallas, (B3).....	2,701	Gates, (G3).....	210	Jefferson, (B3)...	417
Boring, (C2).....	150	Damascus, (C2)...	100	Gearhart, (B1)...	127	John Day, (G3)...	321
Bourne, (G3).....	30	Dayton, (B2)....	448	Gervais, (C2)....	268	Jordan Valley, (J5)	355
Bridal Veil, (C2)...	200	Dayville, (F3)....	117	Gladstone, (C2)...	1,069	Joseph, (H2)....	770
Brookings, (A5)...	350	Deer Island, (C2)...	100	Glencoe, (C2)....	150	Junction City, (B3)	687
Brooks, (C2).....	120	Deschutes, (D3)...	64	Glendale, (B5)...	548	Juntura, (G4)....	127
Brownsville, (C3)	763	Detroit, (C3)....	100	Goble, (C1).....	117	Kamela, (G2)....	100
Buena Vista, (B3)	100	Dilley, (B2).....	100	Goldbeach, (A5)...	290	Kent, (E2).....	150
Burns, (F4).....	1,022	Donald, (C2)....	126	Goldhill, (B5)...	322	Kerby, (B5).....	120
Butte Falls, (C5)...	166	Drain, (B4).....	607	Granite, (G3)....	55	Kings Valley, (B3)	100
Butteville, (C2)...	49	Drewsey, (G4)....	83	Grant, (E2).....	213	Klamath Falls, (D5)	4,801
Buxton, (B2).....	200	Dufur, (D2).....	533	Grants Pass, (B5)	3,151	Knappa, (B1)...	180
Camas Valley, (B4)	100	Dundee, (C2)....	193	Grass Valley, (E2)	317	Lafayette, (B2)...	410
Canby, (C2).....	852	Dundee, (H3)....	100	Greenhorn, (G3)...	5	La Grande, (G2)...	6,913
Canyon City, (G3)	354	Eagle Point, (C5)...	128	Gresham, (C2)...	1,103	Lakeview, (E5)...	1,139
Canyonville, (B5)	156	Eastside, (A4)....	453	Haines, (G3)....	503	Langlois, (A5)...	150





OREGON - Cont'd.

Lapine, (D4).....	126	Mulino, (C2).....	100	Reedville, (C2)...	125	Troutdale, (C2)...	191
Latourell Falls, (C2)...	100	Myrtle Creek, (B4)...	385	Richland, (H3)...	244	Tualatin, (C2)...	234
Lebanon, (C3)...	1,805	Myrtlepoint, (A4)...	934	Rickreall, (B3)...	130	Tumalo, (D3)...	49
Leland, (B5).....	110	Needy, (C2).....	100	Riddle, (B5).....	268	Turner, (B3).....	289
Lexington, (F2)...	264	Nehalem, (B2)...	192	Rogue River, (B5)...	211	Tygh Valley, (D2)...	150
Lonerock, (F2)...	73	Newberg, (J2)...	2,566	Roseburg, (B4)...	4,381	Ukiah, (G2).....	110
Longcreek, (G3)...	148	New Era, (C2)...	200	Rufus, (E2).....	100	Umatilla, (F2).....	390
Lostine, (H2).....	244	New Pine Creek, (E5).....	200	Saint Helens, (C2)...	2,220	Union, (H2).....	1,319
Lyons, (C3).....	150	Newport, (A3).....	580	Saint Paul, (C2)...	160	Vale, (H4).....	935
McCoy, (B2).....	100	North Bend, (A4)...	3,268	SALEM, (C3).....	17,679	Vernonia, (B2)...	142
McEwen, (G3).....	110	North Powder, (G2)...	613	Sandy, (C2).....	242	Waldo, (B5).....	100
McMinnville, (B2)...	2,767	Norway, (A4).....	100	Scappoose, (C2)...	200	Waldport, (A3)...	181
Madras, (D3).....	337	Nyssa, (H4).....	563	Scholls, (C2).....	150	Wallowa, (H2)...	894
Mapleton, (B3)...	125	Oak Grove, (C2)...	100	Scio, (C3).....	309	Wamic, (D2).....	100
Marcola, (C3).....	200	Oakland, (B4)...	516	Scottsburg, (B4)...	109	Warren, (C2).....	100
Marion, (B3).....	100	Olney, (B1).....	180	Scotts Mills, (C2)...	208	Warrendale, (D2)...	150
Marshfield, (A4)...	4,034	Ontario, (H3).....	2,039	Seaside, (B2).....	1,802	Warrenton, (A1)...	730
Maupin, (D2).....	198	Oregon City, (C2)...	5,686	Shaniko, (E4)...	124	Wasco, (E2).....	701
Mayger, (B1).....	110	Orenco, (C2).....	335	Shedals, (B3).....	220	Waterloo, (C3)...	82
Mayville, (E2).....	150	Oswego, (C2).....	1,818	Sheridan, (B2)...	979	Wauna, (B1).....	300
Meacham, (G2)...	100	Paislev, (E5).....	257	Sherwood, (C2)...	320	Weedburn, (A5)...	100
Medford, (C5)...	5,756	Parkersburg, (A4)...	100	Siletz, (B3).....	100	Wending, (C3)...	300
Mehama, (C3).....	100	Parkplace, (C2)...	200	Silverlake, (E4)...	125	Westfall, (H4)...	92
Melrose, (B4).....	100	Pendleton, (G2)...	7,387	Silverton, (C3)...	2,251	West Linn, (C2)...	1,628
Merlin, (B5).....	150	Peoria, (B3).....	100	Sisters, (D3).....	125	Weston, (G2).....	590
Merrill, (D5).....	237	Perry, (G2).....	100	Sodaville, (C3)...	72	Westport, (B1)...	155
Metolius, (D3)...	94	Perrydale, (B3)...	100	Springfield, (C3)...	1,855	West Salem, (B3)...	200
Mill City, (C3)...	750	Philomath, (B3)...	591	Stanfield, (F2)...	278	Whiteson, (B2)...	108
Milton, (G2).....	1,747	Phoenix, (C5).....	159	Stayton, (C3)...	649	Whitney, (G3)...	90
Milwaukee, (C2)...	1,172	Pilotrock, (G2)...	361	Sublimity, (C3)...	172	Wilbur, (B4).....	157
Mist, (B2).....	150	Pine, (H3).....	150	Summerville, (G2)...	116	Wilderville, (B5)...	100
Mitchell, (E3)...	224	Portland, (C2)...	258,288	Sumpter, (G3)...	219	Willamette, (C2)...	317
Molalla, (C3)...	496	Port Orford, (A5)...	250	Sutherlin, (B4)...	515	Willamina, (B2)...	247
Monter, (C3).....	250	Prairie City, (G3)...	643	Sweet Home, (C3)...	175	Wilsonville, (C2)...	150
Monmouth, (B3)...	582	Prineville, (E3)...	1,144	Talent, (C5).....	278	Woodburn, (C2)...	1,656
Monroe, (B3).....	191	Prosper, (A4).....	250	Tangent, (B3)...	130	Woods, (A2).....	100
Monument, (F3)...	147	Rainier, (C1).....	1,287	The Dalles, (D2)...	5,807	Yamhill, (B2)....	166
Moro, (E2).....	418	Redmond, (D3)...	585	Tigard, (C2).....	275	Yankton, (C2)....	130
Mosier, (D2).....	259	Reedsport, (A4)...	850	Tillamook, (B2)...	1,964	Yaquina, (A3)....	300
Mount Angel, (C2)...	936			Toledo, (B3).....	678	Yoncalla, (B4)....	232

Oregon ranks seventh in size among the States and was admitted to the Union 14 Feb. 1859. There are 36 counties in the State. The population in 1920 was 783,389. The capital is Salem.

Topography.—Primarily Oregon is a mountainous State, two great ranges dividing it from north to south; the Coast Range from 10 to 30 miles from the ocean; the Cascade Mountains from 110 to 150 miles inland; and a third, the Blue Mountains, constituting a group in the northeast part. The Coast Range has an extreme altitude of 4,000 feet, and is largely covered with dense forests. The Cascade Mountains, an apparent continuation of the Sierra Nevadas but with an entirely different geological history, have an extreme height of 7,000 feet, with several peaks rising 2,000 to 5,000 feet higher. Mount Hood reaches an altitude of 11,500 feet, McLoughlin or Pitt, 11,000 feet, and Jefferson, 10,500 feet. The Cascades are heavily timbered on their western slope to the snow line. Four transverse ranges connect the Coast Range with the Cascades: the Callapooia, Umpqua, Rogue River and Siskiyou Mountains. The Willamette River Valley, lying between the Coast Range and Cascade Mountains, and rising from the Columbia River to the Callapooia spur, is 150 miles long, from 10 to 70 miles wide, and is extremely fertile and contains the largest part of the population of the State. Eastern Oregon, embracing two-thirds of the State, is a high table-land, with little rainfall, and sparsely populated. There are fertile tracts along the rivers and lakes in the southern portion and in the Blue Mountains. The coast-line, which has an extent of 300 miles, is generally rugged and precipitous. There are, however, several bays or harbors, such as Tillamook and Coos, which are landlocked, with narrow entrances. Toward the south the coast runs to an angle ending in Cape Blanco.

Geology.—Oregon has had a varied geological history. The older sediments of the State are to be found in the Blue Mountains and in the Siskiyou Mountains. These belong to the Pre-Cambrian, Palæozoic and Mesozoic. In the Blue Mountains, metamorphic rocks, including serpentines, schists and gneisses represent the earlier rocks. Igneous intrusives, often of a granitic nature are there also associated with the generally non-fossiliferous sedimentary rocks of Pre-Mesozoic age. In southwestern Oregon these early formations include similar metamorphic and igneous types of rock. The upper Mesozoic is represented by sandstones and shales, of Cretaceous age, outcropping within the drainage basin of the upper Deschutes, Crooked and John Day rivers of eastern Oregon and along the Rogue, Umpqua and Coquille rivers in western Oregon. The Cascade and Coast ranges are of Tertiary Age, consisting of marine sediments and volcanic flows and tuffs. In the Cascades these rocks are basaltic and are in part probably a portion of the great fissure flows which buried the larger part of eastern Oregon to a depth of at least a mile. Later flows of a more andesitic nature, and probably issuing from isolated volcanic cones, are represented within the higher Cascades, and especially in the vicinity of such volcanic peaks as Hood, The Sisters, Mount Jefferson and Mount Mazama (Crater Lake).

Glacial deposits of local nature occur in the lower reaches of the high valleys of the Blue, Stein and Cascade mountains. Gold, copper, silver and chromite have been obtained from mines within the Blue Mountains. The gold is mined both in quartz mines and as placer. Dredging operations are still in progress on the Powder River as well as along certain streams in western Oregon, where platinum has been obtained in small amounts. Some metal mining is to be found at several localities along the western flank of the Cascades. A quicksilver property at Black Butte (near Cottage Grove) has resumed operations. Although coal occurs in the sediments dipping beneath the Cascade lavas on the west side of the range, coal mining operations are confined to the Coos Bay and Nehalem basins in the coast region.

Rivers and Lakes.—The largest river is the Columbia, which forms three parts of the northern boundary of the State and flows nearly due west for over 300 miles, and is navigable to its mouth in the Pacific. Its great tributary, the Snake River, flowing north and serving as a boundary of a great portion of the State eastward, and its affluents, the Umatilla, John Day and Deschutes rivers, on the east side of the Cascade Range, and the Willamette on the west side, all flow into the Columbia. The Columbia has a drainage area of 245,000 square miles. The head of navigation for sea-going ships is at Portland, on the Willamette, about 100 miles inland. From here to the cascades navigation for river steamers is open the year around. Above the dalles the Columbia is navigable for 190 miles and the Snake River for 180 miles. The lower and upper stretches are now joined by a government ship canal on the south side of the river. The Columbia is noted for its beautiful scenery and the great number of salmon taken from its waters. The Columbia Highway, a new scenic motor car roadway, is carved high on the cliffs along its southern bank between Portland and Hood River. Other well known rivers in the State are the Rogue, Coquille, Umpqua, Siuslaw, Alsea, Yaquina, Nestucca, Nehalem, Lewis and Clarke, Clatskanie, Youngs, Sandy, Hood, Owyhee, Malheur, Burnt, Powder and Grande Ronde. The principal lakes are Klamath, Goose, Warner, Salt, Christmas, Albert, Summer, Silver, Henry and Malheur. Crater Lake in the Cascades, 8,000 feet above sea-level, is the crater of an extinct volcano, 10 miles in circumference, and surrounded by bluffs 2,000 feet high. It is the deepest body of fresh water in America. With its surroundings it constitutes a National Park. Goose Lake and Lower Klamath Lake lie partly in California.

Climate.—The climate can best be described by making a sharp distinction between western Oregon, west of the Cascades, and eastern Oregon, east of those mountains. A warm oceanic current from Japan flowing southward along the Pacific Coast gives western Oregon a very mild winter climate. In the summer the northwest winds are cool. On the coast the mean temperature for January is 42.4° and for July 62.3°, while great extremes are rare. Properly speaking, the year in western Oregon is divided into two seasons, the wet and the dry, although the usual names of the four seasons are, in general use. The rains begin

in September or October, continue to February or March and with lessened frequency and volume into May or June. From May to August there is frequently little rainfall in western Oregon except along the coast line and in the mountains. On the coast the rainfall averages 89.6 inches; in the Willamette valley, 35 to 50.8 inches. Thunderstorms are rare. A climatic curiosity is the "silver thaw," experienced occasionally in Portland—a freezing misty rain which sometimes tears down trees and wires by coating them with ice during a cold night. The three western valleys, the Willamette, Umpqua and Rogue, have distinct peculiarities, the more southerly approaching eastern Oregon in climate. Eastern Oregon is a land of much less rainfall and greater extremes of temperature. The distinction between a wet and dry season does not exist. The mean temperature is 29.6° for January and 66.9° for July. In winter the extremes fall below zero; and sometimes nearly 30° below. The rainfall averages 12.7 inches in the northeast and in the south-central portion only 6.5 inches. Thunder storms are not unusual.

Fauna.—Since Oregon has been populated and developed the grizzly bear, black bear, cinnamon bear, gray wolf, coyote, panther, catamount, wildcat, polecat, deer, antelope, elk and mountain sheep, all formerly very numerous, have retreated to the mountains or gradually disappeared. The grizzly and cinnamon bear and the mountain sheep are virtually extinct. There are still to be found in more or less abundance such animals as silver foxes, martens, rabbits, squirrels, raccoons, porcupines, beaver, muskrats and seals, and rarely the river otter, while in the lakes and rivers are salmon, herring, trout, halibut, smelt and other fish. Crabs and clams are taken in large quantities. Oysters and shrimp are negligible. The birds include the eagle (scarce), hawk, pelican, cormorant, gull, crane, vulture, buzzard, raven, crow, jay, robin, swallow, sparrow, hummingbird, swan, goose, duck and pigeon. Reptiles and insects of the more common varieties are numerous.

Minerals.—Oregon abounds in mineral wealth, but gold is the only product extensively mined. It is found mostly in the northeast, in the Blue Mountain region. Silver, lignite, coal, zinc, cinnabar, platinum, iridium, lead, antimony, iron, copper, magnetite and nickel are also found here. In 1908 the principal mineral productions included gold, 41,848 fine ounces; silver, 43,315 fine ounces; and coal, 77,017 short tons; and, in 1909, gold valued at \$712,000, silver \$37,000, coal \$235,085. The building stones are granite, valued at \$5,300; sandstone, \$5,450; and limestone, \$10,900. The production of mineral waters was 50,000 gallons, valued at \$12,000, and the clay products had a value of \$327,000. In 1917, under war conditions, 3,000,000 pounds of copper was produced, gold to the value of \$1,920,000, and 280,000 ounces of silver. The war stimulated the production of chromium, and 12,000 tons was produced, the sale price ranging from \$18 to \$30 a ton. In 1921 only 174,300 pounds of copper, valued at \$22,485, were produced. In 1920 coal to the value of \$93,000 was mined, metals about \$4,000,000, and non-metals other than coal, \$1,500,000. Two large cement plants now are in operation in the State, each with a capacity of 1,000 barrels

of cement a day. The limestone and other necessary ingredients are quarried near at hand. In 1921 42,668 troy ounces of gold, with a value of \$882,034, was mined in Oregon.

Fisheries.—The canning of fish ranks second among the industries of the State, the Columbia River producing canned salmon valued at \$6,530,939 in 1917, as compared with \$1,643,324 in 1890. This industry, which is almost entirely the canning of salmon caught in waters of the Columbia River and its tributaries, has its centre in the city of Astoria. It was once carried on almost exclusively by the Chinese but now Portuguese and Swedish interests practically control. The industry dates back to 1866, and reached a record production in 1883 which afterward decreased. It is carried on also on the north side of the Columbia River, in the State of Washington, the value of the product of this latter State in 1890 being nearly a third of that of Oregon. The Columbia River has long been famous for its salmon, the product for the year 1895 "exceeding in value that of any other river in the United States or the world." The exhaustion of these fisheries has been averted by more rigid laws against impovident fishing, and by the artificial propagation of fish. Since 1898 several refrigerating and freezing plants have been erected, and these, together with the use of refrigerator cars have made possible the shipment of hundreds of tons of fresh fish annually from Portland to the East and to European cities—a fact which has tended to check the increase in the canned product during recent years. There are a few canneries further down the coast, which add somewhat to the total product. The following figures are for the Columbia River:

YEAR	Cases	Value
1907	324,171	\$1,763,490
1908	253,341	1,380,708
1909	274,087	1,760,088
1910	391,415	2,544,198
1911	543,331	3,052,164
1912	285,666	2,319,856
1913	266,479	2,012,387
1914	454,621	3,595,989
1915	558,534	4,305,292
1916	547,805	4,361,075
1919 (Entire State)	511,325	5,447,491

As these figures include only the salmon actually packed in cans, there can be added at least 15 per cent for mild cured, salted and fresh used fish. The increase in the salmon output on the Columbia River for the past few years is credited to the system of retaining and feeding the fry before liberating them, inaugurated by the Fish Department of this State in 1910. Prior to 1910 the young salmon were practically turned out with the yolk sack attached, or as soon as the same was absorbed. At the request of the principal salmon packers on the Columbia River, who furnished the funds, the State installed retaining and feeding ponds at the State hatcheries, and at the present time all the fry are retained and fed from four to nine months before liberated.

Forest Resources.—About 38 per cent of the State of Oregon, or 36,000 square miles, was originally forested. Some of this area has been logged over and either cleared for agricultural use or has become restocked naturally with "second-growth" timber; but the great majority of the forested territory of the State

still remains in its pristine condition, untouched by the axe. The forests in Oregon are of great variety, due to the wide range in climatic conditions between the humid belt in the western part of the State and the arid zone east of the Cascade Range, and between the equable temperature at sea level and the rigorous one at perpetual snow line on the mountains. There grow naturally in the State 75 varieties of trees — of which 32 are conifers, such as pines, fir, spruce and cedar; and 43 are broadleaf trees, such as maple, ash, oak, alder, cottonwood, myrtle, madrone, etc. The hardwood trees are usually very much in the minority, occupying an understory or occasional spots in the forest. The important commercial timber is almost wholly of coniferous trees. The principal tree of the forests west of the Cascade Range is Douglas fir. It is a tree of great size in this State; reaching a diameter of 10, sometimes 12 feet, and a height of 275 feet and forming stands of almost tropical luxuriance that yield as high as 150,000 board feet of lumber per acre. It is the tree used largely in the State's new wooden shipbuilding industry. With the Douglas fir are found western hemlock, western red cedar, yew, noble fir, silver fir, white fir, and many other species of less commercial value or rarer occurrence. Close to the ocean is a strip of forest of great density and luxuriant growth in which Sitka spruce and Port Orford cedar, the principal sources of aircraft lumber, are found in their perfection, along with the other species mentioned above. Practically all the area west of the Cascade Range, except some prairies and meadows in the Willamette, Umpqua and Rogue River Valleys, was naturally forested. Probably 85 per cent of it is still in its virgin condition, but extensive logging operations and agricultural development are constantly reducing the amount of forest. East of the Cascade Range only about 15,000 square miles, or 23 per cent of the land surface, was naturally timbered; the remainder being grassland or sagebrush desert. The principal timber tree in this part of the State is western yellow pine. It forms open forests of trees from 18 to 48 inches in diameter and yields a lumber which is much in demand. With the yellow pine are found sugar pine, lodgepole pine, western larch, white fir, juniper and occasionally other species.

On the upper slopes of the Cascade Range and Blue Mountains, the valuable commercial forest of the lower slopes gives place to a woodland of such species as mountain hemlock, alpine fir, lodgepole pine, white-bark pine. Due to the rigorous climate, their quality and size is inferior to the Douglas fir and yellow pine forests of the lower elevations. Forests extend to an altitude in Oregon of about 6,000 to 8,000 feet; but above 4,000 feet on the west side of the cascades and 5,500 feet on the east side, they are not of a quality to have present-day commercial value for lumber. Their value for watershed protection in the regulation of stream flow is, however, inestimable. The latest estimates* indicate that there is in Oregon 444 billion feet of timber, of which 134 billion is in government ownership on the National Forests, 10 billion is in Indian reservations, and most of the remainder is in private ownership.

The distribution of the 444 billion feet by species is about as follows:

SPECIES	Per cent
Douglas fir.....	63
Western yellow pine.....	16
Western hemlock.....	6
Western red cedar.....	3
Spruce.....	2
Sugar pine.....	2
All others.....	8

This is the estimated stand on the entire forested area. The amount of timber of commercial quality is somewhat less. Forest fires have in the past wrought havoc in the forests of Oregon. The evidence indicates that fires have scourged these forests since time immemorial. Before the advent of man they were caused by lightning, then by the Indians in their effort to make hunting easier or to get grass for their ponies, then by the first white settlers to clear land for their farms, and later by the careless or thoughtless loggers or campers who allowed fire to escape. In the late summer after the dry season, the forests are exceedingly inflammable. The most startling feature shown by the land classification of this State is the extent of the burned areas, especially in the coast ranges and in the northern half of the Cascades. These burned areas comprise altogether not less than 7 per cent of the area of the State. Out of a total area, at one time timbered, not less than 18 per cent has been destroyed by fire. Happily, through the efforts of the timberland owners, fire protective associations, the State Forester, and the Federal Forest Service, the forests of Oregon are now well protected from fire and the annual loss of timber is greatly reduced, and the burned areas are rapidly being reforested. The earliest burns in the State of which we have record occurred in 1843. From that time down to 1903, fires of greater or less magnitude occurred yearly, mainly in the late summer and early fall when everything was driest. About 30 per cent of the timber of Oregon, and 57 per cent of the present timbered area — 13,153,546 acres — is in National Forests under Federal control. These National Forests are divided into 16 administrative units, which occupy the "permanent forest land" in the more rugged and mountainous parts of the State; namely, on the Coast Range, Siskiyou Mountains, Cascade Range and foothills, and Blue Mountains. The mature timber on the National Forests is being sold and cut as opportunity offers, but under such regulation as insures the perpetuity of the forest. The National Forests are supervised and administered by the Forest Service, a bureau in the Department of Agriculture. Portland, Ore., is the headquarters of the United States District Forester having general supervision over the 43,000,000 acres of National Forest land in Oregon, Washington and Alaska. The table on following page shows the National forests of Oregon and the headquarters of the supervisors in charge.

The State Forester, with headquarters at Salem, executes all matters pertaining to forestry within the jurisdiction of the State. He is the executive officer of the State Board of Forestry.

The timber of the National forests is being sold by the government at an average between

* West Coast Lumberman

OREGON FORESTS		Supervisor's headquarters
Cascade.....		Eugene
Crater.....		Medford
Deschutes.....		Bend
Fremont.....		Lakeview
Malheur.....		John Day
Minam.....		Baker
Ochoco.....		Prineville
Oregon.....		Portland
Santiam.....		Albany
Siskiyou.....		Grants Pass
Siuslaw.....		Eugene
Umatilla.....		Pendleton
Umpqua.....		Roseburg
Wallowa.....		Wallowa
Wenaha.....		Walla Walla, Washington
Whitman.....		Baker

\$2.50 and \$3 per thousand feet, according to the value of the varieties of timber. Of the amount of revenue received by the government from this source, 25 per cent of the net receipts is paid into the State treasury for apportionment among the counties of the State in which National forests exist, for the benefit of the public schools and roads, and 10 per cent is expended for the improvement of roads within the forests. Grazing privileges for stock are also permitted by the Forest Service upon the reserves, for which a graduated scale of fees is charged per season, based upon the year-long rate of 60 to 64 cents per head for cattle, 75 to 80 cents per head for horses, 36 to 38 cents per head for swine and 15 to 16 cents per head for sheep and goats. The year-long grazing rate is higher on the coast forests because of better growth and comparatively longer seasons. The State also receives 25 per cent of the net revenue from this source, which is apportioned among the counties and applied in the same manner as in the case of the timber sales fund, and 10 per cent of the net receipts is applied to improvement of roads within the reserves. The gross receipts from timber sales within the forests of Oregon for the fiscal year ended 30 June 1914, amounted to \$159,549.99, and for grazing privileges, \$84,072.97, making a grand total of \$243,622.96. The number of stock grazed within the forests of Oregon during the fiscal year period ending 30 June 1914, was cattle, 97,920; horses, 11,098; hogs, 433; sheep, 872,829; goats, 33.

There are also immense water power advantages in the National forests, which are being conserved for the benefit of the public, and title to which is never transferred outright to individuals or corporate interests. Homesteads not exceeding 160 acres in extent may be acquired within National forests under the act of 11 June 1906 (34 Stat. 233) on lands chiefly valuable for agriculture, not needed for public purposes, and the occupation of which for agricultural purposes will not interfere with the purposes for which National forests were created. If, considering all the circumstances, any land is considered to have a greater value for agriculture than for other purposes, it will be recommended for entry under the above act. The Forest Homestead Law is not a means of securing valuable timber lands under the homestead laws, since it must appear that land is chiefly valuable for agriculture before it will be opened to settlement and entry.

Lumbering.—Next to agriculture, the manufacture of lumber is the leading industry of Oregon. Two and one-half billion feet of timber was sawed in the mills of the State during

1917, and the annual value of Oregon lumber products was over \$30,000,000 even before shipbuilding had become the important industry it became in the war years of 1917-18. Lumbering always has and still constitutes fully 39 per cent of the State's industrial activities. Most of the lumber cut in 1917 was fir, although on account of the demand by the government for air-plane stock, probably 25,000,000 or 30,000,000 feet of spruce were cut in the last half of the year. Oregon's lumber is marketed all over the world. Ships of every nation come into the Oregon harbors to carry it away. California is another heavy purchaser, and thousands of cars are sent overland by rail. Oregon sells its lumber in all the northern group of States west of the Mississippi. The finished product of the Oregon mills, such as sashes and doors, is sent as far east as New York and the New England States. Furniture manufacturing has developed rapidly in the last decade. Portland is the principal furniture manufacturing centre west of Chicago. It has a score of plants, of which fully half a dozen are of major importance. The furniture output in a recent year had a value of \$4,500,000. It was sold south as far as Los Angeles and east as far as Denver and in all the intermediate territory.

Shipbuilding.—While Oregon is primarily an agricultural and lumbering State, her greatest progress in the year 1917 was in industrial pursuits. This was due almost entirely to the development of the shipbuilding industry and to other activities growing out of the World War. Portland under war conditions became the principal wooden shipbuilding centre on the Pacific Coast. Including one plant at Vancouver, Wash., the city by January 1917, had nine wood-shipyards in operation. The Vancouver plant is included because Vancouver is directly across the Columbia River from Portland and for all commercial purposes is a part of Portland. These wood-shipyards in the State outside of Portland in January 1917 included three at Astoria, one each at Marshfield, Tillamook, North Bend, Saint Helens and Columbia City. These wood-shipyards had already launched an aggregate of 37 vessels and had contracts for 148 additional, many of which were in course of construction. These plants are equipped with an aggregate of 74 ways and had 33 additional ways projected. The Oregon yards could launch an average of one wooden ship every other day. These vessels vary in size from 3,500 to 4,400 tons. Portland is the home of four steel-shipyards. These plants received contracts for an aggregate of 55 vessels; most of this work being done on government contracts. The steel vessels cost an average of approximately \$1,700,000 each. In 1920 shipbuilding, including boat building, turned out products valued at \$13,778,000.

The shipbuilding industry in Oregon and Vancouver, Wash., represented (1918) an investment of nearly \$25,000,000 and gave employment to nearly 20,000 men of whom about 15,000 were employed in Portland. Shipbuilding also gave great impetus to many closely related industries, such as the construction of steel and wooden lifeboats, brass and steel fixtures, galvanized iron, sheet metal, engines and machinery of various sorts used in shipbuilding.

OREGON



State Capitol at Salem

Gifford, Portland, Ore., Photo.

OREGON



1 Sugar Pine along road from Medford to Crater Lake 2 Oregon Fir, "the king of commercial woods"—so named by the French. The Oregon Douglas Fir is one of the finest of commercial woods. The trees grow to great height and girth—trees from 12 to 15 feet in diameter are giants, but Oregon has hundreds of thousands of fir trees 10 and 12 feet in diameter. The tree shown is well over 12 feet in diameter

Agriculture.—In western Oregon, notably in the valleys of the Willamette, Umpqua and Rogue rivers, the soil is chiefly a dark silt loam. The hills have a somewhat heavier red soil and the mountains are timbered heavily and used for grazing. In the eastern part, the soil is lighter silt loams and sandy loams in general, with more or less alkali in spots, but is very fertile under irrigation. In the northeast, the Columbia basin and the Blue Mountain valleys, extensive areas of naturally fertile wheat lands are found; in the southeast, the cultivation of crops is as yet less fully developed but the land is extensively used for grazing purposes. The total number of farms in Oregon in 1900 was over 30 times as great as in 1850 and 40 per cent greater than in 1890. In 1920 it was 37.3 per cent greater than in 1900. The total acreage has also increased rapidly, being over 23 times as great as in 1850. The increase from 1910 to 1920 was 15.9 per cent on farm lands and 14.9 on improved land, in spite of the inclusion of an Indian reservation of 484,000 acres as a "farm" in the former census.

For the year 1922 the best available figures indicate that Oregon produced and sold farm products as follows:

CEREALS.

CROP	Quantity bushels	Value
Wheat.....	19,444,000	\$21,323,000
Oats.....	6,675,000	3,805,000
Barley.....	2,160,000	1,598,000
Rye.....	444,000	377,000
Corn.....	2,277,000	2,072,000
Hay (tons).....	1,930,000	26,248,000
Total cereals and hay.....		\$55,423,000

DAIRY PRODUCTS 1919.

	Quantity (lbs.)	Value
Butter.....	13,984,185	\$8,061,141
Cheese.....	9,424,399	2,956,032
Milk and cream.....	197,281,206	11,791,568
Total dairy products.....		\$22,808,741

FRUIT PRODUCTS 1919.

	Quantity	Value
Apples (bu.).....	6,921,284	\$9,343,737
Peaches (bu.).....	504,441	781,855
Pears (bu.).....	761,063	1,217,703
Apricots (bu.).....	6,807	10,214
Blackberries (qts.).....	2,139,110	299,476
Cherries (bu.).....	303,893	1,063,633
Currants (qts.).....	99,890	13,986
Loganberries (qts.).....	10,198,011	1,427,722
Plums and prunes (bu.).....	2,151,864	4,734,103
Raspberries (qts.).....	1,824,901	328,481
Strawberries (qts.).....	4,159,200	790,251
Cranberries (qts.).....	170,757	25,614
Total fruit products.....		\$20,035,775

Oregon produced and sold approximately \$25,000,000 worth of fresh and dried vegetables, many of which were exported or sold in distant parts of the United States. The aggregate value, therefore, of Oregon farm products marketed in 1920 was \$131,884,000. The fruit-growing industry is most extensive in the region lying between the Cascade and Coast ranges.

Irrigation.—In western Oregon in the Willamette Valley and Coast counties there is a very heavy rainfall and irrigation is not used but irrigation of hay lands (resulting in an

extra cutting) is reported from the Rogue River valley in the southern part of this section. The greater part of the eastern section is semi-arid, but the soil, as a rule, is very productive when there is sufficient moisture. There are numerous rivers and the available water-supply of the section as a whole is large. In the counties bordering on the Columbia River, irrigation is generally practised where water is available and the remainder of the area is devoted to dry-farm wheat raising. A great part of the territory south and west of these counties is used both for dry farming and irrigation, and the higher lands for grazing purposes. In the Rogue River Valley in Jackson and Josephine counties, hay is the only crop usually irrigated, but a number of systems have been started or projected for the purpose of supplying orchard lands with water. The total number of irrigators in Oregon in 1900 was 4,636, while in 1920, 9,154 farms were irrigated, 18.2 per cent of the number of farms in the State. The total area irrigated grew from 388,310 acres, in 1900 to 986,162 in 1920. This was 20.1 per cent of the improved land in farms. The area to which enterprises existing in 1920 were capable of supplying water was 1,344,046 acres, and the total acreage included in existing projects completed or under way in 1920 was 1,925,987.

Livestock.—Oregon is the home of an important livestock industry. The total value of the hogs, cattle, sheep, horses, mules and goats owned in the State was estimated in 1920 at \$101,779,342. At Portland the Union Meat Company, which is a subsidiary of the Swift Packing House enterprise of Chicago operates a large packing-plant, which attracts livestock from the region west of the Rocky Mountains. The products of this plant are sold both locally and in the territory tributary to Portland and in normal times some of it is exported. There were 21 slaughtering and meat packing establishments in the State in 1919, with 772 wage-earners, and turning out products to the value \$15,868,000. Portland is a principal livestock centre of the Pacific Coast, a modern stockyards being operated in that city. These stockyards have had a large influence in the livestock industry of the State. Before this market was established in Portland most of the hogs consumed in that city were brought in from Nebraska and other points in the Middle West. Now Oregon produces all its own hogs.

There is excellent pasturage in Oregon and horses, cattle, swine and sheep are raised in large numbers. On 1 Jan. 1920 the total value of all livestock on farms and ranges was \$98,457,779. Of this, cattle represented \$47,818,486 (including \$18,390,981 in dairy cows); horses, \$19,225,842; mules, \$1,589,552; asses and burros, \$150,592; swine, \$4,664,307; sheep, \$24,423,544; goats, \$585,456. The foregoing livestock was reported from farms; but there were some thousands of animals, including 21,350 cattle, on range. The table on the following page shows the changes since 1850 in the numbers of the most important domestic animals on enclosed farms.

The number of dairy cows in Oregon in 1901 was almost 13 times as great as in 1850 and 7.3 per cent greater than in 1890. Nearly 18 times as many neat cattle, other than dairy

YEAR	Dairy cows	Other neat cattle	Horses	Mules and asses	Sheep	Swine
1923	220,000	626,000	272,000	14,000	1,953,900	231,000
1910	172,402	552,146	271,111	10,324	2,696,779	217,496
1900	122,447	577,856	287,932	7,751	1,961,355	281,496
1890	114,156	406,492	224,962	4,946	1,780,312	208,259
1880	59,549	356,693	124,107	2,804	1,083,162	156,222
1870	48,325	71,872	51,702	2,581	318,123	119,455
1860	53,170	100,961	36,772	980	86,052	81,615
1850	9,427	32,302	8,046	420	15,382	30,325

cows, were reported in 1900 as in 1850. Oregon produced about 12,992,000 pounds of wool in 1922, with a value of approximately \$4,330,666 (average 1922 price). In 1910 the census reported the value of the wool clip \$3,306,179. The State still is one of the biggest wool producers in the Union. The census notes a slight decrease in number of fleeces, but increase in weight and value. Portland is the principal wool market on the Pacific Coast and in this particular is second only to Boston in the United States at large. All the wool produced in the Northwest west of the Rocky Mountains is marketed in Portland.

Manufactures.—Oregon is destined to be one of the great manufacturing States of the West, if not of the entire country. The natural advantages of the State are extensive, furnishing raw material for its various manufacturing enterprises and its streams furnish abundant water power of approximately 20,000,000 horsepower or one-third of all the undeveloped water power in the United States. This is located in the Columbia Basin. (Senate Document 676, 60th Congress, 2d Session). Of this amount, over 3,000,000 horsepower is within economical transmission distance of tidewater at Portland. The total developed water power in Oregon at present amounts to 158,186 horsepower. The principal industries include steel and wood ship-building, much stimulated by the war, car and shop construction, pulp and paper manufacturing, fruit and fish canning, furniture, cordage, flouring-mills, rubber products, lumber and timber, printing and publishing, slaughtering, meat-packing, leather tanning and the manufacture of woolen goods. In 1919 there were reported by the United States census, 2,707 manufacturing establishments employing \$237,254,736 in capital and 68,005 persons, expending \$206,206,041 for raw materials, \$95,092,955 in wages and having an annual output valued at \$366,782,627 exclusive of the ship-building industry. The 22 ship-building plants in the State in 1917 reported 23,450 wage-earners and products valued at \$162,000,000, as compared with 30 establishments, 2,990 wage-earners and products valued at \$13,778,000 in the same industry in 1919. The Columbia River was the centre of the wood ship-building industry in the United States during the World War, Portland building more wooden vessels than any other city. In steel ship-building, the Columbia River district stood second on the Pacific Coast. In furniture manufacturing, Oregon is fast coming to the front as a furniture centre. The furniture industry of the State for 1919 totalled \$3,183,000. The largest pulp and paper plant in the entire West is located in Oregon. Eight woolen mills of large capacity are located at Portland, Pendleton, Oregon City, Bandon, Salem and Stayton. Flour-milling reflects the

large wheat-growing interests of the State, the production of this cereal amounting to 19,444,000 bushels of wheat, 6,675,000 bushels of oats, 2,160,000 bushels of barley and 444,000 bushels of rye in 1922. The flour-milling industry gave employment to 822 wage-earners in 1919 and had a product valued at \$42,550,000, as compared with 281 wage-earners in 1890, and a product valued at \$4,184,473.

Oregon is the principal woolen manufacturing centre in the West. Six important woolen mills were in operation in the State in 1918. Most of them in 1918 were working on government contracts but their normal output consists of woolen cloth, blankets and other high-grade materials. A large amount of Oregon's native wool is consumed in these mills. The industry has more than doubled in the last five years and in 1918 employed about 1,000 men and women. Most of the output is marketed on the coast, but recently large shipments have been sent east and considerable volume has been exported. In 1919 the woolen manufacturing plants gave employment to 808 wage-earners and had products valued at \$3,357,000 as compared with 358 wage-earners and products valued at \$614,932 in 1890. The importance of this industry in Oregon is largely a result of the extensive stock-raising interests of the State. Two large wool warehouses are located in Portland, having in storage some 20,000,000 pounds of wool annually.

The State is rapidly learning the economic advantage of preserving its orchard and garden products, either by canning or by evaporation. The dried fruit and vegetable industry is one of recent development in Oregon. Several plants now are in operation, including one at The Dalles and one at Salem. These plants are prepared to handle several thousand tons each of apples and cherries, in addition to thousands of tons of peaches, prunes, berries and other fruits. They also handle several thousand tons of mixed vegetables and the same quantity of potatoes. The greatest benefit that the dried fruit and vegetable plants yield to the State is in the utilization of products that otherwise would go to waste. Another important enterprise is paper manufacturing. Oregon City is the centre of this industry. Native wood is used in the manufacture of pulp and paper. The power for the operation of these plants is generated by the falls of the Willamette River. The mills of this State supply the paper upon which most of the newspapers west of the Rocky Mountains are printed. Great quantities of news stock also are exported to Australia and other points in the Pacific. Another important new industry is the manufacture of loganberry juice. The headquarters are at Salem, where two large plants are operated.

OREGON



Multnomah Falls, 607 feet high, on the famous Columbia River Highway

OREGON



Panorama of the Columbia River as seen from the Columbia River Highway

OREGON



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Cascades of the Columbia River

The loganberries are grown in large quantities in the farming communities near Salem and this industry is gaining additional prominence every year. The value of the juice production for 1917 is estimated at \$500,000. Most of it is marketed in the East. The production has been limited only by the quantity of berries produced by the farmers, as the demand for the juice has hitherto been greater than the supply. Rubber manufacturing promises to become an important industry. Two new plants are operating in Portland. Both of them are growing. Because much of the crude rubber used in the United States now is imported from Asia it must pass through the Pacific Coast ports in order to reach the eastern factories. The economic waste of sending this commodity across the continent in its crude state and then sending much of the finished product back is one of the most potent factors in encouraging the rubber industry in Oregon. A new enterprise of promise is the kaola plant in Portland, which produces cocoanut oil and its by-products. The dried copra for this plant is brought in from the South Sea Islands and Australia on vessels which carry lumber and other Oregon products out.

Commerce.—Before 1886 the exports from Portland were mostly to San Francisco and Honolulu, gold dust and ores forming three-fourths of the shipments. Now the exports reach almost every part of the globe and consist largely of wheat, meat and timber products. The foreign commerce of the State, which emanates mostly from the Columbia River, runs into many millions of dollars annually, three-fourths of it being exports. The largest export countries are Great Britain, China, Japan and other Oriental ports, and the west coast of South America. The principal port is Portland at the confluence of the Willamette and Columbia rivers. Astoria, another port, is at the mouth of the Columbia itself. There are also harbors for coastwise shipping at Port Orford, Rogue River, Coos Bay, Tillamook Bay and Yaquina Bay. A few of the important imports coming from the Orient are copra, crude rubber, spices, sisal and merchandise.

Banks and Banking.—There was a private bank in Portland as early as 1858. In 1865 the First National Bank—the first west of the Rocky Mountains, was established in Portland. In 1922 there were 97 national banks in operation, 175 State banks and five trust companies. The volume of cash and checks passing through the Portland clearing house during 1922 amounted to \$1,563,491,000. This is due largely to the growing jobbing business done in Portland which is a logical point of distribution for a trade territory of over 254,000 square miles, reached mostly by railroads of a "water grade," an economic advantage rare in the western half of the country. Bank deposits the same year amounted to \$212,376,000, of which \$24,697,000 was in savings deposits including postal savings accounts. Demand deposits aggregated \$54,831,000 and time deposits \$10,681,000.

Transportation.—In 1865 there were but 19 miles of railroad in the State, 248 miles in 1875, 582 miles in 1880 and 1,695 miles in 1901. In 1919 there were 16 commercial steam railroads operating 3,455 miles of main line; com-

mercial electric roads, 722 miles; these include steam industrial roads, and street car lines serving Portland, Eugene, Salem, Albany and Astoria, making a total railway trackage of 4,177 miles, including over 700 miles of electric railway track. Steamship lines ply regularly between San Francisco and Portland and other Oregon ports, and river boats operate on the Columbia, Willamette and Snake rivers. The Union Pacific and the Southern Pacific are the two principal railroad lines. Common carriers, together with other public utilities in Oregon are under a State Public Utilities Commission.

Government.—New York and Iowa statutes were the models for the provisional government of Oregon and subsequent legislation followed these lines. The governor is elected for a term of four years and receives a salary of \$5,000 per annum. Legislative sessions are held biennially and are practically limited to 40 days each, members serving without pay if the session extends beyond that period. The legislature has 30 members in the senate and 60 in the house, each of whom receives \$3 a day and mileage. There are three representatives in Congress. There is a Supreme Court, with appellate jurisdiction, the court consisting of seven judges, who are elected for six years and paid \$4,500 a year. There are 20 Circuit courts with 28 judges. There are county courts, executive and administrative in function, with one judge, elected for four years, who is also judge of probate, and two associate commissioners. The Circuit Court judges are elected one-third every two years. There is also a United States District Court. Justices of the peace are elected in every precinct and municipal courts may be created. The constitution authorizes any citizen of the United States, 21 years old and six months a resident of the State, to be a voter. New ballot laws, modeled on the Australian system, were adopted in 1891. Of late years many governmental functions have come to be exercised by commissions created by the legislature. It has been a prevailing policy in Oregon to assign by law membership in such commissions to one or more designated State officers. Several of the most important commissions consist of or include the governor, secretary of state and State treasurer. By this process these offices have become much more powerful and comprehensive in function than their titles would indicate. Oregon was the first State to operate extensively the initiative, referendum and recall, a method of government, therefore, sometimes known as the "Oregon System." Either proposed constitutional amendments or proposed statutes are easily placed upon the ballot by petition and are then either enacted or rejected by a simple plurality.

Finances.—There is a public debt of \$52,290,470. The State revenue from taxation as enrolled for the year 1922 was \$43,304,597 on a real property valuation of \$748,912,570 and personal property to the amount of \$271,891,618. There are revenues also from State school money loaned, for school lands sold, or interest on school loans. The disbursements for the year, 1 Oct. 1921 to 30 Sept. 1922, amounted to \$38,594,525. The constitution prohibits the legislature from contracting any State debt exceeding \$50,000, or assuming the debt of any county, town or corporation, except for purposes of war

or to suppress an insurrection. The cash balance in the treasury 30 Sept. 1922 was \$6,296,817.

Public Institutions.—At Salem are located the School for the Deaf; State Insane Asylum; State Tuberculosis Hospital; School for the Blind; Boys' Reform School; State Industrial School for Girls; State Institution for Feeble-minded and the Oregon State Penitentiary. At Roseburg is located a Soldiers' Home and at Pendleton a second State Hospital for the Insane.

Education.—In 1848, Congress gave the State an area of 3,387,520 acres of the public domain for free schools, and also gave 500,000 acres for a State university, and 90,000 acres for an agricultural college. The free school system has extended to every township in the State. In 1922 the children of school age numbered 221,179; the enrolment in public schools, 164,705; and the average daily attendance, 76 per cent. There were about 2,514 public schools, public school furniture and apparatus valued at about \$2,000,000; houses and grounds valued about \$18,000,000, and 6,722 teachers. Their salaries for the year averaged \$870, and total expenditures \$14,783,718. For higher education there were 245 standard public high schools in 1922, with 30,247 pupils, also private secondary schools; with about 1,500 pupils, one public normal school and 8 universities and colleges for men and for both sexes. The colleges include the University of Oregon, at Eugene; State Agricultural College, Corvallis; Reed College, Portland; Pacific University, Forest Grove; Willamette University, Salem; McMinnville College, McMinnville; Pacific College, Newberg; Philomath College, Corvallis. There is a federal government Indian training school at Chemawa, near Salem, and a State normal school at Monmouth.

Religion.—The religious denominations of the State are given in the order of their strength and influence, as follows: Roman Catholic (42.9 per cent in 1890; 29.4 per cent in 1906); Methodist bodies (16.9 per cent in 1890; 18.1 per cent in 1906); Baptist (7.8 per cent in 1890; 9.4 per cent in 1906); Presbyterians (7.4 per cent in 1890; 9.1 per cent in 1906); and the Disciples of Christ or Campbellites (5.8 per cent in 1890; 8.7 per cent in 1906). The church membership in 1922 was 179,468. In 1890, 30,231 Roman Catholics were 42.9 per cent of the church population; in 1906, the 35,317 Catholics were 29.4 per cent. In 1921 the Roman Catholic church membership was reported officially as 67,123.

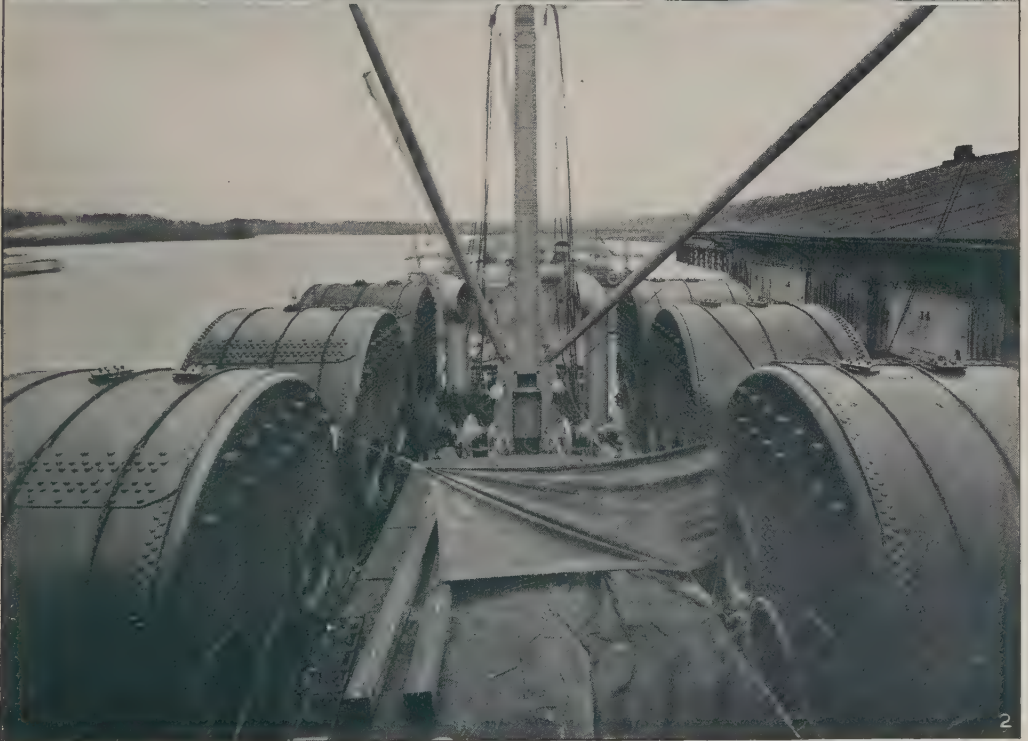
Indian Reservations.—There exist in Oregon the remnants of a large number of Indian tribes, most of which are aboriginal to this region, representing more than 10 distinct linguistic stocks. They have been collected largely upon five reservations, namely, Grande Ronde, Klamath, Siletz, Umatilla and Warm Springs, while some still live along or near the Columbia River, and depend upon fish and game for their support. Grande Ronde reservation is situated in the northwestern part of Oregon, in Polk and Yamhill counties, and contains an area of 93¾ square miles. Approximately 10,000 acres are arable, being a fair quality of land, lying in the small valleys along the tributaries of the Yamhill River. The Indians at Grande Ronde represent the remnants of nine small tribes: the Clackamas, Cow Creek, Lakmiut, Mary's River, Rogue River, Santiam, Umpqua, Wapete and

Yamhill, numbering in all 402. The larger number cultivate their own allotments and those of the infirm members of their families. Oats and wheat are their principal crops. Klamath Reservation lies east of the Cascade Mountains, in Klamath and Lake counties, and embraces an area of 1,650 square miles.

History.—There is much uncertainty surrounding the early explorations of the North Pacific Coast. Spanish and English navigators undoubtedly reached the Oregon coast in the 17th century. Captain Cook landed at Mootka Sound in 1778, and the French navigator, Laperouse, sailed along the coast in 1786. In 1789, two Americans, John Kendrick and Robert Gray, were sent out by Boston fur merchants, and in 1791 Gray gave the Columbia River its name. In 1805-06, the Lewis and Clark expedition explored considerable of the Oregon region. (See LEWIS AND CLARK EXPEDITION). In 1811 the American Fur Company established trading posts at Astoria. (See ASTOR, JOHN JACOB). The northwestern boundary between the United States and Canada was fixed by the convention of 1818, as the line of 49° from the Lake of the Woods to the Rocky Mountains. West of this point the territory was to be open to both parties for 10 years. (See NORTHWEST BOUNDARY). By the convention of 1827, ratified in 1828, joint occupation was continued indefinitely. The Oregon question (q.v.) occupied the attention of Congress from 1820 to 1824. The Methodists founded a mission under Jason Lee in 1834, and the American Board (Presbyterian, Congregational, etc.), under Marcus Whitman in 1836. In 1839 the emigration of New Englanders commenced overland by way of the South Pass, and the Territory continued to receive settlers from the east and middle west by this route until the railway superseded the ox-team. In 1848 the California "gold-fever" attracted a large quota of the territory's citizens away, but in 1850 the land-donation law, passed by Congress, had the effect of registering 8,000 citizens in Oregon, which was formally organized as a territory 3 March 1849. On 2 March 1853, Washington Territory was formed out of the northern half of Oregon. On 5 Nov. 1857, a State constitution was adopted; and 14 Feb. 1859 the State was admitted into the Union by Act of Congress under the constitution previously ratified. From 1845 till 1855 there was sporadic warfare with Indian aborigines, and a resumption of the same occurred in 1858, and again in 1866-68, when occurred the Shoshone War, and in 1864-73, when the Modoc War prevailed. Since 1875 the Indians have been confined on the reservations.

Politics.—Under the provisional government, 1843-45, adopted by the people 5 July 1843, the executive power was vested in a committee of three persons; the legislative power was vested in a committee of nine persons, elected by the qualified electors, giving to each district representation in ratio of its population, excluding Indians; the judicial power was vested in a Supreme Court, consisting of one supreme judge and two justices of the peace, and a probate court. Oregon had a provisional governor (1845-49) and seven Territorial governors (1849-59). The first governor under the State Constitution was a Democrat. In presidential elections the State is regarded as safely Republican, it having gone Democratic in presi-

OREGON



- 1 Laying out frames at a Portland, Ore., wood shipbuilding plant. Notice the size of the timbers
2 Shipment of Scotch Marine Boilers for Balboa. Portland has the largest Scotch Marine boiler plant in the United States

OREGON



1 The largest log cabin in the world. Dimensions 206 feet by 102 feet; 72 feet high, supported by 64 pillars 54 feet high. More than 1,000,000 feet board measure in the building

2 Sample of Douglas Fir Timber used in construction of vessels in State of Oregon

dential elections only in 1868, and split the vote in 1892. Of late years the legislature is always overwhelmingly Republican, but no such uniformity exists in the election of United States senators and governors. In 1876 it was discovered that one of the Republican electors held a Federal office, and was consequently ineligible. The Democratic governor issued a certificate to the minority candidate, but the two Republican electors filled the vacancy, and their position was sustained by the Electoral Commission (q.v.).

GOVERNORS OF OREGON.

BEFORE PROVISIONAL GOVERNMENT

Dr. John McLoughlin, director of Hudson Bay Company and by courtesy called Governor of Oregon.....	1823-1843
First Executive Committee.....	1843-44
Second Executive Committee.....	1844-45

PROVISIONAL

George Abernethy.....	1845-49
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TERRITORIAL

Joseph Lane.....	1849-50
Knitzing Pritchett (acting).....	1850
John P. Gaines.....	1850-53
Joseph Lane.....	1853
George L. Curry.....	1853
John W. Davis.....	1853-54
George L. Curry.....	1854-59

STATE

John Whiteaker.....	Democrat.....	1859-62
Addison C. Gibbs.....	Republican.....	1862-66
George L. Woods.....	".....	1866-70
Lafayette Grover.....	Democrat.....	1870-77
S. F. Chadwick (acting).....	".....	1877-78
William W. Thayer.....	".....	1878-82
Zenas F. Moody.....	Republican.....	1882-87
Sylvester Pennoyer.....	Democrat-Populist.....	1887-95
William P. Lord.....	Republican.....	1895-99
Theodore T. Geer.....	".....	1899-1903
George E. Chamberlain.....	Democrat.....	1903-09
Frank W. Benson.....	Republican.....	1909-10
Jay Bowerman (acting).....	".....	1910-11
Oswald West.....	Democrat.....	1911-15
James Withycombe.....	Republican.....	1915-19
James Withycombe*.....	".....	1919
Ben. W. Olcott.....	".....	1919-23
Walter M. Pierce.....	Democrat.....	1923-

Population.—There are 36 counties in Oregon, with population as follows:

COUNTY	1920	1910
Baker.....	17,929	18,076
Benton.....	13,744	10,663
Clackamas.....	37,698	29,931
Clatsop.....	23,030	16,106
Columbia.....	13,960	10,580
Coos.....	22,257	17,959
Crook.....	3,424	9,315
Curry.....	3,025	2,044
Deschutes.....	9,622	.....
Douglas.....	21,322	19,674
Gilham.....	3,960	3,701
Grant.....	5,496	5,607
Harney.....	3,992	4,059
Hood River.....	8,315	8,016
Jackson.....	20,405	25,756
Jefferson.....	3,211	.....
Josephine.....	7,655	9,567
Klamath.....	11,413	8,554
Lake.....	3,991	4,658
Lane.....	36,166	33,783
Lincoln.....	6,084	5,587
Linn.....	24,550	22,662
Malheur.....	10,907	8,601
Marion.....	47,187	39,780
Morrow.....	5,617	4,357
Multnomah.....	275,898	226,261
Polk.....	14,181	13,469
Sherman.....	3,826	4,242
Tillamook.....	8,810	6,266
Umatilla.....	25,946	20,309
Union.....	16,636	16,191
Wallowa.....	9,778	8,364
Wasco.....	13,648	16,336
Washington.....	26,376	21,522
Wheeler.....	2,791	2,484
Yamhill.....	20,529	18,285
Total.....	783,389	672,765

The principal cities and towns are as follows: Portland (258,288); Salem (17,679); Astoria (14,027); Eugene (10,593); Medford (5,756); Baker (7,729); Oregon City (5,686); Albany (4,840); Corvallis (5,752); Roseburg (4,381); The Dalles (5,807); Pendleton (7,387); and La Grande (6,913). In 1922 there were about 900 post-offices of all grades; and 265 periodicals, of which 33 were daily, 1 three times a week, 11 semi-weekly, 174 weekly, 3 semi-monthly and 36 monthly. The total population of the State in 1850 was 13,294; (1860) 52,465; (1870) 90,923; (1880) 174,768; (1890) 313,767; (1900) 413,536; (1910) 672,756; (1920) 783,389. Of this number 102,151 are foreign born whites.

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OREGON, Ill., city, county-seat of Ogle County; on the Rock River, and on the Chicago, Burlington and Quincy Railroad; about 90 miles in direct line west of Chicago. It has considerable manufacturing interests. The chief manufacturers are foundry and machine-shop products, flour, pianos, street-sprinklers and dairy products. It has good schools and a public library. The waterworks are the property of the municipality. Pop. 2,227.

OREGON, a river in the western part of North America. See COLUMBIA RIVER.

OREGON, University of, the State University, chartered in 1872 and opened in 1876 at Eugene. Its organization comprises (1) the College of Literature, Science and Arts, including general courses in liberal arts and special courses in course preparatory to medicine; course preparatory to law; course preparatory to journalism; course preparatory to engineering. The bachelors' degrees conferred are A.B. and B.S. The University is coeducational, number of women students being about 40 per cent of the total. It is supported mainly by State appropriation; tuition is free; the income in 1924 was \$925,000. The library (1924) contained 130,000 volumes; the students numbered 2,427 and the faculty 134. (2) School of Law, a three-years' course, requiring two years' work in liberal arts for admission. (3) School of Architecture, a four-years' course. (4) School of Commerce, a four-years' course. (5) School of Education, a four-years' course. (6) School of Journalism, a four-years' course. (7) School of Medicine, a four-years' course in Portland, with two years' preparatory college work in Eugene. (8) School

of Music—piano, voice, violin, wind instruments, harmony and musical history. (9) Summer School, a six weeks' course. (10) School of Correspondence Study. (11) Graduate School.

OREGON BROOK-TROUT, the rainbow trout (q.v.).

OREGON CITY, Ore., county-seat of Clackamas County; on the Willamette River and on the Southern Pacific Railroad; about 14 miles south of Portland. The falls in the river, 40 feet in height, furnish extensive water-power which is used for the electric-light works and for the development of manufacturing industries. The chief manufactures are flour, lumber, woollen goods, soap, paper, pulp and furniture. It has a House of the Good Shepherd, public and parish schools and a public library. A passenger elevator, owned by the municipality, carries people up and down hill. The city owns pure mountain waterworks. Pop. 6,600.

OREGON QUESTION, *The*. The Oregon question of boundary between the United States and Great Britain involved the right to the territory upon the Pacific Coast of North America extending inland eastward to the Stony (Rocky) Mountains and bounded upon the south by the parallel of 42° N. lat., upon the north by the parallel of 54° 40' marking the southern limit of what was formerly Russian America. The claim of the United States to this territory was based upon the discovery, 11 May 1792, of Capt. Robert Gray of Boston, who, in the ship *Columbia*, entered the river called Oregon by the Indians. "He passed its bar and anchored in the river, 10 miles above its mouth" and "afterwards sailed up the river 12 or 15 miles and left it on the 20th of the same month, calling it Columbia after his ship."

A second claim was based on the exploration of Meriwether Lewis and William Clark sent out with a party by the United States government, in 1804, across the newly-purchased Louisiana territory. They followed the Missouri River to its headwaters, crossed the Rocky Mountains, reached the Columbia River and followed it down to the Pacific. They encamped on the north side of the mouth of the Columbia, on Cape Disappointment, wintering there, 1805-06 and returned to Saint Louis in September 1806. "It was this important expedition which brought to the knowledge of the world this great river, the greater by far on the western side of the continent, with its numerous branches and the vast regions through which it flows above the point to which Gray and Vancouver had ascended."

Priority of settlement was claimed for the United States on account of the settlement made by the party sent out under the company of which John Jacob Astor was the head. "Early in the spring of 1811, they made their establishment on the south side of the (Columbia) river, a few miles above Point George." Great Britain took this post and others in 1812 after the beginning of war between the United States and Great Britain. By the first article of the Treaty of Ghent, 1814, which terminated the war, the posts were restored to the United States, the formal transfer occurring in 1818.

The United States last item of claim was based on the Treaty of Louisiana in 1803, with

France, and the Treaty of Florida in 1819, with Spain. By the latter, Spain conveyed to the United States all her rights, claims and pretensions to the country west of the Rocky Mountains and north of the 42d parallel. By the treaty of 20 Oct. 1818, between the United States and Great Britain, the boundary line between the United States and British America was fixed on the 49th parallel from the Lake of the Woods to the Rocky Mountains. West of the Rocky Mountains, the line was not defined, but it was agreed that the Oregon country with its harbors, bays and rivers, be open for the term of 10 years to the vessels, citizens and subjects of either power. The boundary was left unsettled and the agreement above specified was renewed in 1827, except that the time was left indefinite and the agreement terminable at the discretion of either power upon a 12-months' notice to the other. The country in question was a wilderness traversed by the hunters and trappers of the Hudson Bay Company and the Indians, the possession of which was not considered an issue of the first importance. In 1843 President Tyler's annual message called the attention of Congress to the Oregon boundary and stated the United States claim as embracing the country from the 42d parallel to that of 54° 40'.

The claims of Great Britain were similar to the claims of the United States. In 1778, the English Captain Cook visited and explored the northwest coast of America from latitude 44° northward. In 1792, 1793 and 1794 Captain Vancouver, for the English, surveyed the coast and its adjacent islands. In point of "accuracy and authenticity" these discoveries were said to be superior to those of any other country.

"In 1793, Mackenzie, a British subject, had crossed from the Rocky Mountains to the Pacific, exploring the upper waters of Fraser's River, which in process of time was traced to its junction with the sea near the 49th degree of latitude, thus forming in point of exploration a counterpoise to the exploration of that part of the Columbia which was first visited by Lewis and Clark." An English expedition intended to anticipate the Astoria settlement, was a little late, not reaching Astoria till July 1811. Great Britain denied the validity of the Spanish claim to the Oregon country, practically on the ground that she was so much stronger than Spain that Spain could not make good her claim. The above claims and counter claims, with various modifications, were discussed at times by the diplomatic representatives of Great Britain and the United States from 1826 to 1846.

The Oregon question as an issue in American politics was made prominent by a plank in the platform of the national convention of the Democratic party at Baltimore, the latter part of May 1844, which read, "resolved, That our title to the whole of Oregon is clear and unmistakable, that no portion of the same ought to be ceded to England or any other power, and that the reoccupation of Oregon and the reannexation of Texas at the earliest practicable period are great American measures which this convention recommends to the cordial support of the Democracy of the Union." The words reannexation and reoccupation implied that the territory in question had belonged to the United States, Texas under the Louisiana purchase and

Oregon by discovery, exploration, etc., till the United States left the claim to sovereignty over Oregon in abeyance by the convention of joint occupancy with Great Britain. It must be recognized that in 1844 the United States had no undisputed sovereignty over the territory on the Pacific Coast now belonging to the United States. Joint occupancy with Great Britain of the Oregon country was not sovereignty over it. The California country belonged to Mexico. If the sovereignty of the United States was to extend from ocean to ocean, that power must acquire the California country from Mexico or exclude England from Oregon. The settlement of the Oregon boundary had been discussed for some time previous to 1844 and it had been hoped that the treaty which was negotiated in 1842 between Mr. Webster and Lord Ashburton, fixing the line between Maine and Canada, would also fix the Oregon line; but such was not the case. James Buchanan, in a speech in the Senate, 12 March 1844, upon a resolution requesting the President to give notice of the termination of the joint occupancy of the Oregon country, pointed out clearly that England leased that territory to the Hudson's Bay Company in December 1821 for 21 years and in 1838 renewed the lease for 21 years more; that the Hudson's Bay Company had six permanent establishments on the coast, 16 interior and several migratory hunting parties, six armed vessels, one of them a steamer; that they hoped to keep British interests on the ascendant in the Pacific. Mr. Buchanan also showed that Great Britain was content to keep the *status quo* and that the only way to force her to act was to give the notice. The plank in the Democratic platform was considered decidedly aggressive in some sections of the country. As might have been expected, New England and the sections whose cities and shipping would be more at the mercy of the enemy in case of war were not so enthusiastic for an aggressive foreign policy as those States in the centre, west and south of the Union which were more remote from the "firing line" and which were deeply interested to see that the flag of the Union sweep through from "sea to sea." The discussions in Congress revealed calculation of the probabilities of war as the result of the notice. It was urged that Ireland was hostile to England and there might be a rebellion. Far more important was the fact that England received nine-tenths of her cotton from the southern United States; that war would cut off this supply and close the English mills with all the social distress involved, to say nothing of the loss of the markets the United States afforded for English manufactured products. In 1844, one-third of the foreign trade of the United States was with Great Britain. After Polk's nomination, it was brought out in the proceedings of Congress in June 1844, that so far back as the session of 1828-29, he had laid out a definite plan of policy for the United States including giving the notice and taking the consequences. When, therefore, Polk was elected in November 1844, the Democratic party considered its platform approved by the country and it proceeded to carry out its policy of territorial aggrandizement. The cry of "54° 40' or fight" phrased the ultra aggressive sentiment on the part of the United States looking to push its territory to the Russian line, while Great Britain seemed equally

determined to force the line of the Columbia River. War with Great Britain might involve the loss to the United States of all the Pacific Coast. Blaine in his 'Twenty Years of Congress' attributes the emergence from a difficult situation to the foresight and ability of Calhoun and of Buchanan. These gentlemen as well as Clay and Webster, when occupying the post of Secretary of State, had been willing to continue the line of 49° to the Straits of Fuca. There were serious objections to the Columbia River line. The most important of these, barring consideration of national honor and pride, was the fact that there were no good harbors in the territory left to the United States south of the Columbia, whereas, if the line ran, as it does at present, on the 49th parallel to the Straits of Fuca, all Puget Sound with its waters sheltered from the storms of the Pacific and its branches accessible to a very large territory, would belong to the United States. San Francisco harbor then belonged to Mexico. Within the United States, sentiment was divided. War with England would hurt the South seriously by cutting off her cotton market and possibly limiting what might become slave territory to the Southwest. The anti-slavery sentiment of the North had defeated Clay for the Presidency for his willingness to compromise on an issue on which it would brook no compromise. President Polk was a friend of General Jackson and peace was not an idol at whose shrine Jackson worshipped. The influence of other public men looking toward peace, their interests and rivalries, were to be considered. The Administration escaped from its "54° 40' or fight" position by taking the advice of the Senate in advance of the treaty. This course, unusual and in some cases highly undesirable, shifted the responsibility for action upon the shoulders of the Senate, at the same time allowing the Secretary and Great Britain to feel that the instructed action of the Secretary could not consistently be rejected by the Senate. It cleverly rescued the Administration, for if the Whigs insisted upon the line of 54° 40', they put themselves squarely upon Democratic ground. If they were willing to compromise on 49° for the sake of peace, it would hardly seem reasonable to taunt the Democrats with cowardice for acting upon Whig advice. When the resolution of notice passed the House in February 1846 "the country at once became alarmed by the growing rumors that the resolution of the House was a direct challenge to Great Britain for a trial of strength as to the superior title to the Oregon country." The resolution, amended by the Senate and given a conciliatory tone, passed Congress 23 April 1846. By that time the Administration must have seen its future course clear, for by the middle of June the diplomatic representatives of Great Britain and the United States had come to an agreement which was ratified by the respective countries and proclaimed in force in August 1846. The line agreed upon was the parallel of 49° to the Straits of Fuca, thence following the middle, roughly speaking of that Strait to the Pacific. War with Mexico broke out contemporaneously with the passage of the amended Oregon notice to Great Britain and as a result of the war with Mexico and the Oregon treaty with Great Britain, the United States acquired its present sovereignty over the great territory west of the

Rocky Mountains with a frontage of some 1,500 miles on the Pacific.

E. BENJAMIN ANDREWS,
Late Chancellor of *The University of Nebraska*.

OREGON ROBIN. The "varied thrush" (*Merula naxia* or *Ixoreus naxius*) which represents the eastern robin in Oregon and northward to Alaska west of the mountains. It is dark slate-blue above and orange-brown in the lower parts, with a crescent of black on the breast, from the horns of which a line of black leads along the neck and through the eye. It makes its nest in bushes and lays greenish-blue eggs, clearly marked with spots and points of dark brown. It is a sweet singer.

OREGON SNOW-BIRD. See SNOW-BIRDS.

OREGON STATE AGRICULTURAL COLLEGE, founded in 1870 at Corvallis. The four-years' courses include agriculture, domestic science, mechanical, electrical and mining engineering and pharmacy, there are also a two-years' course in mining, a two-years' business course (added in 1901) and a winter course of four to six weeks in agriculture, and a preparatory department with a one-year's course. The college is coeducational and there are women on the faculty. The 'experiment station is connected with the College, though separately supported, and farmers' institutes are organized under supervision of the faculty; in 1901, 11 such institutes were held with an attendance of 3,100. The income is derived chiefly from the land grant fund of 1862 and from Federal and State appropriation; tuition is free; in 1922-23 the annual income amounted to about \$1,661,825. In that year there were 4,548 students in attendance and 450 members of the faculty. The library is an excellent one.

OREGON STURGEON. See STURGEON.

OREGON TRAIL, an old emigrant route, about 2,000 miles long, extending from Independence, Mo., to Oregon City and Fort Vancouver on the Columbia River. It followed the valleys of the Kansas and Little Blue rivers to Fort Kearney, thence along the North Platte River, touching at Fort Laramie, through the Black Hills, touching at Independence Rock and Devil's Gate, thence into the Sweetwater River valley, through the Wind River Mountains, crossing the Big Sandy River and following the valley of the Bear River. To this point the trail was that used in reaching California, but a trail struck off to the southward at Soda Springs, and another slightly farther where the headwaters of Snake River were reached. The Oregon Trail continued along the Snake River Valley to Fort Boise, then northward across the Blue Mountains to the headwaters of the Columbia River, and along its course to Fort Vancouver, its course being practically that of the Union Pacific Railroad from the point of its touching Bear River. Across Nebraska the trail was indefinitely called "California," "Oregon," "Salt Lake" and "Mormon." An old Indian and buffalo trail, it was further defined by trappers and settlers and afterward blazed part of the way by Vérendrye in 1742; and more definitely routed by the Lewis and Clark expedition in 1804, and by an Astor party establishing fur-trading posts in 1810-12. The trail continued in use, some slight variations being made in it, and in the later 30's several missionary expedi-

tions passed over it; while in 1842 Frémont made the government survey of a route to the coast. From 1842 a constantly increasing tide of emigration poured over the trail. Efforts are now being made to have an automobile highway mark the course of the old trail. A map of the trail was published by the United States government in 1848, and others are in the 'American Nation Series' (XIV, XVII), and in the 'Quarterly of the Oregon Historical Society' (1900-01). Consult Parkman, F., 'The Oregon Trail' (1872); Meeker, E., 'The Ox Team, or the Old Oregon Trail' (1906); Frémont, J. C., 'Expedition to the Rocky Mountains' (1850); Bancroft, 'Oregon' (1890).

O'REILLY, ò-rí'li, **COUNT Alexander**, Spanish soldier: b. Dublin, 1725; d. Murcia, 23 March 1794. He entered the Spanish army when a boy, fought the Austrians in Italy, joined the Austrian army in 1757, and the French in 1759, and then returned to Spain. He served in the war with Portugal (1762), acted as governor of Havana, rebuilding the fortifications dismantled during the British occupation, was governor of Madrid during the rising of 1765. He was governor of Louisiana in 1769, and acted there with great severity until his authority was established, when he showed himself attractive and liberal. He commanded an unsuccessful expedition to Algiers in 1775, but still retained the king's favor. After the death of Carlos III (1788) he was disgraced and retired from the army; he was subsequently appointed to the chief command of the Spanish army in 1793, but died suddenly before reaching his army.

O'REILLY, Charles, Canadian physician: b. Hamilton, Ontario, 19 June 1846. He was educated at McGill University, and engaged in practice in 1867. He was resident physician at the Hamilton City Hospital in 1867-75; and was medical superintendent at the Toronto General Hospital in 1875-1905, where he was responsible for the improvements which made it the present model institution. He organized the Toronto General Ambulance Corps in the North West Rebellion of 1885; was an examiner in clinical medicine at the universities of Toronto and Trinity; and was the first Canadian on the consultant staff of the surgical department of the Sisters of Charity Hospital, Buffalo. He is recognized as a foremost hospital expert.

O'REILLY, John Boyle, Irish-American author and journalist: b. Dowth Castle, County Meath, 28 June 1844; d. Hull, Mass., 10 Aug. 1890. He was apprenticed to a printer at nine, became a compositor and a reporter and was an active member of the Fenian Society, in whose interests he enlisted in May 1863 in the 10th Hussars. Three years later he was tried for treason and sentenced to death, a sentence commuted to 20 years' penal servitude. From Dartmoor he was transported in 1867 to West Australia, whence he escaped in a boat furnished by the Rev. P. McCabe, and, having been picked up by the *Gazelle*, an American whaling ship, made his way to Philadelphia, where he was naturalized. He removed to Boston almost immediately, and became editor of the *Pilot* in 1870 and part owner in 1876. He accompanied the Fenian raid of 1870 as press correspondent, and was a prominent advocate of Home Rule for Ireland. He wrote some good verse, notably that

on Australian themes: 'Songs of the Southern Seas' (1873); 'Songs, Legends and Ballads' (1878); 'America' (1882), and 'In Bohemia' (1886); and in prose, 'Moondyne,' a novel dealing with penal life (1879); 'The King's Men' (1884, with Robert Grant, 'J. S. of Dale,' and J. F. Wheelwright); 'The Irish Question' (1886); 'Ethics of Boxing and Manly Sport' (1888), and 'Stories and Sketches' (1888). Consult Roche, J. J., 'Life of John Boyle O'Reilly' (Boston 1891).

O'REILLY, Robert Maitland, United States army surgeon: b. Philadelphia, 14 Jan. 1845; d. 1912. He was appointed a medical cadet in the United States army 7 Jan. 1864, and served through the remainder of the Civil War, taking his M.D. at the University of Pennsylvania in 1866. He was appointed assistant surgeon in the army in 1867, remained in the service and was regularly promoted, reaching the rank of surgeon-general in 1902. He served in the Spanish War in the volunteer service as lieutenant-colonel and chief surgeon, and in 1909 was retired with the rank of major-general. He served for a time as personal medical adviser to President Cleveland.

OREL, ô-rêl' or **ORLOFF**, Russia, (1) a town, capital of the government of same name, on the Oka, 238 miles southwest of Moscow. It consists of narrow streets and houses built principally of wood, and has manufactures of linen, tanneries, rope-works, worsted-mills, etc. It is well situated for trade, communication by water with the Black Sea, the Caspian, the Baltic, and forming an important entrepôt, especially for Petrograd and Moscow. Pop. about 91,051. (2) The government, bounded on the north by the governments of Smolensk, Kaluga and Tula, on the east by that of Voronezh, on the south by Voronezh and Kursk, and on the west by Tchernigov, has an area of 18,060 square miles, the surface being diversified with hill and valley, and watered by the Oka, the Desna, the Don and its tributary the Sosna. Stock-raising, the lumber business and agriculture constitute the chief industries. There is a considerable seasonal migration of the peasants to Petrograd, Moscow and southern Russia.

O'RELL, Max. See BLOUET, PAUL.

ORELLANA, Francisco de, frân-thês'kô de ô-rêl-yâ'nâ, Spanish explorer of the Amazon: b. Truxillo, Spain, about 1500; d. Brazilian Guiana, 1550. He was a friend and fellow-townsmen of Pizarro (q.v.), fought under him in Peru, founded the city of Guayaquil in 1537, and in 1540 accompanied the expedition across the Andes in search of El Dorado, and sailed down the Napo River with a few men to the Amazon, which he followed to its mouth, and, because of the stories he heard of women warriors and women chiefs along its course called it the Amazon. The voyage, which was beset with difficulties with natives and with mutiny, was completed in 1541. Upon his return to Spain he told amazing stories of the richness of the country he had explored and received its government in 1544. He died of malaria soon after his return to South America, where his expedition was entirely unsuccessful. Consult the contemporary account of his travels by his chaplain, Gaspar de Carvajal, reprinted at Seville in 1894, and 'The Voyage of Francisco de Orellana down the River of the Amazons,'

translated by C. R. Markham from the 'Historia general de las Indias occidentales,' by Antonio de Herrera, and published in the publications of the Hakluyt Society, Vol. XXIV (London 1859).

ORENBURG, ôr'en-bûrk', Russia, (1) a town, capital of the district of the same name, on a slope above the right bank of the Ural, 990 miles southeast of Moscow. It has spacious and regular but ill-paved streets. The principal buildings are two gymnasia, several stone churches, two mosques, a governor's house, exchange, custom-house, merchant house, abattoir and Bashkir caravansary. The chief manufacturers are woollens, partly for army clothing, leather and soap. There are also many large tallow-melting houses. The trade, carried on principally by caravans from Khiva and Bokhara, is very extensive. The chief exports are meat, hides, wool and dairy products. Pop. 93,600, comprising Russians, Kirghiz, Tatars and Jews. (2) An eastern district partly in Europe and partly in Asia, in the southern Urals, with an area of 73,254 square miles. The soil is in general good, but agriculture is very wasteful. The steppe to the east of the Urals, however, is barren. Stock-raising is an important industry. It has celebrated deposits of gold, platinum, copper, silver, coal, iron and salt, which are extensively worked. Pop. about 2,000,000, 70 per cent Russian, the rest Mohammedans, chiefly Bashkirs.

OREODONTS, an extinct family (*Oreodontidae*) of artiodactyl ungulates, the remains of which occur in the early Tertiary deposits of North America, and are among the most primitive of hoofed mammals. Their skeletons abound in the Lower Miocene formations of Colorado and northward, especially in the White River beds. They are mainly animals not larger than sheep, with a very long tail and with four functional toes on each foot. The dentition is usually complete, though the incisors are sometimes rudimentary or even wanting in the upper jaw; and all the genera exhibit, says Woodward, one very peculiar feature, namely, the degradation of the lower canine to the rank of an incisor, while the foremost premolar is enlarged to usurp its function in opposing the moderately larger upper canine. The best-known genera are *Oreodon* and *Agriochærus* of the eastern foothills of the Rockies, and the larger *Eporeodon* of the Pacific Coast. Consult Woodward, 'Vertebrate Palæontology'; Osborn, 'Evolution of the Ungulate Foot' (Trans. Amer. Philosophical Soc., U. S., Vol. XVI, 1889); Cope, 'The Artiodactyla' (*American Naturalist*, 1888 and 1889).

OREOPITHECUS, the generic name given to the oldest known fossil ape, fragments of whose skeleton (jaws and teeth) have been recovered from the Middle Miocene of Tuscany. They are interesting as exhibiting a comparatively large animal (*O. bamboli*), showing resemblances both to the *Cercopithecidae* and to the *Simiidae*, "as if," remarks Woodward, "they represented an annexed ancestral type."

ORESTEIA, The. 'The Oresteia' of Æschylus, the only Greek trilogy that has come down to us, is a tableau in which different stages of the same great action pass before our eyes, and in which the poet unfolds the long conse-

quence of a sin, as Schiller does in 'Der Fluch einer bösen That.' The first play, the 'Agamemnon,' is not only the poet's masterpiece; it is also one of the greatest tragedies in existence.

The scene opens at early morn in Argos. On the roof of the palace is the watchman looking for the beacon signal. He has been placed there by Clytemnestra, the spouse of the absent chieftain. We learn after a few verses that Troy has fallen. Most fearful conflicts are presented in the second play; but in the first the poet had another object—to get his audience in the right frame of mind. We are oppressed with a vague sense of many crimes at the very beginning. The watchman declares that he will be glad to see his lord again. More he will not say. If the house could speak it might tell much. The chorus of elders enter and take us back in their song to thoughts of the army, when Agamemnon 10 years before led forth the flower of Argive youth to Troy.

The queen comes forth to offer sacrifice, and the chorus carry us back in a dactylic strain to the sacrifice of Iphigenia, which gives the keynote to the catastrophe. Clytemnestra relieves the anxiety of the elders by announcing that the Greeks have taken Priam's citadel. The description of the relay of courier-torches is one of the most famous passages in all Greek literature. Clytemnestra now dwells on the images of prostrate forms and ransacked houses in Troy. The chorus dismiss her in a rather short and ironical commendation. The theme changes to the trouble brought on innocent people at home. The action gradually moves toward Argos. Suddenly a herald enters with direct tidings. He addresses all the gods and blends sad memories with the joy of treading his native soil again. Clytemnestra comes forth and addresses the messenger of her lord:

"Let him come quickly, loved of all the land,
And may he find the wife he left behind
Unchanged, still faithful."

Then the king comes. In his chariot is Cassandra, Priam's daughter. Agamemnon speaks grandly of his victory. His wife receives him with protestations of love and fidelity. Her expressions are exaggerated, because they are mendacious. But her joy is real—she has her victim. The king is not deceived by his wife's hypocrisy in her outburst of superabundant love. Reluctantly he enters the palace with that pomp which he feels is a challenge to the envy of the gods. Cassandra remains in the car. The chorus give expression to the fears that besiege their souls. Here the second part of the drama begins. The ode is brief, because the catastrophe is approaching. Clytemnestra comes out again for her second victim. But Cassandra heeds not her exhortations to alight, and impatiently the queen returns to the palace. The chorus urge the captive to descend; but the prophetess merely utters a wild cry: "Apollo, where hast thou brought me?" "To the house of the Atreidai," is the answer. "Ha! So it is—a house accursed. It could tell of many a bloody deed. There stand the witnesses—little children slaughtered for a meal. Their own father ate them—Ha! What wouldest thou do? She lifts her hand. In the folds of the mantle he is caught. He falls in the bath." The chorus believe the poor maiden is distraught—her words carry but half sense.

They marvel more and more, as she continues, and wonder how it will all end. The inspired virgin now sees and prophesies her own fate. Cassandra enters the palace. The chorus are overwhelmed with suspense. Then the death-cry of Agamemnon is heard. They take counsel excitedly. As they approach the gate, the back-wall of the stage opens and discloses the interior. On one side of Clytemnestra, in the bath, lies the corpse of Agamemnon enveloped in an embroidered web, on the other the corpse of Cassandra. The elders expected to meet Ægisthus. But it is their queen that stands before them. She does not flinch. Triumphant she stands with the axe in her hand and shouts exultantly how the deed was done. The elders declare that she is wondrous bold to boast thus. But the queen replies:

"This corpse, I tell you,
Is Agamemnon, once my lord;—his death
The work of this right hand, proud to have wrought
A masterpiece so righteous."

Clytemnestra is magnificent even in her crime, upborne by her indomitable will. The elders mourn the fallen king. But the queen haughtily commands them not to prate of dishonor—he but paid the price for Iphigenia's death. Suddenly Ægisthus enters with an armed retinue. He shouts with joy at the welcome sight: "Day of Vengeance, thou has come! Agamemnon's father set before my father, Thyestes, his own children to eat. Feet and hands were hewn off and concealed beneath bits of roasted flesh. Thyestes ate of the repast. When he was aware of the food, he spat it out, upset the table and uttered this curse: 'So fall the whole race of Pelops! This is the crime for which Agamemnon's death atones!'" The elders are faithful to their king and denounce the assassin. Ægisthus warns them not to kick against the pricks. Clytemnestra steps between the soldiers and the elders. The tragedy ends in the trochaic tetrameter which mediates between this play and the next, a prophecy of what is to come: the end is not yet—there is only a truce. Clytemnestra leads Ægisthus within: "We control the palace henceforth; what we will is law."

The 'Agamemnon' is a drama of crime. The 'Chœphori' (Libation-Bearers) is a drama of revenge. There is still an echo of the storm; and in the third play, the 'Eumenides,' the drama of propitiation, the thunder dies away and the stormcloud lifts.

An interval of 10 years separates the 'Chœphori' from the 'Agamemnon.' Menelaus is still absent. But Orestes, the son of the murdered king, returns to Argos at the bidding of the god at Delphi. An oracle of Apollo has charged him to slay his mother and avenge his father. He is resolved to do the deed even if the oracle be false. He is not, like Hamlet, prompted to his revenge by heaven and hell, but by Apollo and by his own feelings—he needs no visitation to whet his almost blunted purpose. Orestes enters with his inseparable companion, Pylades. Near the palace is the tomb of Agamemnon. After laying two locks of hair on the grave, the youth observes a train of women bringing drink-offerings to his sire. One of them is his sister, Electra. They sing a song, the burden of which is the blood that will not out, and they call for justice. Electra has been commissioned by her

mother (who had dreamed that she gave birth to a viper) to do what she dares not do herself. She plays only a secondary part in the play, but it is of great dramatic importance; and there are some touches of extraordinary poetic beauty. The young men have retired and watch the procession unobserved. Electra prays to her father to send Orestes that the murderess may die the death of retribution. As the chorus chant the dirge, she pours three libations, takes up the lock of hair, and in great excitement notes the resemblance to her own tresses. Her passionate sisterly love finds beautiful expression in the wish that the hair had a kindly voice. No one in Argos possesses locks of equal sheen. She cannot assert with absolute belief that the fair offering came from her dear Orestes; but now she observes the footprints, like her own, the same form of heel, the print and mould in general. Orestes comes forward and reveals himself. His sister hesitates to yield too hasty credence, but is finally convinced. The eloquent outburst, which Orestes cannot control, is truly dramatic. He calls upon Zeus to look down upon the fatherless brood of the eagle. The chorus remind them of their duty, and they concert measures for vengeance. That Apollo will not betray him, Orestes knows, for the god had threatened him with exile, if he did not pay the guilty back, in like coin, blood for blood. The most important thing is to secure the aid of Agamemnon's shade. Brother and sister approach the tomb and call on their sire to help them. Orestes kneels and prays that he may regain his sceptre.

There are 1,076 verses in the play, but not until we come to 560 do we see the plot on which the drama turns unfolded. An elaborate preparation for vengeance has been made; then the action is rapid and decisive. The only delay is when Clytemnestra begs for mercy.

Orestes bids Electra go within, while he and Pylades appear before the gates as strangers from Phocis. They knock. Clytemnestra in great pomp comes forth. Orestes tells her that her son is dead. She feigns sorrow and bids the attendants conduct the men to the guest's apartments. Then the queen bids the nurse, Kilissa, summon Ægisthus with all speed. Her rustic homeliness and grotesque but natural inconsecutiveness of speech form an effective contrast with the tragedy that impends. Her pithy but illiterate babble about Orestes' babyhood adds just the touch of nature desired to relieve the tension at the crisis. Ægisthus arrives and enters the palace. Soon his shriek is heard. The incestuous dog has met his doom. The chorus withdraw to avoid suspicion. Darkness comes on and the scene shifts to the interior. A servant rushes to Clytemnestra's door and calls. The queen appears. The delineation is slight, but the portrayal shows the same outline as in the Agamemnon. Even her defense, which to modern feeling is coarse, is in keeping with her unflinching shamelessness. She takes in the situation at a glance; the hour for final settlement has come. She orders the servant to fetch an ax. Orestes enters, leaving the door open, through which can be seen the corpse of Ægisthus. When Clytemnestra shrieks, Orestes draws his sword. Clytemnestra, baring her bosom, pleads with her son to forbear: "On this breast didst thou often rest in sleep, from these nipples suck the mother's

milk." But Pylades warns him not to forget Apollo's high command, and Orestes orders his mother to follow: "Here by the side of him you preferred to my sire the death-stroke will I give to you." "Woe is me! The viper stings that I bare and reared." "Thou sayest true. Fulfilled's thy dream of terror. Thy act was sin—come now and die, e'en if that be sin."

In this encounter of mother and son the dramatic interest of the trilogy reaches its highest point. Orestes is constant to his purpose. Unlike Hamlet, he needs no occasions to spur on his dull revenge, no examples gross as earth to exhort him.

The chorus sing an ode of exultation that justice has been done, and the scene shifts to the adjoining room, where two corpses are seen, Orestes standing near. Servants hold the net in which Agamemnon was entangled. A multitude of people assemble. Orestes bids the servants unfold the web, the witness of the vilest stroke that was ever presented to human eyes.

The end of the play, where Orestes' justification is interrupted by spasms of approaching madness, affords a scene which gives scope to the poet's peculiar powers—

"Streaked with his mother's blood, but striving hard
To tell the story ere his reason goes."

His act presses to his memory like damned guilty deeds to sinners' minds, as a legion of foul fiends environ him: "Ha! What are these? Women in dark mantles, serpents writhing round their heads. I must be gone!" "What fancy of the brain bewilders thee?" "It is they—the avenging spirits of my mother. Apollo! more and more arise. They drive me forth. I cannot stay!" Orestes rushes out, the chorus sings of the storms that have beaten against the royal house, and the play ends in painful uncertainty.

The 'Eumenides' is a drama of propitiation. It begins with the main catastrophe of the trilogy; hence the tumultuous rhythm in striking contrast with the 'Agamemnon.' The whole interest centres in Orestes. His grim pursuers, the Erinyes, form the chorus. They have chased their victim to Delphi and have been cast into a deep sleep by Apollo. Orestes, exhausted, crouches before the altar. The aged priestess stands before the temple ready to perform her daily duties. She enters, but returns in terror. An unexpected sight has driven her out. The interior of the temple is now disclosed. Apollo promises Orestes not to forsake him. Hermes conducts the fugitive and Apollo vanishes. The ghost of Clytemnestra rises and upbraids the sleeping furies. Their only answer is a snore. Again she chides, and they are aroused. Their aspect is so frightful that they almost create a panic in the theatre. Apollo drives the hideous creatures from his sacred temple, and the scene changes to the Acropolis at Athens. Many years have elapsed. Orestes kneels before the statue of Athena. He speaks as one whose guilt is mellowed by time. Trusting in Apollo, he awaits the final verdict. The Erinyes range themselves in the orchestra chanting a song of vengeance. They are tracking their victim to his doom. Athena enters and bids her strange guests disclose their mission. The goddess resolves to establish the court of the Areopagus for trials of homicide. The herald proclaims silence. Athena takes her seat as presiding judge. The Erinyes accuse

Orestes, who admits his guilt, but justifies his act and calls on Apollo to testify. When both sides have been heard, the jurymen cast their ballots secretly, Athena openly. The votes are found to be even. Athena pronounces Orestes free. But his accusers, the *primæval* deities, are enraged because they are thus trampled down by younger gods. Athena allays their wrath, and they agree to remain in Athens; they will bless the people, become *Eumenides* (Gracious Goddesses). Athena places herself at their head and conducts them in solemn procession to their new home in a cavern below the Areopagus.

The satyr drama, which concluded the tetralogy, was the 'Proteus.' We know nothing about the structure of the play.

The 'Oresteia' received the first prize, was recognized at once as a classic and has never lost this distinction. It forms the high summit of the dramatic work of Æschylus, who will live forever as one of the most sublime poets of the world and as one of the greatest tragedians.

JOSEPH E. HARRY,
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ORESTES, ô-rës'têz, in Greek mythology, the son of Agamemnon and of Clytemnestra. Saved by his tutor with the assistance of Electra from the fate of his father, who was murdered by Ægisthus, Clytemnestra's paramour, Orestes was brought up in the house of his uncle Strophius, Prince of Phocis, and formed with his son Pylades that intimate friendship which has become proverbial. Called upon by the Delphian god to avenge his father, he hastened back to Mycenæ. To conceal himself he has recourse to artifice. His tutor and Pylades appear with an urn, which they pretend contains the ashes of Orestes. Clytemnestra hears the news of her son's death with a joy which she can hardly conceal; but she soon falls under his dagger. Ægisthus undergoes a similar fate. According to the Greeks, the murderer of his mother became a prey to the Erinyes or Furies. These terrible goddesses unrelentingly pursue the unhappy prince, and at last drive him to madness. From this, according to one story, he is released by worshipping the Furies, as the Eumenides (the Kindly), while according to another, told in Euripides, he was ordered to convey the statue of Artemis from Tauris to Athens. In fulfilling his injunction, he meets with further adventures.

ORFILA, ôr-fê-lâ, Mathieu Joseph Bonaventure, French chemist, founder of the science of toxicology both in its therapeutic and legal bearings: b. Mahon, Minorca, 24 April 1787; d. Paris, 15 March 1853. He served in the merchant marine, studied medicine at Valencia, Barcelona and Madrid; was sent to Paris by the Spanish government in 1807; and after the loss of his pension consequent on the war between France and Spain lived there in poverty for a time. By 1811 he had become doctor of medicine, and his successful practice and marvelous knowledge of chemistry made him quickly famous. He was naturalized, became professor of toxicology (1819) and of chemistry (1823), and was dean of the medical faculty from 1830 to 1848. He was famed as an expert witness, did much to reform French medical

education, and wrote 'Traité des poisons' (1813); 'Eléments de chimie médicale' (1817); 'Leçons de médecine légale' (1821-23); 'Recherches médico-légales et thérapeutiques sur l'empoisonnement par l'acide arsénieux' (1842).

ORFORD, ôr-fôrd, Earl of. See WALPOLE, SIR ROBERT.

ORGAN, a functional part of a living being. It is an essential quality of a living being (see LIFE) that it shall exhibit activities, the expression or product of organic constitution. Hence, any living being either vegetable or animal is termed an organism—the broadest possible name for the animate world as opposed to the inanimate.

Nature of Organs.—Organs may be spoken of in two senses. In common speech they are large functional parts of gross anatomy, such as roots, leaves or blossoms of plants, the limbs, the heart and blood-vessels, the lungs, the stomach, the liver and excretory glands, the generative parts, etc., of animals; these are termed, properly enough, the respiratory, digestive, locomotive or reproductive organs, and so on. But each is made up of many parts, which unite to effect the great functions that characterize the group as a whole, and all are more or less interdependent. The number and diversity of these structures, large and small, visible and invisible, vary enormously in different plants and animals, and are the result of an organic evolution, that is, a struggle for existence among organs, or intra-evolution, as it has been termed by some German naturalists.

Degrees of Organization.—Where the organs are few and simple, in some cases more than one distinct function being performed apparently by the same part, the animal or plant is said to be of simple or synthetic structure or organization; where the subdivision of labor in the organism is extensive, separate structures doing each a more particular work for the benefit of the whole, the organization is said to be complex or specialized. Increase of specialization is regarded as an advance, hence we speak of "lower" and "higher" animals, referring to the less or greater degree of complexity and specialization of their organs. Comparison of existing organisms, considered with reference to their activities, and a study of the phylogeny of animals and plants as revealed by palæontology and embryology, establishes the truth of this standard of comparison, and throws light upon the evolution of organs. Tracing backward any particular group, as, for example, that of the digestive system, we find it less and less complex as we descend the scale of organization until we arrive at the simplest forms—the one-celled moners, which have no structure that our power is able to detect, the drop of undifferentiated protoplasm which constitutes their whole being accomplishing all the work of nutrition, locomotion and reproduction. A little higher stands the *amœba* (q.v.), and other protozoans and protophytans, in which a beginning of differentiation and structure appears in the presence of a nucleus, a vacuole, microsome, etc. Still higher stand the sponges, coelenterates, and so on, whose comparative superiority is manifested by the assignment of certain parts with gradually in-

creasing definiteness to perform distinct offices. But the higher organisms primarily differ from the lower ones only in the fact that they are composed of many cells in more and more complicated arrangement, while the lowest consist of only a single cell; hence in the last analysis, an organ can be defined only as a cell or group of cells devoted to doing a special part of the labor required for the continued life, activities, and prosperity of the organism. This is only a corollary of the general doctrine of the cell as the seat of life. (See CELL). Of the origin of function or organic activity we know nothing.

Form and Symmetry.—Returning now to the ordinary sense of the word "organ" as a functional part, certain general facts may be considered. Among these are the form and symmetry of organs. The form is determined by the work to be done, the organ as an instrument assuming that shape and relative position in the body, and acquiring that structure, which will be most effective for the purpose. Many of the problems here which seemed so difficult to early investigators have been solved by the application of mechanical laws. Mechanical principles, controlling, to begin with, the original cell-division of the egg, and regulated in growth by external conditions, as gravity, air or water pressure, strains, muscle-leverage, etc., are no doubt at the basis of the symmetry which so remarkably characterizes the arrangement of organs throughout the living world. Two general types may be recognized—radial symmetry and bilateral symmetry. The former is most characteristic of plants, where the majority of organs occur in circles around an axis (see PLANTS, STRUCTURE OF; FLOWER; PHYLLOTAXIS, etc.); and of such animals as the echinoderms, coelenterates and many worms, whose organs are radially disposed about an oral-aboral axis, as in polyps and starfish. The superior orders generally, and the arthropods and vertebrates particularly, display bilateral symmetry in a marked degree in all their outward parts, the external organs being in pairs (with one important exception in the higher forms) and these approximately, though not absolutely, alike. The internal organs of the vertebrates are by no means symmetrical at present, although they seem to have reached their asymmetry by evolution from a primitive paired condition. In insects and arthropods generally the internal parts show much bilateralism. Among mollusks the bilateral arrangement of the organs is normal, but one side is often developed at the expense of the other, even to the complete loss of the latter.

Correlations.—As might be expected under such circumstances certain definite correlations exist between organs as to size and relative proportions. Thus in the human frame, the limbs are equal in length, the head is one-seventh of the total height, the internal organs must be of a relative size in respect to one another and to the frame, and so on. The symmetry and correlation of organs is necessary to the continuance of healthful interacting functions.

At the same time homologous parts—that is, those structurally alike—may vary greatly among animals of the same class, according to the varying requirements of habits and environment, as for instance among vertebrates, the locomotive organs are in the form of fins or paddles for aquatic species, wings for aerial crea-

tures, and legs and feet for those of terrestrial habit; and these may be vastly modified among the different groups, adapted to diverse habits, giving all the difference, for example, between the massive, shovel-like, digging-paws of the mole and the long slender legs of the antelope, or even the total disappearance of homologous parts, as in the snakes and limbless lizards. Such alterations of form adaptive to the requirements of environment and habit come about gradually, and are likely to require a corresponding change in other organs, directly or indirectly; since all or many organs in the frame are dependent upon the coaction of others, and conditions of space, gravity, etc., require mechanical as well as physiological conformity. The stomach, lungs, etc., of a long slim animal will be elongated and narrow, while those of a related but more compactly built species will be more globular. Sometimes, however, the changes render some secondary organ unnecessary, and its continual disuse results in its gradual reduction and perhaps extinction, as has happened in the case of the loss of eyes by many burrowing or cave-dwelling animals. When such a loss has become permanent in a type the remains may occur only in the embryonic stage, or may exist in adulthood, quite useless to the animal in its present condition. Such obsolete structures, of which the false hoofs of many ungulates, the "balancers" of flies and the appendix vermiformis in man are examples, are called vestigial organs, and were most difficult of explanation until this relationship was recognized.

Function Change.—Organs may not only change their form, but may also change their function. Many perform more than one function, even in the higher animals, and often, especially in the case of the limbs, this has produced a change of form as between the fore and hind limbs, relegating to one pair, say the hind limbs, the main work of progression, while the other pair assist in this respect only a little, but serve mainly as the means of seizing and holding food; most of the rodents afford examples of this case, of which the kangaroos and the extinct iguanodons are extreme instances. But function-change has often been more radical, the original or primary service by an organ having been completely superseded by some other service, to accomplish which the organ underwent gradual transformation in accordance with change of habit and the arising of a novel bodily need to which existing machinery could be adapted. The origin of lungs in air-breathing amphibians, reptiles and warm-blooded mammals and birds is directly traceable to the transformation for this new purpose of the swimming-bladder of fishes; teeth came into existence as a relic of the hard scales of ancient fishes whose function was purely as an armature, the structure and office surviving only in a few such forms as the gar (see GAR); the three pairs of "jaws" of crabs are structures which, in the early history of the crustacean type were primarily swimming and breathing organs, but long ago lost those functions altogether and became fitted wholly for mastication of food. Similar examples in great number might be drawn from both animals and plants. Indeed, it might be said that most if not all of the successful and persistent variations have involved change of function on the

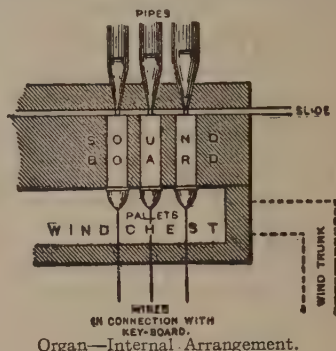
part of organs, the result of which in many cases was greater specialization.

For development of organs in the embryo see EMBRYOLOGY. See also ANATOMY; PHYSIOLOGY.

ERNEST INGERSOLL.

ORGAN (Gr. *ὄργανον*, Lat. *organum*, an instrument), a name applied to several musical instruments that are in construction and principle somewhat closely allied; but more distinctively appropriated to the largest of these, the pipe-and-pedal organ, which may be briefly described as a wind instrument, the sounds of which are those of a great number of pipes of varying lengths. The sounds are produced by the admission to the pipes (as determined by the keys and stops moved by the performer) of compressed air conveyed to them along certain channels, from a bellows worked by electricity, hydraulic, human or other motive power. From its essential feature of construction the pipe-and-pedal organ, is incomparably the noblest and most imposing of musical instruments, being in majesty of tone and grandeur of orchestral effect, produced by a single performer, without a parallel. As in the human voice, the tones of the organ are produced by the vibrations of the air in the tubes or pipes through which it is propelled. The three essentials of an organ are (1) a chest of compressed air; (2) sets of pipes in communication with this chest; and (3) a console of claviers or keyboards, by means of which this communication may be opened or closed at pleasure. The air is forced into the wind-chest by means of bellows or electric fans. To the upper part of each wind-chest is attached a sound-board, a contrivance for conveying the wind to any particular pipe or pipes at pleasure. It consists of two boards laid horizontally. On the upper board are arranged parallel rows of pipes, the pipes in each row, regarded longitudinally, being of the same timbre or quality of tone, but of a different quality when regarded laterally, that is, as they extend backward. Under each lateral row of pipes there is a groove or channel in the sound-board for the passage of air from the wind-chest to the perforations in the sound-board by which the pipes communicate with the grooves. Air is admitted into these grooves by means of valves or pallets, which are connected with the keys. On the depression of a key the valve is opened, and the compressed air rushes into the groove, and would, it is obvious, cause all the pipes communicating with that particular groove to sound their respective notes were it not for the register. The register is a slider which moves in other grooves in the sound-board, cut at right angles to those above mentioned, and communicating by perforations with the longitudinally arranged pipes; it contains holes to correspond with these pipes. By drawing the register or stop the holes of one of these rows are opened, as then the holes of the slider are directly under the entrance to the pipes, and by pushing it they are closed. From this it is clear that by drawing several of these registers corresponding rows of pipes are opened. When a register is open air can be admitted into any of the row of pipes under which it is placed by simply pressing the key that opens the valve of the groove with which it communicates. The

series of pipes above each slider is called a stop. The principal stops of an organ are the open, stopped and double diapasons; the principal, dulciana, twelfth, fifteenth, flute, trumpet, clarion, bassoon, cremona, oboe and vox humana. Those pipes of the various registers that open into each channel are so constructed that while one shall give a fundamental note, the others shall give the chords of that note. An organ may have several wind-chests filled by the same bellows, and several keyboards, each keyboard and wind-chest representing a distinct organ. In the largest instruments the number of these organs generally amounts to five. The most powerful of these is called the great organ; a smaller one the choir organ; another is called the swell organ, from the circumstance of its being enclosed in a wooden



box with a front of louvre-boards, which can be worked by the player so as to give diminuendo and crescendo effects to the sound; a fourth is called the solo organ, being employed for special solo stops, such as the hautboy, the flute-stop, the vox humana and others; lastly, there is the pedal organ, so called from its keyboard being played by the feet. The keyboards for the hand are termed manuals, that for the feet the pedal. The most usual compass of the manuals is from CC (8 feet)* to F in alt, four octaves and a half; that of the pedal from CCC to E or F, two and a quarter to two and a half octaves.

There are two kinds of organ pipes—flute pipes and reed pipes, of each of which there are several species. Flute pipes consist, first, of a foot, which is hollow, and receives the wind that sounds the pipe; second, of a body which is attached to the foot. Between the foot and the body of the pipe is a diaphragm or partition, having a small narrow aperture to let out the wind; over this aperture is the mouth, whose upper lip, being horizontal, cuts the wind as it escapes through the aperture and sets it in vibration, so causing the sound. The pipes are made either of pewter, of lead mixed with tin, or of wood. The metal pipes are generally cylindrical, open at their extremities and clear in their sound. The wooden pipes are square and generally stopped at their extremities by a plug covered with leather, so as to be air-tight. The sound of these is softer. The longest pipes yield the gravest, the shortest, the most acute sounds. The pipes, however, which are stopped have only half the length of those that are open, for the same sound. The pipes vary in length from 32 feet or so, to the

size of the pipe of a very small key. The reed pipes consist of a foot to carry the wind to the reed, a thin tongue of hard brass, one of the extremities of which is fitted into a kind of mold by a wooden plug, and the other is left free to vibrate; and in proportion to the length of that part of the tongue which is at liberty is the depth of the sound. After passing the reed the wind traverses a long pipe, whose dimensions and shape give character and quality to the sound.

The hand or barrel organs consist of a movable, turning cylinder, called a barrel, on which, by means of wires, pins and staples, are set the tunes it is intended to perform. These pins and staples, by the revolution of the barrel, act upon the keys within, and give admission to the wind from the bellows to the pipes. The hand-organ is generally portable, and so contrived that the same action of the hand which turns the barrel gives motion to the bellows.

The invention of the organ is attributed to Ctesibius (q.v.) of Alexandria, about 200 B.C. An organ was presented by Emperor Copronymus to Pepin, king of France, about 755; and in 826 a water-organ was erected at Aix-la-Chapelle. The use of organs, however, was not common before the 14th century. At the beginning the instrument was very imperfect; it had only from 12 to 15 broad and large keys, which were struck with the fist and produced the tones of the diatonic scale. The keys in time became smaller, and between the diatonic tones the semi-tones were inserted. In 1444 H. Drossdorf of Mayence built a great organ with a pedal. According to others, Bernhard, a German, organist to the Doge of Venice, built the first organ with a pedal between the years 1470 and 1480. Improvements succeeded quickly in the 16th century; the division of all the pipes into different stops was now invented, and the tone of the instrument was adapted to the tone of the choir. The bellows were particularly improved when Christian Forner in the 17th century invented the windchest, by which an equal pressure of wind is obtained in all the bellows. Till then 20 to 24 pairs had often existed in one organ, requiring from 10 to 12 men to tread them. Later, hydraulic engines and electric motors were adapted to the purposes of working the bellows, and in many of the most modern organs, electric fan-blowers, supplying specially constructed air-chambers, have supplanted bellows. The adaptation of venetian shutters to increase or reduce the tones of pipes enclosed in a box and called the swell, was due to an English builder, Abraham Jordan, who introduced the idea in 1712. Another Englishman, C. S. Barker (1806-79), inventor of the pneumatic lever, patented in 1863 a contrivance for utilizing electric mechanisms. From both of these, with considerable improvements, the tubular-pneumatic and electro-pneumatic actions have developed, giving a wonderful facility of touch and response to the 20th century pipe-organ, compared to the several pounds pressure which were required to force down any single key of the tracker actions of the older-type organs. The standard radiating convex and concave pedal board, compared to the old straight pedal board, also increased facility of pedal execution. The adaptation of the pneumatic action to the old draw stops and their combinations, which in modern organs are

replaced by tilting tablets and push-buttons, has also facilitated digital technique. The profession of organist, formerly confined to men owing to the great physical strain imposed, has thus been opened to women. Chief among inventors of recent date who contributed to these improvements are Robert Hope-Jones (1841-1914); John Austin who in 1894 invented the universal air-chest; and Cousans who invented the kinetic fan-blower; both of which have supplanted the bellows. The wonder excited by the famous organs of former centuries has largely disappeared, through the familiarity of modern days with the splendid creations to be found not only in churches, but in civic and concert halls, in department stores, theatres and other places of amusement of large centres of population. Also by the instruments of exquisite tone and ornate appearance, installed in the homes of wealthy patrons, a specialty with certain organ-building firms. The perforated paper roll, accurately recording the technical performances of accomplished organists by ingenious adaptation permits these organs to be played mechanically. For secular purposes, pipe-organs also are frequently provided with orchestral percussion stops, to reproduce the sounds of chimes, glockenspiel, triangle, drums, etc. Since the beginning of the 20th century, American built pipe-organs have taken foremost position among the best produced in the world, and in 1914 there were 85 organ manufacturing in the United States employing over 3,000 persons; the gross value of their products for that year was \$6,297,000. For modern developments in organ construction consult Miller, G. L., 'The Recent Revolution in Organ Building' (New York 1913); also consult Audsley, G. A., 'The Art of Organ-Building' (2 vols., New York 1905); Broadhouse, J., 'The Organ Viewed from Within' (New York 1914); Cellier, A., 'L'orgue moderne' (Paris 1913); Clarke, W. H., 'Standard Organ Building' (Boston 1913); Dixon, 'Practical Organ Building' (London 1887); Hinton, H., 'Organ Construction' (London 1900); Lewis, W. and T., 'Modern Organ Building' (London 1911); Locher, C., 'Dictionary of the Organ' (New York 1914); Matthews, J., 'A Handbook of the Organ' (London 1897); Statham, H. H., 'The Organ and its Position in Musical Art' (New York 1910); Warman, J. W., 'The Organ' (Aberdeen 1907); Wedgwood, J. I., 'A Comprehensive Dictionary of Organ Stops' (London 1905) and 'Continental Organs and Their Makers' (London 1910); Williams, C. F. A., 'The Story of the Organ' (London 1903).

CHARLES LEONARD-STUART,

Editorial Staff of *The Americana*.

ORGAN BIRD, a name applied to two different birds. (1) The Tasmanian crow-shrike, *Gymnorhina hyperleuca*, which has a single clear note and is sometimes taught to whistle or mimic. (2) The Amazonian wren, *Cyphorhinus cantans* is noted for its flute-like song.

ORGAN MOUNTAINS, or **SERRA DOS ORGÃOS**, Brazil. See **ORGÃOS**, **SERRO DÓS**.

ORGAN-POINT, or **PEDAL-POINT**, a musical term derived from the mediæval *organicus punctus*, and applied to the single tone, usually the tonic or dominant, held or maintained by one of the voice parts, while the other parts move freely, without reference to the sus-

tained tone, except at the beginning and the end of the passage. In modern composition the organ-point is usually in the bass, hence the alternative term pedal-point, the organ pedal being best adapted to sustain the long note. When an organ-point occurs in any other part than the bass, it is said to be inverted, and if in the soprano is called the "holding-note," this term being also of mediæval conception and the origin of tenor from *tenere*, to hold, the voice by which the *organicus punctus* was generally sustained to an effective contrapuntal climax. In many modern compositions, especially pastorales, a double-organ or pedal-point on both tonic and dominant is frequently used. The prelude to Wagner's 'Rheingold' contains the longest organ-point ever scored and consists of 138 bars.

ORGANIC CHEMISTRY. See CARBON COMPOUNDS.

ORGANIC SENSATIONS. See SENSATION, ORGANIC.

ORGANO-METALLIC COMPOUNDS, in chemistry, compounds consisting of an organic radical in combination with a metallic base. The alkyl radicals—methyl, CH_3 ; ethyl, C_2H_5 ; propyl, C_3H_7 ; etc.—are the most familiar examples of organic bases which enter into combinations of this character; and zinc, lead, tin and mercury are the most important metallic elements which combine with them. Zinc-ethyl, $\text{Zn}(\text{C}_2\text{H}_5)_2$, may be prepared by the action of metallic zinc upon ethyl iodide, $\text{C}_2\text{H}_5\text{I}$. A non-volatile, crystalline compound having the formula $\text{C}_2\text{H}_5\text{ZnI}$ is formed at first, but under the influence of heat this decomposes into iodide of zinc and zinc-ethyl. As thus prepared zinc-ethyl is a colorless liquid, which boils at 244°F . When exposed to the air it takes fire spontaneously, burning with a greenish flame. It may be converted, by slow oxidation, into ethylate of zinc, $\text{Zn}(\text{OC}_2\text{H}_5)_2$. Three compounds of ethyl and tin are known, and two compounds of ethyl and lead. Boron and silicon form compounds with ethyl, and these, although they contain no metal, are also called "organo-metallic" bodies. Silicon-ethyl has the formula $(\text{C}_2\text{H}_5)_4\text{Si}$, and may be prepared by treating zinc-ethyl with silicon-tetrachloride. It is a colorless liquid, boiling at 302°F . Several of its derivatives have a considerable theoretic interest, among these being a substance which has the formula $\text{SiC}_2\text{H}_5\text{O}$, smells like camphor and behaves, chemically, like an alcohol. Sodium-ethyl has not been isolated in the pure state, but a double compound of this substance and of zinc-ethyl has been prepared, having the formula $\text{NaC}_2\text{H}_5 + \text{Zn}(\text{C}_2\text{H}_5)_2$. The organo-metallic compounds, especially those of magnesium, are extremely useful for purposes of chemical synthesis. See also GRIGNARD REACTION.

ORGANOTHERAPY, or OPOTHERAPY, the medical use of animals' organs or glands, or of their extracts. The use of the extracts of many of the viscera of lower animals for their remedial effects in illness is of great antiquity. The savage who ate the heart of his courageous enemy had an inkling of a truth, even if the results were obtained only by what is now termed contagious magic, a form of animistic thinking. Ancient Chinese,

Indian, Greek and Roman medicine dealt largely with the fancied effects of eating certain organs, but it has only been within the era of exact physiological chemical methods that physicians have been in a position to apply the principles of organotherapy along rational and individual lines. As Paracelsus was the first to show that it was not the entire drug that was valuable, but that each drug contained some active principle to the action of which its effects were due, and thus was the forerunner of the distinctly modern school of "active principles," so Brown-Séquard, who maintained (1869) that each organ of the body had an internal secretion which was an active agent, was the founder of the modern school of organotherapy. The full applications of these general truths are far from being in sight, especially when one considers the recent developments of knowledge concerning specific cytotoxins, cytolytins, etc. Claude Bernard may be said to have antedated Brown-Séquard when he discovered the glyco-genic function of the liver; but Brown-Séquard, with more brilliancy and fancy than fact, made the broad application that all the glands of the body—liver, spleen, suprarenals, kidneys, testes, thyroids, ovaries, etc.—possessed internal secretions which passed into the blood and lymph and thus contributed to the metabolism of the body. Subsequent study has not borne out his theory, but it is known that certain glands and organs of the body do contain substances which are found only in those particular glands and organs, and which, extracted from the corresponding glands in the lamb, sheep, pig, cow, etc., and used hypodermatically, or by the mouth, have marked physiological actions and may be employed in therapeutics. Many of the extracts first devised by Brown-Séquard are now known to be worthless, particularly the extracts from the testicles of the ox and ram, which were to invigorate the old, and extracts of the brain, of the ovaries and of the mammary glands. All of these contain well-known compounds which are present in most of the tissues of the body, and beyond possessing certain tonic properties, such as a good beef-tea would possess, their action is nil. Later study has shown, however, which of the organs contain practicable therapeutic principles, and further research will undoubtedly reveal others, and may discover some in the organs now rejected as containing nothing specific. The most important of these substances now used in medicine are derived from the liver, the stomach, pancreas, thyroids, thymus, suprarenals, pituitary and sexual organs of the more common domestic animals. Of these the digestive ferments pepsin and pancreatin, alpha iodine compound, thyroid, epinephrin from the suprarenals, and spermin from the testicles are the most important. The action of the digestive ferments is discussed under digestion (q.v.).

The peculiar symptoms that resulted from the taking out of the thyroid gland in men and animals drew attention to this organ and its effects on secretion. The close resemblances of certain diseased persons to man and animals, deprived of this gland was noted, and it was soon established that myxœdema and cretinism (q.v.), two hitherto intractable diseases, were really due to diseases of the thyroid function. It was but a step, after finding the cause, to

apply the remedy, thyroid extract, and these two previously hopelessly incurable diseases became amenable to treatment. At first fresh glands were used; later, extracts; still later, the active principle, called by a variety of names iodothyron, thyroiodin, thyreoglobulin, etc. Thyroid extract causes, in addition to its effects in metabolism, a fall of blood-pressure through dilatation of the blood-vessels, and a slight depressing action on the heart in large doses. It also increases the nervous irritability of the heart-muscle by reason of its action on the vagus nerve. Small doses of the drug administered during a considerable period of time cause symptoms comparable to exophthalmic goitre (q.v.). The diseases for which it is used are cachexia strumipriya, following surgical removal of the thyroids; goitre of the hyperplastic follicular variety, a form which is associated with diminished formation of thyroid substance; myxoedema, sporadic cretinism; certain obscure skin-diseases and obesity. It is also used as a general metabolic stimulant. Within a few years an extremely active and powerful substance has been discovered in the suprarenal glands. It has received various names, suprarenin, adrenalin, etc., all of which are closely allied products that represent as nearly as possible the active principle or principles of this gland. This substance in the human body is probably of great importance in maintaining the tension of the blood-vessels, and it also bears some relation to the sugar-oxidizing properties of the liver or pancreas, or both. The effects of adrenalin, used hypodermatically, are immediate. It causes a marked rise in the blood-pressure, due to its stimulating the mechanism that constricts the blood-vessels; it slows the heart and causes it to beat more strongly; it depresses the breathing centres somewhat, dilates the pupils and slows down the peristaltic movements of the intestine. In medicine it is extremely useful as a local application to constrict blood-vessels, lessening hemorrhage, reducing inflammation, stopping discharges of the mucous membranes. It is thus particularly valuable in sore throat, running from the nose, inflammation of eye, hemorrhage from the nose or from the stomach. It has a certain value in some forms of diabetes, especially in bronzed diabetes, in rachitis, in spasmodic asthma and in the treatment of shock of any description, particularly if associated with loss of blood-pressure. The use of the active principle of the suprarenals is only just begun.

The pituitary gland contains a number of substances which exercise quite remarkable influences on bony and fatty growth. Furthermore the pituitary stands in close relation to the thyroid and suprarenal glands. All of the endocrinous glands stand in very close relation the one to the other. All organotherapy should consider the interaction of the various glands.

In the sexual glands substances rich in nucleins and phosphorus are present. Many of these have received names, but few have been isolated in sufficiently pure form to be useful in therapeutics. Those that are now available stimulate metabolism, and some are of value for counteracting the undesirable effects of the removal of some one of the organs of generation, as in castration or in ovariectomy. Consult Jelliffe and White, 'Diseases of the

Nervous System' (3d ed., 1919). See POLY-GLANDULAR ENDOCRINOPATHIES.

SMITH ELY JELLIFFE, M.D.,
Editor of 'Nervous and Mental Monograph Series.'

ORGANZINE. See SILK AND SILK INDUSTRY.

ORGÃOS, Serra dos, sār'rā dōsh ôrgownsh', or **ORGAN MOUNTAINS**, Brazil, a portion of the Serra do Mar cordillera, 40 miles northeast of the city of Rio de Janeiro, so called from their resemblance to the pipes of a church organ, as viewed from the sea. The highest peak is 6,500 feet.

ORGAZ, ôr'gās, Francisco, Cuban poet: b. Havana, Cuba, 1815; d. Madrid, Spain, 1873. He was educated in Havana, entered journalism and in 1839 went to Madrid where he took up his residence. His first volume of poetry, 'Preludios del Arpa' (1841), won for him recognition as one of the best lyrical poets of Spanish-America; he also wrote two dramas and several historical works besides a second volume of verse 'Las Tropicales' (1850).

ORGETORIX, ôr-jêt'ô-riks, Helvetian chief: d. about 62 B.C. He was a man of vast wealth and power and intrigued to gain sovereign power, endeavoring to persuade the Helvetii to emigrate to Gaul. His designs were suspected and he was brought to trial, but died, supposedly by his own hand, before a decision was rendered. Consult Cæsar's 'Commentaries,' Book I, and 'Dio Cassius,' xxviii, 31.

ORGIES, ôr'jis, or **ORGIA**. See BACCHUS.

ORIANA. (1) The mistress of Amadis de Gaul, the legendary hero of mediæval chivalry. According to romance she was the daughter of Lisuarte, the English monarch. Queen Elizabeth was often styled "The peerless Oriana" in the complimentary poems of her day. (2) The chief personage in Fletcher's comedy, 'The Wild Goose Chase' (1621), and in Farquhar's comedy, 'The Inconstant' (1702). (3) A character in Beaumont and Fletcher's play, 'The Woman Hater' (1607). (4) The title of a poem by Tennyson in which the name is introduced as a constant refrain (1830).

ORIANA, The Triumphs of, the title of a book of madrigals composed in honor of Queen Elizabeth, which Thomas Morley compiled and printed in 1601.

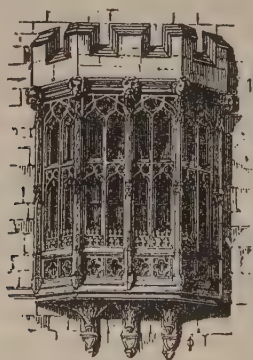
ORIANI, ô-rē-ā'nē, Barnaba, Italian astronomer: b. Garegnano, Italy, 1752; d. 12 Nov. 1832. He was ordained to the priesthood, studied astronomy under Lagrange, assisted Reggio and De Cesaris in measuring the arc of the meridian, and his calculations proved Ceres, which Piazzi discovered in 1801, to be a planet, not a comet as Piazzi had supposed. He was director assistant in Brera Observatory at Milan in 1802 and was editor of the 'Effemeridi Astronomiche' in 1778-1830. He was created a count by Napoleon and published 'Tables of Uranus' (1785); 'Spherical Trigonometry' (1806), etc.

ORIBASIUS, ôr-î-bā'shî-ûs, Greek physician to the Emperor Julian the Apostate: b. Pergamon (or Sardis) about 325 A.D.; d. about 400. He studied in Cyprus under Zeno, became attached to Julian during the Oriental exile of the latter, accompanied him to Gaul, and,

after his accession in 361, was appointed quaestor of Constantinople. But after Julian's death, when the Christians again obtained the upper hand, he was banished among the Danubian barbarians. He was recalled during his last years. Oribasius is reputed the first to describe the salivary glands. Under Julian's direction he summarized the medical lore of the day. A Latin version of the 6th century has been edited by Bussemaker, Daremberg and Molinier.

ORIEL COLLEGE, Oxford, England, founded in 1326 by Edward II on the suggestion of Adam de Brome, his almoner, for a provost and 10 fellows, and first named the College of Saint Mary, derived its present title from La Oriole, the name of a house presented by Edward III, into which it moved two years later. The buildings of Oriel College are among the finest in Oxford. The college now consists of a provost, 12 fellows and two professorial fellows and has 12 scholarships, tenable for five years and four exhibitions tenable till the end of the 20th term from matriculation. The value of each of these scholarships and exhibitions (during residence) is £80 per annum. Candidates for the exhibitions must be deserving persons in need of support at the university. No one is eligible to a scholarship who has attained the age of 20 years or who, being a member of the university, has passed two years since matriculation. The college has presentations to 15 livings. Among its distinguished alumni are Matthew Arnold, Barclay, Butler, Clough, Hampden, Thomas Hughes, Langland, Prynne, Sir Walter Raleigh, Cecil Rhodes, Wilberforce, etc., and several leaders of the Tractarian movement, Arnold, Keble, Newman, Pusey and Whately.

ORIEL WINDOW, a bay window of an upper story supported by brackets or corbels. In some cases the support is derived from a pier or engaged column carried from the ground with the upper part corbeled out to meet the



Oriel Window, Balliol College, Oxford.

floor of the projecting window. Formerly no distinction was made between this and a bay window which rose from the ground.

In France and England the oriel window is a feature of late Gothic and early Renaissance architecture, both in civic and domestic buildings. It is a favorite characteristic of German architecture where, placed at the angle of a building, it is sometimes carried up through

two or three floors and covered with a roof. It began to appear in the earlier Middle Ages and by the 15th century was in general use, chiefly above entrance gateways. Many fine reproductions of oriel windows appear in the modern American architecture of collegiate institutions and civic buildings. The word probably signifies "gilded porch" and originally was applied to the altar recess of a small oratory or chapel.

ORIENTAL REGION, one of the primary divisions of the earth considered with reference to its fauna; a zoogeographical province. It embraces the whole of southeastern Asia south of the Himalayan watershed, from Beluchistan to the Philippines and including all the Malayan archipelago as far as Celebes. It is separated from the Australian region by "Wallace's Line." See ZOOGEOGRAPHY.

ORIENTAL RESEARCH, the investigation and interpretation of ancient remains in the Near East.

Egypt.—Modern Oriental research commences with the expedition of Napoleon Bonaparte to Egypt in the summer of 1789. This expedition was accompanied by scientists and artists, who published the results of their observations in a great work entitled 'Description de l'Egypte' (1809-13). The antiquities collected by that expedition became the property of the conquering British and formed the foundation of the Egyptian collections in the British Museum. Among these was the famous Rosetta Stone. This monument, which became the key to the interpretation of all Egyptian literature and civilization, was a slab of black granite containing a portion of a decree in honor of Ptolemy V. Epiphanes, 205-181 B.C., written in ancient Egyptian hieroglyphics, the more modern Egyptian demotic script and Greek. By means of this trilingual inscription the Egyptian script was deciphered somewhat by Young in England and completely by Champollion in France, in the years 1821-32 or at least a comprehension of that script was established by their efforts, although scientific accuracy was not attained until more than 60 years later, principally through the labors of Brugsch, Erman and Maspero. The decipherment of the Rosetta Stone led to a desire to obtain more inscriptions, and in 1828-29, a Franco-Italian expedition was sent out, headed by Champollion and Rosellini, to examine the most important ruins of Egypt and copy pictures and inscriptions, the results of which were published both by Paris and Turin. In 1842-45 the Prussian government sent out a similar expedition under Lepsius, which explored the whole region of the monuments from the Sudan to Sinai and the Syrian coast, bringing back casts, drawings, maps, plans and (a new invention) squeezes of inscriptions, together with a considerable amount of antiquities and papyri. This expedition, the results of which were published in 12 great volumes in 1859, placed the study of Egyptian art and civilization on a permanent and scientific basis.

The period of excavation commenced in 1850, with the mission of a French scholar, August Mariette. The first and greatest of his discoveries was the Serapeum or tombs of the sacred Apis bulls at Memphis, 64 in all, the erection of which extended through the period

from 1300 to 50 B.C. In 1858 the khedive appointed Mariette conservator of Egyptian monuments, with authority to conduct excavations where he would in Egyptian territory, and established at Cairo the Bulak Museum. From this time until his death in 1881 Mariette exercised the exclusive privilege of excavation in Egypt. His explorations were enormous in extent, including all the well-known ruins, and more of the great discoveries of Egyptology were made by him than by any other man. No systematic report of his excavations, as such, has ever been published. He was concerned principally in the discovery and recovery of antiquities, a method of excavation which inevitably results in the destruction of a great amount of material archaeologically valuable, and his publications concern themselves with the antiquities discovered, not with the method of their discovery.

Mariette was succeeded by his pupil, Gaston Maspero (1881-86, 1899-1916), who instituted a careful system of protection and preservation of antiquities and ruins and constructed a large new museum (1902) to contain the magnificent collection of portable objects which resulted from the numerous excavations now conducted, notably at Deir el Bahri and Karnay. Revising the policy of his predecessor Maspero not only himself conducted excavations systematically at numerous sites on behalf of the Egyptian Museum, but also extended the privilege of excavation on liberal terms, but under careful scientific supervision, to foreign museums, societies and individuals. Taking advantage of this change of policy the Egypt Exploration Fund was organized in 1881, supported by money collected in almost equal parts in England and America, with the direction in the hands of the English contributors, and from that time to this the fund has continued a series of excavations, dividing its share of the finds between English and American museums and institutions. This organization was supplemented later (1896) by Petrie's Research Account, also Anglo-American, out of which developed the British School of Archaeology in Egypt (1905). The French established on a lavish scale the Mission Archéologique Française au Caire (1881), reorganized later (1901) as the Institut Français d'Archéologie Orientale au Caire. The Germans officially established the German Institute of Archaeology and attached its chief archaeologist to the German general consulate at Cairo. Later, in 1899, the *Orient Gesellschaft* was formed, somewhat on the principle of the Egypt Exploration Fund, except that its field was the Near East in general and not Egypt only. Excavations have been conducted not only by these agencies, but further by various museums and institutions, such as the Liverpool and British museums in England, the Metropolitan, Boston and Pennsylvania museums and Harvard and California universities in this country and by numerous authorities and private individuals here and in England, France, Germany, Italy and Austria continuously from 1883 or thereabouts until the present day, the Americans even continuing their work throughout the World War.

The objects found in these excavations are almost incredibly numerous. Besides the magnificent collections in the museum at Cairo, there are to-day important collections of Egyptian antiqui-

ties in the British Museum, the Louvre, Berlin, Turin (here is the famous Papyrus Prisse), New York, Philadelphia and Boston, with smaller but important collections elsewhere too numerous to mention. Besides the monuments and papyri belonging to those periods which we commonly call Egyptian, written in Egyptian characters, there have been found, mainly in the Fayum, vast quantities of papyrus fragments, containing parts of Greek manuscripts. Among these have been discovered several lost works, such as Aristotle's 'Constitution of Athens,' plays of Menander, poems of Sappho, Pindar, Bacchylides and others less famous. Some of the classical fragments contain important new readings in Homer, Herodotus, Xenophon, Sophocles, etc. Other fragments, sayings of Jesus and various heretical gospels, apocalypses and the like possess theological value. Immense quantities of letters, deeds and documents of various descriptions, written on fragments of papyrus or on potsherds, have revealed with photographic minuteness the every-day life of the people of the Fayum district in the centuries immediately preceding and succeeding our era and in doing so have thrown a perfect flood of light on Græco-Roman government and civilization in the Eastern Mediterranean in that most important period which saw the origins of Christianity. These discoveries may be said to have revealed the so-called *koine* or common, popular Greek of the Hellenistic period, and profoundly modified if not revolutionized the linguistic study of the Septuagint and the New Testament. Apparently, moreover, we are still only at the beginning of these discoveries, for millions of papyri still remain unstudied in the hands of museums and private collectors and more are constantly being discovered.

Explorations and excavations in Egypt have also thrown welcome sidelights on certain points of world history. Discoveries of Ægean pottery have enabled scholars to date with considerable accuracy the Minoan civilization of Crete. The discovery of cuneiform tablets at Tel el Amarna in 1888 threw much light on the conditions in hither Asia and especially in Palestine in the pre-Israelite period of the 14th century B.C., and the discovery of the records and documents of a Jewish colony at Elephantine (Jeb) in upper Egypt has both modified somewhat formerly existing views regarding the religion and the history of the Jews at and immediately after the Exile and also furnished scholars with most valuable material for the study of the western Aramaic dialect, in which about one-half of the biblical books of Daniel and Ezra are written. Following Egyptian civilization, Egyptian exploration, particularly in latter years, has extended itself southward to Nubia and the Egyptian Sudan, the ancient Ethiopia, increasing greatly our knowledge of the past history, political, religious and ethnological of that region and its interrelations with Egypt and the civilized world, and incidentally furnishing scholars with a mass of inscriptions (the so-called Meroitic, from Meroe, excavated by Budge in 1902 and Garstang and others since 1910) in a script and language as yet undeciphered. Sinai, also, has been included in the field of Egyptian research, and more particularly the explorations of Flinders Petrie have collected considerable

material and given us valuable information touching Egyptian history and Egyptian mining and metallurgy in that region from the time of the Old Empire onward and also have thrown some light on the inter-relations of Egypt and Asia. Of late, furthermore, attention has been paid by explorers to the collection and study of the Christian (Coptic) and Moslem remains with which Egypt abounds, but which earlier explorers and scholars had overlooked or disregarded.

The object of modern explorers and excavations, however, has not been, like those of Mariette, merely or primarily the collection of objects. Beginning with Petrie's excavation of Tanis in 1883 archaeology has been pursued as a science, excavation has been directed toward the collection and interpretation of all the information to be obtained bearing on the history and nature of the site explored, the location of each object found, in relation to all its surroundings, the careful observation of strata marking eras and periods and an exact plotting, mapping and photographing of the work stratum by stratum. The most distinguished and successful of these scientific explorers, to mention very few out of many, have been Flinders Petrie, Naville, Griffith, deMorgan (for a time director of antiquities), Reisner, Borchardt, Davis, Garstang and Grenfell and Hunt, to whom is due particularly the discovery and decipherment of the vast papyrus hoards. Scientific exploration has also resulted in the preservation *in situ* and the careful protection of ancient remains, temples, tombs, palaces and in some places whole towns, so that there is no part of the world where the traveler can so readily visualize the past as in Egypt. Even where great modern improvements have required a destruction of antiquities, like the flooding of a section of the country by the huge Nile barrage at Assuan, the region affected has first been carefully explored, everything which could be removed excavated and removed and what must be lost studied and exactly plotted and pictured.

In no other country have such extensive excavations been conducted as in Egypt, and in no other country have so large remains of antiquity been discovered, extending over so long a period. Egypt has preserved for us the most continuous record of the existence of man on the earth and his development, and Egyptian research has furnished the most complete and typical cross section of the history of the human race. Remains of palæolithic man have been discovered in deep borings in the Nile Valley, giving evidence of the occupancy of the country in pre-historic, geological periods, a hundred or a few hundred thousand years B.C. Later strata show the development from palæolithic to neolithic occupancy. What we may call civilized occupancy begins perhaps about 7000 B.C. At that time Egypt was peopled by a race somewhat different in type from the classical Egyptian, burying its dead with the body doubled up and the head and hands not infrequently severed from the body. They knew how to make bricks and they built towns, in part at least of brick. They wove linen and dressed leather for clothing; they made pottery of a great variety of forms and of extremely artistic shapes by hand, not being acquainted with the use of the potter's wheel, and by hand

also they cut stone vases of perfect form out of the hardest rock. They knew, furthermore, how to make a glaze both for this pottery and for their rock carvings. In the latter times they were acquainted with the use of copper, but their tools and weapons were still commonly made of flint, and their flint knives and lance-heads were finished more admirably than those found anywhere else in the world.

These people gave way at a still very early date to another people with a higher civilization, which we call the Egyptian, a composite race connected with the Semites of the East, the Libyans to the West, and the Cushites, comprising such tribes of modern times as the Galla and the Somali, to the south and southwest. Gradually the small states of upper Egypt were united in one kingdom and those of lower Egypt in another kingdom. The earliest exact day of which we possess a record comes from the northern kingdom, the kingdom of the Delta. In 4241 B.C. a solar calendar of 365 days was adopted; the same, with slight modifications, which has been handed down from that time to our present. Late Egyptian tradition tells of a dynasty of gods in lower Egypt and a dynasty of demigods in upper Egypt before we come to the first of the 31 dynasties of men, that is to sober, human history. But until very recently the beginnings even of the dynastic period were commonly regarded as mythical. Recent excavations at and about Abydos, however, have revealed a number of tombs of the very first dynasty, including that of the founder, Menes, himself, and we now commence recorded Egyptian history proper, in accordance with ancient tradition, with the first dynasty, about 3400 B.C. At that time Egypt was already united in one great empire, including both the southern and the northern kingdoms, but evidently a long political history lay behind this union. The Egyptian religion, as we know it from the records and monuments of that time, also evinces a long period of development; and while the early hieroglyphic writings of which we have now obtained abundant remains are rude and very different from the hieroglyphics of later times, they likewise show a long period of previous development. Progress, very slow up to this period, now becomes amazingly rapid. With the third Egyptian dynasty, a little before 3000 B.C., having its headquarters at Memphis, we come to the true copper age. Men had found proper instruments with which to cut stone; and the first buildings of hewn stone appear at this time. A century and a half later, about 2900 B.C., we are in the midst of the pyramid age, 3000-2500 B.C. So rapidly had architecture and the arts of sculpture and painting connected with it developed, that, while the first stone building was built not much before 3000 B.C., the period of the 5th dynasty (ca. 2750-2625) marks the zenith of Egyptian art, no structures of a later date equaling those of this period, while its sculptures and wall paintings are unsurpassed by those of any later time. In general the Egyptian of this early period had already reached that condition of luxury, effeminacy and exclusivism which seems to us such a characteristic feature of Egyptian civilization, and which, in striking contrast with the civilizations of Babylonia, Greece and Rome, prevented Egyptian civilization, in spite of the high

standard it attained within itself, from exerting any proportionally important influence on the development of the civilization of the world. The object of the Egyptians was to shut themselves out from the barbarism, uncleanness and dangers of the outer world, which outer world threatened them particularly from the side of Asia, from which side, as we have already seen, there had been already before this time irruptions. They built a wall to protect themselves from invasion by the Semites on the northeast, and beyond this wall they concerned themselves only with the Sinaitic peninsula, which they controlled for the purpose of mining copper, turquoise and malachite. There was of necessity, it is true, some sort of intercourse for purposes of commerce with the peoples of Asia, and objects found in the tombs of the early empire show contact with still more distant regions, but such commerce was conducted by middlemen, foreigners, who visited Egypt, not by Egyptians who visited foreign lands. Only toward the end of the 6th dynasty (ca. 2625-2475 B.C.) was a somewhat more aggressive disposition shown. Egypt was spreading southward, and military expeditions were also conducted beyond Sinai; but these seem to have been due to an unrest then prevailing in the Asiatic world, and resulting aggression from that side. The results of that aggression seem to have been some sort of catastrophe, for immediately following the 6th dynasty ensues a long period of comparative darkness, due apparently to invasion from without and the temporary eclipse of the Egyptian state.

With the 11th dynasty comes a period of restoration of prosperity and power in Egypt, reaching its climax in the 12th dynasty, and extending altogether over a period of almost 400 years, concluding in the first part of the 18th century before Christ, the period of the middle kingdom. This was considered by the Egyptians of a later period, not without justice, as the greatest of all the periods of Egyptian history. It was not a time of conquest. Possibly the old frontier was extended somewhat to the south, chiefly for the sake of the gold mines in Nubia. The copper and malachite mines of the peninsula of Sinai were also reclaimed, but further than this no conquests were undertaken in Asia. It was rather a period of internal development; a period in many ways like the mediæval period in Europe, the period of feudal development. Above all it was a period of literature, the golden age, to which all succeeding ages looked back. Poetry and romance flourished, and much of the literature contained in the papyri of later times consists of copies from compositions of this period. Egypt now also had somewhat more communication with the outside world than under the early kingdom. We find records of travel and notices of commercial and political couriers, who travel with "bricks in their bosoms" into barbarous and unclean lands.

In the early part of the 18th century came another catastrophe; the Hyksos invasion and conquest. A movement of the nations far away to the north and northeast brought into Asia Minor and Mesopotamia peoples from Europe, Sythia or central Asia, who possessed horses. The effects of the displacements thus caused were pressure on the Egyptian front, which

gave way, and in part that collapse was due to the possession and use in war of the horse, which had been introduced, and passed on to the Hyksos by the northern invaders.

From about 1788 to 1580 B.C., during the time while the land was in possession of these foreign and barbarous peoples, Egyptian history is an almost complete blank. With the 18th and 19th dynasties, approximately 1580-1205 B.C., the country entered upon a new period of prosperity, during which its relation to the outside world was very different from that of the past. The struggle with the Hyksos and their final expulsion made Egypt for the time being a warrior nation. Her Pharaohs not only drove out the Hyksos, but followed them into Asia, conquered all Syria up to the Taurus Mountains, and even conducted campaigns across the Euphrates into the land of the Mitanni in Mesopotamia. This resulted necessarily in close intercourse with the kingdoms and principalities of Asia Minor, Assyria and Babylonia, and the correspondence of the monarchs of this period with foreign potentates and with the subject rulers in Syria, the records of expeditions, treaties and the like possess a new kind of interest, in that they present a view of world history. We meet the peoples of Cyprus and Crete, the Hittites of Asia Minor, the Mitanni of Mesopotamia, the Babylonians and Assyrians, and numerous kings of petty states throughout Palestine and Syria. We read of elephant hunts near Aleppo, and obtain glimpses of forests where none now exist. It was a nervous, restless era, and the period of an apparently brilliant but really flashy and pretentious development. It was a time of tension, one great struggle, in which Egypt, at first successful, extending her sway as far as the mountains of Asia Minor and the Euphrates, finally found herself battling for life against new forces pressing on her from the north and east. Her first great opponents were the Hittites, but with and following these came hordes of people driven out of their homes in Asia Minor, the Ægean Islands and further westward by pressure from behind, descending by land and sea on Syria and Palestine, and almost forcing entrance into Egypt herself, while at the same time other hordes pressed in from the east, until all her Asiatic possessions were overrun and wrested from her. As it was a period of political unrest, so it was a period of religious unrest, and that religious unrest helped to precipitate the political catastrophe, namely, the reformation of Amenhotep IV, or Akhenaten, who built his new capital at Amarna, and the counter reformation which restored the supremacy of Thebes and its priesthood, and established hierocracy in Egypt.

From the beginning of the 11th century onward Egyptian history, so far as political power and mental and moral development are concerned, is in general a history of decadence and retrogression. Such revivals of power and activity as occur henceforth are due to conquests from without and the establishment of foreign dynasties. Libyans and Ethiopians struggle for the mastery, and occasionally Pharaohs of these foreign dynasties intervene in Asiatic politics. Then comes the period of Asia's conquest of Egypt. The Ethiopians are driven southward to Meroe, and first the Assyrians, and then, after a brief intermission

under Libyan dynasts, the Persians conquer and annex Egypt to the great Asiatic empires of the East. Next follows the Empire of Alexander, and the brilliant Græco-Egyptian period of the Ptolemies; then Roman rule, with its abundant prosperity and high culture. But Egypt is no longer Egyptian; her rulers, her literature, her culture are alike foreign. Then comes the Arabic conquest, when even the remnants of the ancient language disappear; and so it is as a Moslem Arab province that Egypt passes under Turkish rule, and ultimately under the English protectorate. All these periods have been enlightened by Egyptian research.

Assyria and Babylonia.—Assyrio-Babylonian research may be said to begin with the tentative excavations of Rich at Babylon in 1811. Others before that date had identified the ruin mounds of Babylon and Nineveh, and copies of Babylonian and Persian cuneiform inscriptions had already made their way to Europe, but Rich made the first serious survey of the mounds of Babylon. In 1820 he made a similar exploration in the ruin mounds of Nineveh and Calah. The inscriptions secured by him at these sites formed a nucleus for the later great Assyrian and Babylonian collections in the British Museum.

More than 20 years elapsed after Rich's death before any systematic excavations were undertaken. Then through the influence partly of Julius Mohl, one of the secretaries of the Société Asiatique, who had seen in London the inscribed material gathered by Rich in Assyria and Babylonia, the French government was induced to create, for purposes of investigation, a vice-consulate at Mosul, nearly opposite Nineveh, and Paul Emil Botta was sent out to fill this position. After some rather unsuccessful excavations at Kuyunjik, on the site of ancient Nineveh, Botta was led by the reports of the natives to undertake excavations at Khorsabad, 20 miles to the northeast. Excavations were conducted at this site by Botta from March of 1843 to October of 1844, and by his successor, Victor Place, from 1851 to 1855, at the expense of the French government, which also published the results in monumental form. These results were the systematic and scientific excavation of a palace of Sargon, king of Assyria, 721-705 B.C., which was adorned with a large number of magnificent bas-reliefs and other works of art. The French expedition also discovered a considerable number of inscriptions in the cuneiform script on stone and clay.

Shortly after Botta commenced his work of excavation, Austen Henry Layard visited Mosul on his return from Persia to Constantinople. His enthusiastic report secured for him a small sum of money from Lord Stratford de Redcliffe, the British Ambassador, with which he returned to Mosul in the autumn of 1845 and commenced excavations on a very small scale at the mounds of Nimroud, on the banks of the Tigris, a few miles below Mosul, the remains of the one time Assyrian capital city of Calah. With very limited resources, but with remarkable success in the discovery of sculptures, bas-reliefs, inscriptions and the like, Layard continued to excavate at Nimroud, Kalah Shergat, the most ancient capital of Assyria, still further to the southward, and at Kuyunjik (Nineveh), until midsummer 1847. In 1849 he was again sent out to Assyria and for almost three years

conducted excavations for the British Museum at the sites already mentioned, making one brief and unsatisfactory expedition to Babylonia. The wonderful success which Layard achieved in monumental results, and possibly still more the remarkable ability with which he presented these results in graphic form, connecting them also with the Bible story, aroused an interest which has continued to the present day, and which will forever make the name of Layard illustrious in connection with Assyrian exploration.

In 1851, while Place was excavating at Khorsabad, an admirably equipped expedition, sent out by the French government under the direction of M. Fulgence Fresnel, was exploring Babylonia and conducting tentative excavations at various sites in that region. The material results of this expedition were, unfortunately, lost by the overturning of a raft on the River Tigris. At the same time the attention of the English was called to Babylonia by the work of Loftus, who, sent out as an attaché of the Turco-Persian Frontier Commission, took occasion to explore Babylonia and conduct some small excavations at Warka (Erech). The Assyrian Excavation Fund was organized in 1852, and, under the general direction of Sir Henry Rawlinson, excavations were carried on by Loftus, Taylor and Rawlinson himself at various sites in Babylonia, including Erech, Ur, Eridu, Larsa and Borsippa, the sister city of Babylon, and by Hormuzd Rassam at Nineveh. None of these explorers undertook the scientific excavation of sites, but rather sought to recover inscribed material, which, in the form of clay tablets and cylinders, they found in large quantities, especially Rassam, who, without knowing it, excavated a large part of the library of the Assyrian king, Ashurbanipal (668-626).

From 1855 to 1872 there was a long period of inactivity, so far as excavations were concerned, the attention of scholars being directed to the study of the numerous inscriptions which had been brought back to England and France, the key to the decipherment of which had just been discovered. As in the case of the Egyptian inscriptions, so here, it was a trilingual inscription which furnished the clue to the decipherment. As early as the commencement of the 19th century various scholars had essayed to read the cuneiform inscriptions brought back from Persepolis and elsewhere, and different scholars succeeded at various times in deciphering a few characters, but not in reading an inscription. On the face of a cliff, in a huge space especially prepared for the purpose, its lowest part some 300 feet above the ground, in the mountain pass at Behistun in Persia, Darius, so tradition said, had caused a long inscription to be engraved. Of this inscription Sir Henry Rawlinson on various occasions, between the years 1835 and 1839, at considerable expense and much risk of life and limb, succeeded in obtaining complete copies. It was clearly written in three languages, but what the languages were was unknown. Rawlinson assumed that the first was Persian, similar to the language of the *Avesta*. It was not until 1846 that he was able to complete and publish the decipherment of the Persian cuneiform text. The Persian cuneiform proved to be syllabic, an adaptation, vastly simplified,

from the complex Semitic Babylonian of the third inscription. This, the most important text for students of Assyriology, Rawlinson did not succeed in deciphering for five more weary years (1851). The second inscription, the neo-Susian text, was not satisfactorily deciphered until 1890. The decipherment of these inscriptions was naturally an epoch-making event, and for this as well as for the great service which he rendered in publication (he was the general editor of the Cuneiform Inscriptions of Western Asia, published by the British Museum), Rawlinson's name stands deservedly at the head of the honor list of Assyriology.

In 1872 George Smith, then an employee in the British Museum, discovered among the fragments of clay tablets brought by Rassam from Nineveh, an Assyrio-Babylonian flood legend, strikingly similar in many respects to the flood story of the Hebrew scriptures. The publication of this story aroused such interest that the *Daily Telegraph* of London at once put at the disposal of the British Museum a thousand guineas to send Smith to Kuyunjik to search for more fragments. This expedition opened a new era of excavation. In the following year Smith was again sent to Kuyunjik by the British Museum. In 1875 he was sent out for the third time, but died, without accomplishing anything, in 1876. Rassam then consented to take up once more the work of excavation for the British Museum. Besides excavating at Nineveh and Calah, he explored in this campaign (1877-82) the hitherto unknown Assyrian site of Balawat, where he found great bronze doors with inscriptions and reliefs of Shalmaneser II, 859-826 B.C. He also conducted excavations at a number of Babylonian sites, Borsippa, Cutha, Sippara and others, from which he secured an almost incredible number of inscribed clay tablets. His work was conducted, like that of the English explorers in general, for the purpose of obtaining inscriptions, with no attempt at a complete and scientific excavation of the sites explored.

At the same time that Rassam resumed his work of excavation, DeSarzec was appointed French consul at Basra, in southern Babylonia. Led by reports of the natives, he commenced excavations at some ruin mounds in that region, known as Tello, where he found a quantity of statues dating from the third millennium B.C., executed with remarkable skill in hard diorite and covered for the most part by inscriptions in cuneiform characters, the first monuments of art discovered on the soil of Babylonia. These monuments were purchased at once by the French government for the Louvre Museum, and DeSarzec commenced a systematic exploration of Tello, the ancient Lagash, which he conducted at intervals until the time of his death in 1903, when he was succeeded by Captain Gros. The result of these excavations has been the discovery of an enormous quantity of inscribed clay tablets belonging to a most remote period, as well as statues, inscribed bronze and silver figures, vases and other objects, showing a remarkable development of art in that region at an extremely early period. These results have been magnificently published in monumental form.

American interest in Babylonian exploration dates from the year 1884, when an expedition headed by Dr. William Hayes Ward, called

the Wolfe Expedition, from the fact that the funds were provided by the liberality of Miss Catherine Lorillard Wolfe, of New York, was sent out, under the auspices of the Archaeological Institute of America, to examine ruin sites in ancient Babylonia and report on the prospects, scientific and practical, of excavations in that region. In 1887 a somewhat similar German expedition was sent out, which conducted tentative excavations in two burial mounds, Hibba and Surghul, in southern Babylonia. Both of these expeditions reported favorably on Nuffar, the site of the ancient Nippur, as a place for excavation. In 1888 the Babylonian Exploration Fund was organized in Philadelphia and an expedition was sent out under the auspices of the University of Pennsylvania, with the present writer as director. The site selected for excavation was Nippur, where systematic explorations were conducted under Peters, Haynes and Hilprecht intermittently until 1900. The main work of the excavation at Nippur was directed toward the great Temple of Bel, the chief religious centre of that region from a period long antedating 4000 B.C. Some 40,000 or more inscriptions, clay tablets and fragments of clay tablets, stone monuments and the like were recovered, and our knowledge of the history and civilization of Babylonia was carried back 2,000 years or more. The texts of these tablets are being published by the University of Pennsylvania in a noble series of volumes, but the real work of interpretation has scarcely yet begun.

The success of the Americans in securing remains of such great antiquity aroused fresh interest everywhere. The English resumed for a brief time their abandoned work at Nineveh, and they, and even the Turks, conducted some unimportant excavations in Babylonia. The French excavations at Tello, then lying dormant, were resumed, and finally, in 1897, a new expedition of investigation was sent out by the Germans. In 1899 the German "Orient Gesellschaft" was organized, and excavations commenced at Babylon under the direction of Dr. Koldewey, a member of the former German expedition to Hibba and Surghul, which excavations continued until the war. The French excavations at Khorsabad were scientific; the English excavations in Assyria and Babylonia and the French excavations at Tello were very successful antiquity hunts. The American excavations at Nippur were semi-scientific, but lacked equipment and training to make them entirely so. The German excavations at Babylon were thoroughly scientific, and although the explorers found no such relics of great antiquity as the French and Americans (for, owing to the thoroughness of Sennacherib's destruction, the Babylon unearthed by the Germans is relatively modern, practically the work of Nebuchadnezzar), nor such great masses of inscribed objects as were found by the English. French and Americans, they have given us a knowledge of the construction of Babylonian temples, palaces, streets and dwellings such as none of the others have given. Further the Germans introduced the plan of publishing systematically, at short intervals, reports of progress, *Mittheilungen*, in addition to the fuller scientific publications issued at the close of the whole work. As a result scholars have been able to follow and in a way co-operate in

their work. In 1903, under Dr. Andrae, they commenced a similar excavation of Kalah Shergat, on the Tigris, the ancient Ashur, the original capital and home of the Assyrians, which was continued until 1914 with results which have considerably changed our ideas of early Assyrian history. The earliest temple of Ishtar at this site dates from the close of the third millennium, but below this were still archaic Sumerian remains. The early city was destroyed by fire by conquerors supposed to belong to the Mitanni-Hittite movements, and then out of the composite of these peoples with Semites and Sumerians grew the new Semitic state and religion of Assyria. Like the excavations of Babylon the excavations at Ashur have thrown much new light on town and temple building, on sepulture and the like. The Germans also conducted some slight excavations at Fara (Shurippak) in southern Babylonia, and just as the war broke out they were commencing the great undertaking of a thorough and scientific exploration of the mounds of Warka, the ancient Erech. Unfortunately, while extremely scientific, the German exploration of Babylonia and Assyria has been also political, a part of their elaborate system of controlling the country, and hence since 1900 they have thrown obstacles in the way of all other explorations but their own.

The interest aroused in America by the success of the work at Nippur led to the organization in 1900 of the Ur Expedition, through the energy and enthusiasm of Dr. E. J. Banks, and permission was applied for to excavate Mugheir, the traditional Ur of the Chaldees. For three years this permission was held up by the Turkish government, under the influences just indicated, although during that period similar permission to excavate at various Babylonian sites was freely granted to the Germans. At last in 1903 the Ur Expedition was disbanded. Just at that moment the despatch of American ships to Beirut led to the unexpected issuance of the firman which had been so long delayed. Simultaneously a new organization was formed, called the "Oriental Exploration Fund of the University of Chicago," which accepted the firman issued on behalf of the Ur Expedition, and in the winter of 1903-04 excavations were conducted by this organization, under the direction of Dr. Edgar J. Banks, at Bismaya, the site of the ancient Adab, not far from Nippur, an important city, hitherto quite unknown; presumably in this like many more of the almost countless sites which dot the great Babylonian plain.

Besides these legitimate excavations there has been also a vast amount of destructive digging in Babylonia. From an early period old cities were used as quarries from which to obtain the material for new ones. So Seleucia, Ctesiphon and Bagdad were built largely out of bricks from Babylon. To this industrial exploitation of ancient remains has been added in the last half century the illicit excavations of natives in search of inscriptions to be sold to foreign museums and collectors. Hundreds of thousands of inscribed clay tablets have been excavated in this manner, and probably as many more destroyed, in addition to the incalculable loss of other objects. Many sites have been absolutely riddled, so that no future scientific excavation can make them tell their story. The

feeble efforts of the Turkish antiquities service have been quite unable to check this destruction, and unfortunately foreign museums, and especially the British, instead of combining to stop these illicit excavations, have encouraged them, because they furnished objects for their collections. Fortunately the number of ruin mounds in Babylonia is almost countless. There everything was built of clay, and even monuments of stone are few. Only in Assyria the palaces and temples were frequently faced with stone, stone monuments were freely used, and the rooms of temples and palaces were often wainscoted with slabs of stone carved in bas-relief. Only the British Museum and the Louvre possess fine collections of these stone monuments; but collections of clay tablets from Assyria and Babylonia numbering hundreds of thousands are scattered among many museums, notably London, Paris, Berlin, Constantinople and Philadelphia, and private collections too numerous to mention.

Persia.—Research in Persia is closely connected with research in Babylonia, and it was indeed through the decipherment of the cuneiform inscriptions found at Behistun in Persia, on the road from Bagdad to Hamadan, that the key to the decipherment of the Babylonian inscriptions was discovered. Rich visited and described Persepolis as well as Babylon and Nineveh, and other early explorers copied inscriptions there and elsewhere in Persia; but no excavations were conducted until 1851. These first excavations at the site of Susa, conducted by the English explorer, Loftus, and Colonel Williams, head of the Turco-Persian Frontier Commission, were, however, of very small extent. Thirty years later M. and Mme. Dieulafoy conducted excavations of a more extensive character at the same place, enriching the Louvre Museum in Paris with very many beautiful colored tiles, and published an account of their discoveries, a large work in many volumes, and a briefer and more popular work, *L'Acropole de Susa* (1890); but even these excavations were very superficial.

In 1895 the French government concluded a treaty with Persia, by which it received exclusive rights of excavation, and in 1897 M. J. deMorgan, at that time Director of Antiquities in Egypt, was appointed Director of Excavations in Persia. While no other part of Persia has been explored beneath the surface, since that date systematic and extensive excavations have been conducted at Susa by deMorgan and his associates for the French government, and the results have been published with remarkable promptitude and in admirable form for the student. The explorers have been notably successful in discovering a large amount of inscribed material, their most important discovery, and one of the most important in the annals of Oriental research, being a large *stele*, carried off by the Elamites from Babylonia, containing the code of laws of Hammurapi, king of Babylon about 2100 B.C., by more than a thousand years the earliest code of laws ever discovered anywhere, and one which profoundly influenced all the later legislation and civilization of western Asia, but which was manifestly a codification, enlargement and application, like Alfred's code in England, of laws and customs having already a long history of growth behind them. A not inconsiderable part of the treas-

ures found at Susa are Babylonian and Assyrian statues or inscriptions carried off by the Elamites in their raids or conquests. Lying along the valleys of the Karun and the Kerkha, which, descending from the Persian mountains, find their way to the Persian Gulf along with the Tigris and Euphrates, Elam is almost a part of Babylonia, and the excavations at Susa show that their civilization was practically identical. The relation between them for about 2,500 years was similar to that of England and Scotland, Elam representing Scotland. They warred with one another, and raided and conquered one another from the beginning of the third millennium onward. The earliest inscriptions from Susa are in the Babylonian script and language. Later we find inscriptions in the same script and the language of the Elamite mountaineers, the so-called Anzanite, out of which ultimately developed, apparently, the neo-Susian, the second language of the Behistun inscription, known only from that inscription, written in a simplified form of cuneiform with less than 90 signs, as over against the 500 more or less of the Babylonian. From this again seems to have developed the Persian script of 36 or 37 characters found in the Behistun inscription, and in a few short rock and vase inscriptions.

Assyriology.—Unlike the Egyptian the Babylonian civilization was from the outset international, and as a result the cuneiform script came to be widely used from a very early period. Invented by the Sumerians, it was adopted and applied to their tongue by the Semites in Babylonia. In Elam it was first used, as already pointed out, with the Sumerian language, but afterward was employed to write the native Anzanite language. Later, modified and simplified, it was used for the neo-Susian and the Persian. By the beginning of the second millennium the Semitic Assyrians were using the Babylonian cuneiform script in a somewhat simplified form, while a little earlier the Cappadocians of Asia Minor had already begun to use both the Babylonian script and language in clay tablets. At about 1400 B.C. Syrian and Palestinian princes were using the Babylonian cuneiform even in their correspondence with the Egyptian overlord; the Hittites and the Mitanni were using it both for Babylonian and their own languages, as revealed by clay tablets found in Egypt and Asia Minor; and a little later the people of Armenia were using it for inscriptions in their own tongue, the so-called proto-Armenian, on the rocks in the region of Lake Van. Up to the present time cuneiform inscriptions have been discovered in no less than eight languages covering a vast extent of territory and a period of 3,000 years and more, from the close of the fourth millennium to 50 B.C. The decipherment and interpretation of these inscriptions on clay, stone, glass, ivory and metal constitute what we know as Assyriology.

The interpretation of these inscriptions, with the other discoveries made by excavations in Babylonia, Persia and Assyria, enables us to trace the course of Babylonian civilization from about 7000 B.C. At that period the inhabitants of Babylonia were already organized into communities, building fortified towns, the central point of importance in which was the temple of their god. They made pottery; they manu-

factured bricks, although using in their structures for the most part unburned bricks. One people seems to follow another, or perhaps rather the strata show differences of development. The bricks made at the beginning are never excelled. Pottery of a high grade appears in certain early strata, only to disappear again, giving way to inferior goods. As early, apparently, as 5000 B.C. the principle of the arch was discovered. A system of drainage had been developed. Huge canals were dug to direct and control the inundations of the Tigris and Euphrates. City communities were sufficiently large and well organized, socially and politically, to undertake constructions of great size, involving the work of large numbers of men extending over a long period. In the latter half of the fourth millennium we begin to meet with written records and enter upon what we may call the historical period. The Sumerians, who invented the complicated cuneiform script, evidently brought it from some mountainous region, perhaps from the Persian mountains through the Elamite plain; and at the period when we first meet that script it evidently had a long period of development behind. The people using it, the Sumerians, were already in the copper stage of civilization. They occupied principally the south of Babylonia. In the north were chiefly Semitic peoples, who very shortly adopted and adapted the Sumerian script, and Babylonian civilization resulted from the amalgamation of the Sumerians of the south and the Semites of the north. In the first half of the third millennium, about the period of the great pyramid builders of Egypt, we find in southern Babylonia a remarkable sculptural development, having its centre at the town of Lagash. From about this period also date the earliest long religious texts, synchronous with the pyramid texts of Egypt. It must be said, however, that while we find such synchronisms there is no apparent connection of Babylonian and Egyptian civilization in these earlier periods. Each goes on its own independent way. These earliest religious texts show us that in the first half of the fourth millennium Babylonian civilization stretched up the Euphrates almost, if not quite, to the Mediterranean. The Semites of northern Babylonia constituted part of a larger whole. Aleppo is mentioned side by side with Kish in Akkad, or northern Babylonia, and Nippur in Sumeria, or southern Babylonia, as one of the three great cult cities. Throughout the whole of the third millennium B.C. various city states north and south strove with one another for the hegemony, while Elamites and Babylonians engaged in a continuous struggle. Toward its close, just when Egypt was going into a state of eclipse due apparently to Semitic invasions, the Semitic element finally prevailed over the Sumerian, the north over the south, and an actual empire was established embracing the whole of Babylonia. Babylon became the centre of culture, religion and literature, and Babylonian civilization became Semitic, the Sumerian language, however, continuing to be used until almost the commencement of the Christian era as a church language, as Latin was used in Europe through the Middle Ages.

By the close of the third millennium Babylonian civilization had crept northward up the

Tigris and founded a new centre at Ashur. Early in the second millennium there were great upheavals in the north and movements downward from Asia Minor of Indo-European peoples who sacked and burned both Babylon and Ashur. These movements, which resulted in Egypt in the Hyksos conquest, resulted eastward and northward in the establishment of the Kassite dynasty in Babylonia; of the kingdom of the Mitanni in Mesopotamia, westward of Assyria; and of the dominance of Hittites and Egyptians further westward still in that trans-Euphratean region which up to this period had been Babylonian, and where the influence of the Babylonian script, literature and religion still continued largely to prevail.

Politically Babylon loses influence from that time, although it continues, until its destruction by Sennacherib, in 689 B.C., to be the great religious and cultural centre of all Hither Asia, playing from Persia to the Mediterranean and from the Black Sea to the Persian Gulf a rôle comparable to that played by Rome in Europe during the Dark and Middle Ages. Politically Assyria forges gradually to the front, becoming first the dominant factor in the valleys of the Tigris and Euphrates, and then a great world power, full of the lust of conquest, destructive rather than constructive, overturning and exploiting kingdom after kingdom, and empire after empire, until in the 7th century it ruled the world, from Persia on the East to Egypt on the West, and from the mountains of Armenia northward to the Persian Gulf and Arabia southward. Its devastations open the way finally for a great invasion of wild Scythian hordes and Nineveh falls toward the close of that century, to be succeeded for a brief period by a new empire of Babylon, by the Lydian kingdom in Asia Minor, by the Median kingdom to the east and the Egyptian to the west. A little later these are merged in the mighty Persian empire, which sought to construct and unify, while it conquered, the whole of Hither Asia, the region included in our review. The history of our region from this time onward is not one of research and exploration, derived from cuneiform texts and monuments, but is known from the literary remains of Greece and Rome and Judæa. In Babylonia and Assyria, along the Euphrates, and in Mesopotamia there are abundant remains of the Seleucidian, the Sassanian, the Parthian and the brilliant Arabic periods, but so far research and exploration has concerned itself almost entirely with the more ancient material, leaving the remains of these later periods untouched.

Palestine.—While the keenest interest in Egyptian and Babylonian excavations was aroused by their relation to the Bible, exploration in Palestine, the Bible land proper, commenced at a much later date and has been prosecuted with less energy than the similar work in those regions. The first important work was done by an American, Rev. Dr. Edward Robinson of New York. In 1838 (and again in 1852), accompanied by Eli Smith, an American missionary in Beirut, he explored the Holy Land, identifying for the first time on rational grounds the greater part of the ancient sites of the country, a work of historical topography. The second move in exploration, a direct result of Robinson's work, was also made by America, the United States government sending out an ex-

pedition in 1847 under Lieutenant Lynch of the navy to explore the Jordan and the Dead Sea. The interest aroused by Robinson's publications affected England and the continent of Europe still more than America, and during the next two decades a number of travelers and explorers visited the country, including the Prince of Wales and Dean Stanley. Van de Velde of the Dutch navy prepared a map, as the result of his visits; William Smith compiled a dictionary of the Bible, and Sir G. Grove visited the Holy Land to study the places he was to describe in that work; Baroness Burdett-Coutts, anxious to furnish Jerusalem with a proper water supply, contributed £500 to make a plan of Jerusalem and its environs, and in 1864 Sir C. W. Wilson made the survey for this, including an accurate map of Jerusalem, with plans of the sacred sites.

Finally, in 1865, the Palestine Exploration Fund was organized for the purpose of undertaking a scientific and complete exploration of the country, and commenced its work by excavations at Jerusalem, under Sir Charles Warren (1867-70), which were valuable in determining the topography of the temple area, although almost nothing was found in the way of antiquities. At the same time (1868-79), partly connected with the Palestine Fund, partly independent of it, Sinai and the "Desert of the Exodus" were mapped and explored by Sir C. W. Wilson with a party of Royal Engineers, and by Professor Palmer of Cambridge. Then followed (1871-77) a careful survey of Western Palestine, under the direction of Conder and Kitchener, assisted by naturalists, archaeologists and linguists, so that the result was not merely a careful and accurate physical map of the country, but a study of all ruins of any sort visible on the surface, of the climate and the geology, of the fauna and flora, of place names, with a view to identifying ancient sites, and much more; all of which was published in the monumental memoirs of the fund, which has also, since 1869, published quarterly statements (to which have been added latterly annual volumes) giving a current view not only of their work, but of all matters of interest concerning Palestine.

An American Palestine Society, similar to the British Palestine Exploration Fund, had been formed simultaneously with the latter, to which had been assigned the country east of the Jordan, and an expedition was sent out to explore that country. Unfortunately this expedition accomplished little or nothing, and the American society shortly disbanded. In 1881 Conder was commissioned by the British Palestine Exploration Fund to do the work which they had undertaken, but the strained relations of the British and Turkish governments brought this survey to a speedy conclusion, after only 500 square miles had been surveyed. Later this work was done in part by a local engineer, Dr. Schumacher, of the German Temple Colony at Haifa, sometime an American citizen, but later a German, first for the British Palestine Exploration Fund, but after 1884 for the German Palestina Verein (organized in 1878). In 1883-84, also, Professor Hull, Director of the Geological Survey of Ireland, conducted for the fund a geological survey of the Arabah, the great depression con-

taining at its lowest point the Dead Sea. The geographical survey was finally completed by the survey in 1913-14 of the region known as the Negeb, extending from Beersheba southward to the Egyptian frontier. On the whole Palestine has been explored, mapped and surveyed as far as anything above ground is concerned, with great thoroughness (in Western Palestine especially every foot of the surface has been minutely covered), and the results made available in scientific publications and popular volumes, in maps and casts and pictures, to a very large public. In fact nothing comparable has been done for any ancient country.

It must be said that this exploration yielded very small results in ancient monuments and inscriptions of importance and indeed such of the latter as have been found were found by the natives or by accident. These are the Moabite Stone, containing an inscription of Mesha, a king of Moab in the 9th century B.C., found by a German missionary, Klein, at Dibon in 1868 and later largely destroyed by the Arabs, what remains being preserved in the Louvre; secondly, a Hebrew inscription, possibly of the time of King Hezekiah, found by boys bathing in the Siloam tunnel, beneath the hill of Ophel and dealing with the construction of that tunnel, now in the museum at Constantinople; and thirdly, a Greek barrier inscription from the temple of Herod, found by Clermont Ganneau in use as a tombstone in an old graveyard in Jerusalem, also at Constantinople. More important for the history of Palestine, however, than any of these inscriptions found in Palestine itself, was the discovery in 1888, already referred to, by the natives, at Tel el Amarna in Egypt, of about 300 clay tablets written in the Babylonian cuneiform script, from kings, petty princes and Egyptian representatives in Palestine, northern Syria, Mesopotamia and Babylonia to the Egyptian overlord, about 1400 B.C. The discovery of these inscriptions made it plain that at that date, antedating the Hebrew conquest, Palestine possessed a civilization largely identical with that of Babylonia and that writing on clay tablets was practised in that region.

This discovery led to the belief that excavations in Palestinian sites would result in the discovery there of similar inscriptions on clay and probably also of stone inscriptions like the Mesha monument and the Siloam inscription from the Hebrew period. On behalf of the Palestine Exploration Fund, which had conducted no excavations since the conclusion of Warren's work at Jerusalem in 1870, Petrie, the Egyptian explorer, made a reconnaissance in 1889 and conducted tentative excavations at the mound of Tel-el-Hesi, the ancient Lachish, in the extreme southwestern part of Judæa, on the borders of the Philistine plain. In the following year the Palestine Exploration Fund entered upon a systematic campaign of scientific excavation under the direction of Dr. F. J. Bliss of Beirut, an American. Excavations were conducted at Lachish (1890-93), at Jerusalem (1894-97), where the southern wall of the city was excavated and traced and from 1898 to 1900 at various sites in the Shephelah, the foothills between Judæa and Philistia, including Tel es-Safi, the ancient Gath, and Tel Sandahannah, the ancient Marissa, where a

Seleucid city was explored, but the excavations came to a close before the Hebrew city beneath could be examined. Later, the natives unearthed the necropolis of this city, and, in 1902, Dr. Thiersch of Munich and the present writer had the good fortune to discover in that necropolis elaborately decorated tombs containing Greek inscriptions belonging to a Sidonian colony settled at Marissa, then the Edomite capital, in the Seleucid period, the only discovery of this sort yet made on Palestinian soil. More complete and much more extensive than any of the foregoing was the excavation of Gezer by R. A. S. Macalister, formerly Dr. Bliss' lieutenant (1902-03 and 1907-09), the account of which is contained in three volumes of the monumental memoirs of the fund. This was followed in 1911-12 by Mackenzie's excavation of the neighboring Beth Shemesh.

Besides these excavations of the Palestine Exploration Fund, excavations have also been conducted during the present century by Dr. Sellin of Vienna, at Taanach, on the plain of Esdraelon, and at Jericho in the Jordan Valley. Just before the outbreak of the World War he had also commenced excavating in the neighborhood of Shechem. Dr. Schumacher for the German Palestine Society and the *Orient Gesellschaft* excavated Mutesellim, the ancient Megiddo, and a Harvard University expedition partially excavated Samaria, finding, apparently, the lower part of Ahab's palace. Immediately before the war excavations were conducted on the hill of Ophel, south of the temple at Jerusalem, under English and Jewish auspices. Under various auspices also there have been explorations of the synagogues of Galilee, the tumuli and stone remains of the East Jordan country, and the Nabataean-Edomite rock city of Petra. In 1900, through the efforts of the late Professor Thayer of Harvard, an American Oriental school, similar to the schools of archaeology at Rome and Athens, was established at Jerusalem, to give American students an opportunity for study and research in the Holy Land itself, and to secure continuous and systematic investigation. In 1903 a similar German institution was established and at about the same time the French Dominican monks established an *Ecole Biblique*. These three institutions have not only undertaken various minor explorations and excavations; they are also centres of observation to study and make known all that is found or done in Palestine.

Besides the scientific and legitimate excavations above described, there has also been in the latter years much structural excavation for new buildings at Jerusalem and an enormous amount of illicit digging by natives to obtain antiquities to sell to tourists and collectors. Especially immense numbers of graves and tombs have been opened and robbed, so that some ancient sites now resemble nothing more than rabbit warrens and the destruction of ancient remains as a result of this sort of antiquity-hunting has been, probably, in proportion to the amount of those remains, much greater than in any other ancient country.

On the whole the results of excavations in Palestine have been disappointing. Of the expected inscribed clay tablets there have been found in all only about half a dozen, Babylonian and Assyrian, of no great importance; of Hebrew inscriptions, a seal cylinder or two, and

a few potsherds and jar handles. In general, the more interesting and important discoveries have been pre-Israelite. At Gezer, where the excavations were most complete, there was unearthed a pre-Israelite open-air temple or place of worship, consisting of huge stones set up in alignment, connected with an ancient system of caves; also a remarkable shaft tunnel of the same period, cut through the solid rock to a source of living water beneath. From these excavations, with what has been obtained from Babylonian and Egyptian sources, especially the latter, we are able to restore somewhat the history of Palestine before the Philistine and Hebrew conquests. Before the middle of the third millennium the country was inhabited by a primitive and barbarous people, living largely in caves dug out of the soft rock and using stone implements. By the middle of the third millennium, the time of the great Semitic development in Egypt and Babylonia, these were replaced or overlaid by Semites, using copper, who built overhead cities and organized city states; but who adapted and developed certain of the practices of the earlier inhabitants, religious and otherwise, and who especially developed enormously, but for different purposes, their cave-cutting habits. As a part of Amurru, the West Land of the Babylonians, these soon came into contact with outside civilization, Ægean, Egyptian and Babylonian, adopting from the latter in the second millennium the cuneiform script and the Babylonian language for their apparently scanty official correspondence. Compared with the surrounding civilized regions they were very backward. Under Thutmosis and his successors in the 16th century Palestine became a part of the Egyptian empire, retaining, nevertheless, the Babylonian script and tongue for official use. With the development of the Hittite power in the 15th century Palestine became in part a battleground between Egypt and that power. About 1400 B.C. the Amarna tablets reveal a number of city states, nominally under Egyptian suzerainty, crumbling away before invasion from without. When this period of disintegration comes to an end we find the Philistines, apparently from Crete, in possession of the coast, and the Hebrews, in the main an Aramæan people, but using the kindred language of Canaan, struggling for the possession of the land as a whole. This is the commencement of the Biblical period, for which we have excellent literary sources in the Bible, supplemented somewhat by Assyrian-Babylonian and Egyptian monuments, but on which excavations in Palestine have shed little light. The Hebrew period is singularly barren of structural, architectural and inscriptional remains. The visible remains of the past, such as they are, with the exception of the rock cuttings—tombs, holy caves, cities of refuge and the like—which are extraordinarily abundant and belong to all periods, date generally from later periods, the Judeo-Roman of Herod, at Jerusalem and Samaria; the Hellenistic, beyond Jordan, to which belong the magnificent ruins at Amman and Gerash; or the time of the Crusades, which was an age of massive building that left its mark on the whole land.

Syria Outside of Palestine.—Excavations were conducted at various points on the Phœnician Coast in 1860 and 1861 by a French expe-

dition under the direction of Renan, without important results. In 1888 native stone-cutters at Sidon discovered the so-called Alexander sarcophagi, which, with the sarcophagus of a Sidonian king, Tabnith, were excavated by Hamdy Bey and carried to Constantinople. These Sidon sarcophagi rank among the art treasures of the world. In 1901-02 a Phœnician temple was excavated at Sidon for the Turkish government by Macridi Bey. Through the interest in Oriental archaeology aroused in the German emperor by his visit to the East, a German expedition was sent out in 1901 to explore and restore the ruins of the temples at Baalbek and in connection with this some excavations were conducted in the Hellenistic Gerash, beyond Jordan. At the same time the Sultan presented to the Kaiser the small but remarkable ruins at Mesheyta in Moab and in 1903, under the direction of Dr. Schumacher, these were removed bodily to Berlin to adorn the New Friedrich Museum.

The surface antiquities of Northern Syria southward to the Hauran were explored, inscriptions collected and the like a half a century and more ago by two French scholars, de Vogué and Waddington, and various scholars have visited and described the Palmyrene region. At the beginning of the 20th century a far more complete work of surface exploration was carried out by the American Archaeological Expedition to Syria, under the auspices of Princeton College and the direction of Howard Crosby Butler. In the 70's of the last century the British undertook some very superficial excavations at Carchemish (Jerabis), the capital of a Hittite kingdom on the Euphrates. In 1911 the British Museum resumed a more systematic excavation of this important site, under the general direction of Hogarth, which was stopped by the war. In 1886 and again in the following decade, the Germans conducted excavations at the small mound of Sinjerli, northward of Aleppo, which resulted in the discovery of a town and palace of rather rude construction, with Aramæan and Hittite inscriptions and sculptures of the 8th and 9th centuries B.C. With these exceptions no excavations have been conducted in Syria. We know from Babylonian inscriptions that northern Syria was a centre of culture and Aleppo a famous cult foundation as early as the first part of the third millennium B.C.; from Egyptian and Assyrian inscriptions and from the Hebrew scriptures we learn of numerous important cities throughout Syria in the succeeding pre-Christian millennia and especially of Damascus. From Greek and Roman sources we know of the mighty cities of this region in the early Christian centuries and particularly of Antioch. Surface exploration also has brought evidence of the boundless prosperity of Syria in those ages and almost countless ruin mounds dot the whole country; but so far as excavation is concerned Syria is as yet practically virgin soil.

Asia Minor.—The famous excavations of Schliemann at Hissarlik, the site of ancient Troy, gave us our first glimpse of the civilization of the Mycænæan period and showed us the existence of long eras of succeeding cities, going back certainly into the third millennium B.C., Troy being an outpost on the north of that brilliant Ægean, pre-Grecian civilization which seems to have bloomed at its richest in

Crete in the middle of the second millennium B.C. Excavations at Pergamos, Assos, Ephesus and Sardis with smaller excavations at Cyzicus, Halicarnassus and elsewhere, conducted by English, Germans, Americans and Austrians, have revealed remains of the later Greek and Græco-Roman periods. Only at Sardis, where the Americans, under Howard Crosby Butler of Princeton, explored on a magnificent scale for five years (1909-14), until their work was stopped by the war, were remains found of an earlier Asian culture, in the shape of inscriptions in the as yet undeciphered Lydian language. Since Texier published his '*L'Asie Mineure*' (1841) various scholars have explored and described surface remains from all parts of the country. Among the most noteworthy of these are the excavated rock cones existing by thousands in Cappadocia (described by Sterrett, Wolfe expedition, 1888). From Cappadocia also there have been brought, since 1887, a number of clay tablets with cuneiform inscriptions, which show the influence of Babylonian civilization and culture in Asia Minor as early as the latter half of the second millennium B.C. Further eastward, through Armenia, inscriptions have been found in cuneiform characters, cut in the rock, partly in the Assyrian language and partly in the native language of the country, which have now been deciphered, giving evidence of the existence of powerful kingdoms in that region in the 10th century and thereabouts, rivals at times of the Assyrian power.

Explorations by various travelers of the interior portions of Asia Minor revealed, besides numerous Greek and Latin inscriptions of the Christian and classical period, rude figures and hieroglyphic inscriptions cut in the rocks or carved out of stone, from the Mediterranean on the west to Armenia on the east and from a point a little south of the Black Sea on the north far into Syria on the south. By comparison with similar inscriptions and carvings found at Carchemish, known to be a Hittite capital, these were assumed to be Hittite and to show that Hittite power and influence covered a wide territory, comprehending a large part of Asia Minor and northern Syria. One of the finest Hittite inscriptions was found by the Germans at Babylon and the Bible records mention Hittites in southern Palestine at and long before the Hebrew conquest. Egyptian inscriptions testify to a great Hittite empire which disputed with Egypt the possession of Syria from the close of the 15th to the close of the 13th century. The Assyrians record a struggle with powerful Hittite states in northern Syria from the 10th century on, culminating in the capture and destruction of Carchemish, in 717 B.C. Finally, excavations in 1906-07 at Boghaz-Keui, the ancient Hatti, in northern Asia Minor, by the German scholar, Winckler, furnished us with a great number of clay tablets in cuneiform script, some in the Babylonian, some in the Hittite language and some bilingual, containing among other things the Hittite version of the famous treaty between Rameses II, Pharaoh of Egypt, and Hattusil, emperor of the Hittites, 1271 B.C. This discovery seems at last to have solved the Hittite problem, and to enable us to form a general idea of the early history of Asia Minor: along the coast a fringe of Ægean culture; in the interior various Asian peoples of language and

connection unknown to us; Babylonian commerce and culture penetrating into Cappadocia in the latter part of the third millennium; Indo-European invasions from the north by a horse using, chariot driving people, the formation of new states under their domination, the invasion of Mesopotamia, and the sack and destruction of Babylon and Ashur early in the second millennium. This resulted in the establishment of the Kassite dynasty in Babylon, of the kingdom of the Mitanni in Mesopotamia, of the foundation of the great Hittite culture and empire, extending finally over all Asia Minor, and the first encroachment of Indo-Europeans on the Ægean civilization in the capture and occupation of Troy. The Hittite empire reached its culmination in the 15th century B.C., when it was reaching out beyond Asia Minor southward, struggling with Egypt for the possession of Syria. Apparently even at this time, however, the Hittites were subjected to a pressure from behind, driving them southward. The empire of Hatti comes to an end about 1200 B.C., and the Hittites are pushed out of Asia Minor by the Muski; but until the close of the 8th century a number of Hittite states exist in northern Syria, contending with Assyria for the supremacy of that region. Of the following movements in Asia Minor and of the history of that country we have knowledge only from Assyrian inscriptions, and those rock-cut inscriptions of the people of Armenia to which reference has already been made. Asiatic peoples, some of whom have left us a few little fragments sufficient to determine the fact of their existence and our ignorance of their language, struggled with one another and with the Assyrian invaders. Finally in the 7th century one of these peoples, the Lydians, established a great empire with its seat at Sardis, while the Greeks occupied that fringe along the coast formerly occupied by the Ægean civilization; and Indo-Europeans pushing in from the East occupied Armenia. So far research has enabled us to outline the history of Asia Minor before written history begins.

Arabia.—Up to the present time no work of excavation has been conducted in Arabia. Various travelers have explored and mapped the country, from the time of the Danish Niebuhr (1761-64) onward. These include Burckhardt (1814-16), Burton (1853, 1877-78), Palgrave (1862-63) and others. These earlier travelers explored the country, visited Mecca and studied Arabic life and habits, but did little in the way of collecting or copying inscriptions. This was done principally by Halévy (1870-71), Doughty (1876-78) and Glaser (1882-94) in the south, and Euting and Huber (1883-84) in the north. These explorations were conducted under the greatest difficulties. Halévy traveled as a poor Jew; Doughty lived as a Bedouin; others professed Islam to accomplish their purpose; some, like Huber, lost their lives at the hands of fanatical natives. The inscriptions collected by Euting in northern Arabia show us the Aramæans inhabiting that region in the 6th century B.C. The inscriptions from southern Arabia reveal the existence there as early as 1000 B.C. of civilized peoples using alphabets derived from the so-called Phœnician alphabet. We are able to trace the successions and names of certain kings and peoples, and some light has been thrown on the ancient

religion and religious practices of the Arabs. Shortly before the beginning of the Christian era commenced the movement from Arabia of the Nabatæans, who occupied eastern Syria as far northward as Damascus, their chief centre being Petra. These were followed by another movement in the first centuries of our era, which established the Lakhmid state on the western confines of Babylonia, and the Ghasanid on the eastern confines of southern Syria. Beyond this, research in Arabian antiquities has not proceeded up to the present time.

General Results.—The general results of oriental research in Egypt and western Asia, covering in all a period of somewhat more than a century, have enabled us to trace the history and development of civilization from about 7000 B.C. At that time, research has now shown, there existed independent centres of civilization in Egypt and Babylonia, which countries were occupied by city-building and civilized peoples. By the middle or end of the fourth millennium a conventionalized script had been developed out of picture writing, independently in each of these countries, and the civilization of each region had assumed those definite types which we know respectively as Egyptian and Babylonian. From this point on we have in both cases written records, but no well-determined system of chronology until much later. The civilization of Egypt, while attaining in the matter of art, architecture and literature a very much higher development than that of Babylonia, was always singularly self-centred. Babylonia was more concerned with practical life, and the application of knowledge to material conditions. Babylonia, moreover, was always in contact with the world about it, and its civilization affected the civilization of surrounding regions to such an extent that it may fairly be claimed as the ancestor of later Western civilization. Egypt gave little to the outside world and received little from it, but, on the whole, what it received was greater than what it gave. It is Egyptian art, the painting on the Egyptian tombs, which gives us a vivid picture of the manner of Egyptian life; it is the innumerable clay tablets and business documents of Babylonia which enable us to restore in detail the laws, rules, customs and commerce of the Babylonians.

The earliest civilization of Babylonia was non-Semitic, developed among the people of the south, commonly designated as Sumerian. The earliest inscriptions are written in the Sumerian language, and even as late as the Assyrian time magical and religious texts continued to be written in the same tongue. By 3000 B.C. the Semitic peoples of Akkad, or northern Babylonia, had adopted and adapted the civilization of Sumerian Babylonia, and this Sumerian Semitic civilization became by the middle or close of the third millennium B.C. to all intents and purposes the civilization of the whole region from Persia on the east to the Mediterranean on the west.

In the first half of the second millennium Egyptian and Babylonian civilizations were brought into contact with one another, and with another civilization of equal rank and almost equal age which had developed to the west and north. By the 15th century B.C. a period of high culture, having several independent centres, was attained in this ancient world.

One of these was the Mycenæan or Ægean civilization, having its central point in Crete and the islands and shores of the Ægean Sea. So far at least as Crete was concerned, this had its own system of writing, which has not yet been deciphered. Another centre was Egypt, at this period politically dominant in Syria, although the civilization and culture of the latter region continued to be Babylonian. Another centre was Babylonia, which had communicated its writing, its religion and its art to the neighboring regions of Elam, Mesopotamia, Syria, Assyria and, to some extent, Armenia and eastern Asia Minor. Still another was the Hittite in Asia Minor, which was, however, ruder than the rest. At this period a belt of civilization seems to have extended vaguely from China on the east to Spain on the west, and from the Danube on the north to Nubia on the south; but the highly civilized portion consisted only of the territory from Elam to Greece, and from the Hellespont to Ethiopia.

Then came a catastrophe similar in cause and result to the Dark Ages which followed the brilliant period of the Græco-Roman civilization in the 4th and following centuries of our era. Barbarians, acquainted, however, with the use of iron, which made them formidable to the copper-using civilized peoples, pressing in from the north, overwhelmed the Mycenæan-Ægean civilization, reduced Egypt to a condition of depression, and for a time almost annihilated both Assyria and Babylonia. The movements of the northern peoples, driving southward and rendering foot-loose Ægeans and Hittites, forced these into the Semitic countries, expelling in turn from their homes the Aramæan hordes, who as Habiri passed into Palestine, and as Suti into Mesopotamia and Babylonia. These Dark Ages may be said to have come to an end about 1000 B.C. At least at that time a new civilization begins to dawn. As to the Dark Ages of the Christian era we owe two great discoveries, one material and the other spiritual, which largely changed the character of the succeeding civilization, namely, gunpowder and the printing-press, so to these Dark Ages of the earlier time we owe the discovery of iron, or perhaps its adaptation to practical use, and the invention of a real alphabet, the so-called Phœnician, two discoveries which conditioned the new civilization that came into being at or about 1000 B.C. Out of these Dark Ages developed on the spiritual side the religion of the Hebrews, and on the economic cultural side the Aramæan race of middle men, which so greatly helped by its common tongue and its international commerce to weld all Hither Asia into one, and to prepare the way for amalgamation in that great world culture which developed westward in Greece and Rome from 500 B.C. onward.

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ORIENTATION, the adjustment and maintenance of itself by an organism in its proper position toward its environment; the acts of perceiving, assuming and controlling its normal attitude and movements in reference to gravitation, direction, equilibrium and other requirements of its relations to space. The ability to keep right side up, to face or move in a determined direction, to place one's self as a whole in any desired attitude, to bring the various parts of the body into definite relations with other parts, to maintain equilibrium, and con-

stantly to control and utilize this power, are the elements of the faculty of orientation, which seems in some degree necessary to every living thing, and whose phenomena in their higher manifestations surpass present human powers of explanation.

The faculty is essentially a mental perception of a necessity for a muscular act; but so incessant and habitual is it, at least in animals possessing the power of moving, that its exercise is ordinarily unconscious, and belongs to the realm of automatic reflexes, or at least to that of subliminal consciousness.

The proof of this appears in the partial inability of young animals, notably of the higher classes, to adjust themselves to their surroundings. Babies have to acquire a knowledge of relative direction, distance and proportion by slow degrees. So simple a matter as bringing the hand to the mouth must be learned; the first difficulty in learning to walk is to acquire the power of maintaining equilibrium; and this must be acquired anew when a grown person attempts some novel method of locomotion, as skating or the riding of the bicycle. Proof appears also in the loss or destruction of the power of orientation which follows the derangement of the brain or nervous system by certain drugs or diseases. A symptom of intoxication is staggering, and when the intoxication is excessive ability to stand or to use the limbs definitely disappears,—the power of co-ordination is lost. Some forms of insanity have a similar effect; and a characteristic of the disease locomotor ataxia is that it deprives its victim of the power of control of equilibrium (q.v.) and of the muscles used in walking; it is not muscular weakness but disorganization of the power of co-ordination. If the affected person is able to walk at all he finds it impossible to turn without falling; or when he moves will start off at right angles to the course he intended to take. A similar defect of power accompanies great sleepiness—our heads droop and we totter and progress aimlessly until well aroused. Persons walking in the dark, with nothing to guide them but the touch of the feet upon the floor, find it hard to walk straightly or firmly. Orientation, then, that is the power to maintain a proper relative attitude, to comprehend direction, and to control locomotion, depends originally upon sensation and experience, combining many factors, both psychical and physiological, often not easily separable.

At the basis lies the faculty for equilibrium, the ability to feel and to keep one's self right side up. It is a notable fact that animals stricken with death when free to turn, as are those in the water, turn upon their backs—the part of the body that in life is kept away from the ground. This is a matter of gravity—the dorsal half of the body is the heavier. How do such creatures as fishes and low marine animals know how to resist this inclination in life, and hold themselves in the opposite or whatever may be their normal attitude toward the plane of the horizon? The only explanation is that they possess a sense of equilibrium which is supposed to reside primarily in certain organs, whose office is supplemented by various sensations, as of feeling, sight and hearing, the influence of each varying in proportion according to the degree of nervous organization of the

animal, its structure, size, shape, the medium in which it operates, etc. In the case of man and the animals nearest to him, balance is maintained by constant muscular response—in large part unconsciously, of course—to the sensations of tension and pressure in muscles, tendons and joints; to the wavering suggestions of pressure upon the soles of the feet or upon the bones and flesh of this side of the body or that, as the weight is shifted; to suggestions from the eyes with reference to fixed objects, or from the ears as sounds vary in intensity, or even from the interior of the body, where organs or contained fluids report movements which must be corrected to restore the centre of gravity. The broad examples of this, which are matters of commonplace experience, such as the leaning away from a weight carried in one hand, or the outstretching of an arm to counteract a slip of the foot, or the swerving outward when rounding a curve at a rapid pace, are only large illustrations of the minute adjustments which go on incessantly in maintaining the equilibrium of animals. Underlying these adjustments, however, is the faculty, before alluded to, of perceiving when the body is in equilibrium, and this is believed to reside especially in certain organs represented in man by the labyrinth of the ear, and in the lower animals by the homologues or analogues of this structure. These are sufficiently described and illustrated in the article EAR, and consist essentially of some movable particle at the end of a nerve-filament, which, by its change of place as the body moves, informs the mind of the direction and degree of the departure from a state of equilibrium. Prominent among these special organs are those of the lateral line in fishes, whose perceptions of vibrations make them akin to organs of hearing; but the higher purpose of which is believed to be equilibrial. With these and similar organs in the lower ranks of animals the complicated labyrinth of the ear in the higher vertebrates and in man is allied by descent; and unquestionably the semi-circular canals are the seat of our perception or sense of levelness, change of direction, relative position, acceleration of movement, rotary motion, and all the rest. The orientation of the body thus depends primarily upon the index furnished by the inner organs of the ear.

Whether this is to be regarded as a "sixth sense," as it is often styled, is by no means clear; but some of the manifestations of the power of animals and some men to perceive, take and keep a course in the entire absence of anything in the way of guidance visible to human understanding, transcend our power of explanation at present. The extraordinary faculty which savages have inherited from primitive men of finding their way through extensive forests or over wide plains that present no landmarks cannot be explained by the men themselves—they say they *feel* that the direction they follow is the right one, and become uneasy when they deviate from it. A similar explanation will alone account for the unerring manner in which birds migrate across hundreds of miles of open ocean to some island or point of coast annually revisited. See EQUILIBRIUM; TROPISMS.

The literature of the subject is mainly French and German, the latest summary being

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ORIENTE, Cuba, the extreme eastern province formerly Santiago de Cuba (q.v.).

ORIFLAMME, or **AURIFLAMME**, the former royal standard of France, originally the church banner of the Abbey of Saint Denis, and borne by the counts of Vexin, patrons of the church. It was presented by the abbot to the lord protector of the convent whenever it was necessary to take up arms for the preservation of its rights and possessions. It was a piece of red taffeta fixed on a golden spear, in the form of a banner, and cut into three points, each of which was adorned with a tassel of green silk. When Philip I afterward united Vexin to the possessions of the crown, it fell to him to bear the banner as protector of the abbey. It was then carried with the armies, and eventually became the great standard of the kingdom. Since the time of Charles VII it has never been carried into battle.

ORIGEN, ôr'i-jên, ecclesiastical writer, surnamed ADAMANTIUS: b. Alexandria 185; d. Tyre 254. He was early instructed by his father in the Christian religion. His teachers were Clement of Alexandria and Ammonius. In his early youth he gave proofs of greatness of soul. When his father was thrown into prison during the persecution of Severus, Origen exhorted him to die rather than apostatize. After the martyrdom of his father in 202 he maintained his mother and sister by giving instructions in grammar. At 18 he was appointed to instruct the believers in Alexandria. Males and females crowded to his lectures. To escape calumny he mutilated himself, thinking the act justified by the New Testament, though afterward he expressed sorrow for the act. After the death of Severus (211) Origen went to Rome, where he gained friends and admirers, and subsequently, at the request of Bishop Demetrius, continued his instructions at Alexandria. A popular tumult compelled him to flee to Palestine (215). He was permitted by the bishops there to preach in their assemblies, afterward returning to Alexandria. On his way to Cesarea, in Palestine (227), he was ordained presbyter by the bishops who were there assembled. This laid the foundations for the persecutions which embittered the remainder of his life. Demetrius maintained that he alone had the right to ordain Origen. He deprived Origen of his priestly office, prohibited him from teaching in Alexandria, whither he had returned, banished and excommunicated him. This sentence was confirmed at Rome and by most of the other bishops. But the Churches of Greece and Asia sustained Origen, who denied that he was guilty of the errors of which he was accused. In the year 231 Demetrius died, and Origen enjoyed tranquillity. The persecution under Maximin forced him to remain for two years in concealment. When peace was restored to the church in 237, he took advantage of it to travel to Athens. He then went to Arabia to refute Bishop Beryllus, who affirmed that the divine nature of Christ did not exist before his human nature. Beryllus recanted, and thanked Origen for his instructions. In the Decian persecution Origen was thrown into

prison, and subjected to the extreme sufferings, from whose severity he died.

Few authors have written so much as Origen; few men have been attacked with such virulence, both during his life and after his death. He was reproached with blending the Christian doctrines with Platonism, particularly in his book, 'De Principiis'; but he gives his opinions only as a possibility; moreover, "heretics," he says, "corrupted his writings." He has been accused, without reason, of favoring materialism. His double achievement was to "destroy gnosticism and to give philosophy a recognized place in the creeds of the Church." Of his works, besides the one just mentioned, there are extant only his 'Exhortation to Martyrdom,' commentaries, homilies and scholia on the Holy Scriptures, nothing more of which we have than free translations. His critical talent is shown in his 'Hexapla,' of which an edition was published by Montfaucon, and afterward by F. Field (1875). In 1896 further portions of the 'Hexapla' were found at Milan. His work against Celsus is the most complete defense of Christianity of which antiquity can boast. His works were edited by Lommatzsch in 25 volumes; the most recent edition has been issued by the Berlin academy. Consult Begg, 'Christian Platonists of Alexandria' (1886); Fairweather, 'Origen and Greek Patristic Theology' (1901); Freppel, 'Origène' (1868); Harnack, 'History of Dogma' (Vol. II, 1899); Möller, 'Geschichte der Kosmologie der Griechischen Kirche bis auf Origenes' (1860); Thomasius, 'Origines'; the volumes in the 'Ante-Nicene Fathers' series; and the 'Encyclopedia of Religion and Ethics' (1917).

ORIGIN OF SPECIES BY MEANS OF NATURAL SELECTION, a remarkable work by Charles Darwin, published in London, 24 Nov. 1859. In it the author expounded the famous theory known as Darwinism. The book created a profound sensation not unmixed with consternation. A torrent of anathema was poured over the head of the scientist whose patient observations in the great laboratory of nature had led him to the now generally accepted doctrine of Evolution. Theologians and laymen prophesied ruin to religion and morality if that doctrine were accepted. Nevertheless the work, slowly at first, but with increasing rapidity, made its way to general recognition and more or less qualified acceptance, and its anathematizers were gradually constrained to find a *modus vivendi* between their creeds and the theories propounded in the 'Origin of Species.' The revolution in scientific doctrine and scientific method brought about by the publication of this work was so far-reaching that 21 years after its appearance Professor Huxley declared there was no field of biological inquiry in which the influence of the 'Origin of Species' was not traceable; that the foremost men of science in every country were either avowed champions of its leading doctrines, or at any rate abstained from opposing them. But it is not only in physical and natural science that the influence of this work can be traced to-day; it has been said, perhaps prematurely, that one must seek back to Newton or even Copernicus to find a man whose influence on human thought and methods of looking at the universe has been as radical as

that of Darwin. His originality has been assailed; Lucretius, Kant, Laplace, Buffon and Erasmus Darwin (grandfather) have been brought forward as the real originators of the fertile idea which has taken its name from Charles Darwin. Undoubtedly, he received inspiration from a study of what had been done by his predecessors, but whereas the old theories produced no results, those of Darwin had a mature vitality that compelled recognition.

ORIGINAL SIN, the sin which all the descendants of Adam inherit from their first progenitor. The doctrine of Original Sin is a first postulate of Christianity in the scheme of man's redemption by Christ. The first explicit statement is to be found in Saint Paul (Rom. v. 12 et seq.): "As through one man sin came into the world, and death by sin, and so death penetrated to all men, because all sinned . . . for if by the trespass of one the many died, much more the grace and the gift in the grace of the one man Jesus Christ abounded to the many." The ante-Nicene Greek Fathers say little about the doctrine, and this only incidentally. When they do mention the subject it is always in the spirit of Saint Paul's statement, that all mankind fell in Adam, and that through this first sin death entered into the world, the will became weakened, reason obscured, and concupiscence disordered. There is also little to be gathered from the Latin Fathers of the ante-Nicene Age, for the doctrine had not become the subject of controversy, and so awakened but slight theological discussion or formulation. Wherever mentioned by them, the prevailing idea at bottom was the Pauline doctrine of the fall of the human race in Adam, with its dire consequences, which are to be remedied only by the grace and merits of Christ.

Saint Augustine (q.v.) was the first Latin Father to treat it systematically and extensively in his controversy with the Pelagians in relation to grace, free-will, predestination, etc. His teaching is succinctly stated in the following passage: "He (Adam), exiled after sin, bound his offspring also, which by sinning he had corrupted, as it were in the root, under the penalty of death and condemnation, so that all progeny born of himself and his wife . . . should draw to itself original sin, and thence be drawn through diverse errors and pains to that last and endless torture with the angels, who deserted and corrupted (others), and with those who inherit and share in their portion." (Euchirid. ch. 10). Saint Augustine's exposition of the doctrine exercised a great and lasting influence throughout the subsequent centuries, and has been, in its broader outlines, followed by the theologians of the Middle Ages. A more definite and scientific formulation grew up with the development of the stricter methods of scholastic philosophy, which reached its complete expansion in the 13th century. Saint Thomas Aquinas (q.v.), the greatest theologian of the scholastic period, declares that the essence of original sin consists in the "privation of original justice," understanding by original justice that state in which Adam was created and lived prior to the fall, with all the gifts of grace which God had bestowed upon him with the view to his supernatural end in ultimate possession of the Divine Vision. All this Adam forfeited when he fell, and that forfeiture passed by natural

generation to all his descendants. In this view original sin is not a positive evil added to human nature, but the deprivation of a supernatural good originally bestowed upon the race in the headship of Adam. Following this original loss, as a penalty of Adam's transgression, came the direful consequences of death, the confusion and disorders of all the human faculties, and the sting of concupiscence. This is the accepted teaching of the Roman Catholic Church, and the Council of Trent defines as of faith, that Adam lost original justice, not only for himself, but also for us; that he "poured sin, which is the death of the soul, into the whole human race," and that this sin comes, not by imitation of Adam's transgression, but by propagation from him.

The reformers of the 16th century generally held to a very strict interpretation of the Augustinian view, and regarded original sin as a complete corruption of the will and reason. Luther held that it consisted in concupiscence. The Lutheran and the Reformed Churches both held similar views regarding original sin, following Calvin rather than Zwingli, who looked upon it as an evil or disease, and only as a sin when a commandment was thereby transgressed. The Arminians and Socinians, on the other hand, discountenanced the ecclesiastical view of the doctrine. While the Protestant Church maintained that Jesus alone was absolutely free from original sin, the Roman Catholic Church exempts the Virgin Mary from its dominion. Uniform adhesion to the Augustinian dogma on the part of the reformers was by no means the case. From Luther's dispute with Erasmus, who would only admit a weakness of the free-will and not its destruction, up to the present time the doctrine has been variously defended and attacked, philosophers as well as theologians taking part in the controversy. Kant showed the moral signification of the doctrine, and represented original sin as an inherent tendency in man's nature to evil. Rationalism, on the other hand, taught with Pelagius that it was only a weakness of man's nature with regard to knowledge and his power for good. According to Hegel original sin is nothing else than the necessary finitude and limitation of our nature. In recent times orthodox theologians, such as Olshausen, Hengstenberg and others, have stood up for the Augustinian doctrine, while those of the liberal school have modified it in various ways. Consult Clemm, 'Christliche Lehre von der Sünde' (1897); Fisher, G. P., 'History of Christian Doctrine' (New York 1896); Harnack, A., 'History of Dogma' (Boston 1897-1900); Tennant, F. R., 'Sources of the Doctrine of the Fall' (New York 1903); Tulloch, John, 'Christian Doctrine of Sin' (New York 1877); Hodge, 'Systematic Theology' (1871); MacKintosh, R., 'Christianity and Sin' (New York 1914); Landis, 'Doctrine of Original Sin' (1885); Müller, 'Christliche Lehre von der Sünde' (1888).

ORIGINS OF CONTEMPORARY FRANCE. The. 'The Origins of Contemporary France,' like his work in criticism and philosophy, exemplifies certain general conceptions which Hippolyte Adolphe Taine (1828-93) put forth insistently from the beginning to the end of his career. Man is not a free agent. His course of action is determined by great unconscious forces or pressures, such as race,

environment, and his relation to the past. A religion, a work of art, a form of government, do not represent free creations and free choices of the human spirit. They are products just as the compounds in a chemical laboratory are products, the result of combinations of elements, and they should therefore be studied scientifically.

It was the results of the Franco-Prussian War that deflected Taine's attention from more purely literary and philosophic studies to a consideration of the unhappy state of his own land. France had been conquered, the empire suddenly and unexpectedly overthrown, the Commune had started to revive the excesses of the revolution. What was the destiny of France? Through what form of government could the forces that are France most effectively express themselves? These were the questions which forced themselves upon him. They could be answered only by a study of the past, and Taine began to apply to the history of his country the method and the theories which he had already applied to literature.

In the many volumes of this history he was therefore treating France as a parallelogram of forces of which he was to find the diagonal. In the French Revolution these forces which were to make or wreck his country had been released and could be studied in freest play. But before beginning his study of the Revolution proper he summed up the social and political situation as it existed in France in the 18th century in what has been generally recognized as the most brilliant portion of his work, the volumes on 'The Old Régime' (l'Ancien Régime), which were to deal with the 18th century and the marshalling of the forces that brought on the cataclysm.

Taine loved startling effects, and they were here ready to his hand. On the one side he had the brilliant and sumptuous life of the court, on the other the misery of starving peasants. The greatest economic, social and political upheaval in history was impending, and in the minds of the philosophers were being prepared the new doctrines that were to hurry in the climax. Taine's powerful imagination and extraordinary command of style gave this stupendous drama a presentation worthy of the theme and of the writer.

He was now ready to make his study of 'The French Revolution' which to him was a conflict of ideas and forces rather than of individuals. The rôle of the revolutionary leaders is therefore subordinated; for the most part they are carried along by movements which they are powerless to check and unable to guide; and the implication everywhere is that the cataclysm was the result of lack of any strong central control. A rereading of these volumes to-day shows how close a parallelism is presented between the work of the Jacobins in France and that of the Bolsheviks in the collapse of Russia. 'The Modern Régime,' the least interesting section of his work, was the title of the later volumes which carry us on only into the early period of the 19th century.

Taine's enthusiasm for the method of science led him to claim that he worked with entire detachment and studied the transformation of France as a naturalist studied "the metamorphosis of an insect." His own conclusions on life and his theories of development were, how-

ever, so strongly held that he most readily found in history what his theories had led him to seek. As artist and master of style, he outranks any of the later French historians. His theories on historical method were powerfully to influence his successors, though many of them, less strong in temperament and philosophic bias, were to cover the same ground more thoroughly if far less brilliantly than their master whom they frequently disowned. Nor was his influence confined to historians. The naturalistic novelists like Zola were only too willing to assume the dignity of "scientists" after having regarded the life of their hero or heroine as a naturalist regards "the metamorphosis of an insect."

The validity of Taine's historical work and the sufficiency of his erudition have in the present century been frequently impugned by historians more methodical but less gifted. The most important of these attacks on Taine is the volume of Aulard, 'Taine Historien de la Révolution Française' (1907). For a French estimate of Taine consult Giraud, 'Essai sur Taine' (1909, 4th ed.).

CHRISTIAN GAUSS.

ORIHUELA, ō-rē-wā'la, Spain, city in the province of Alicante, 13 miles northeast of Murcia and 15 miles from the Mediterranean, on the Murcia-Elche Railway. The town extends on both sides of the river Segura and is situated in a very beautiful and fertile region. The town was captured by the Moors in 713, and was recaptured by James I of Aragon in 1265. It is the seat of an episcopal see and has an episcopal palace dating from 1733. There is also a Gothic cathedral of the 14th century, and a town hall with important archives. It formerly possessed the University of Orihuela but this was closed in 1835. It has a normal school and a theological seminary. The surrounding district produces fruit, wine, oil and cereals and the town has a considerable trade in them. It also manufactures silk, linen and woolen fabrics; and has tanneries, dyeworks and oil and flour mills. Pop. about 35,072.

ORILLIA, ō-ril'li-a, Canada, town and port of entry of Simcoe County, Ontario, on the west shore of Lake Couchiching, on the Grand Trunk, Canadian Northern and Canadian Pacific railways, 86 miles north of Toronto, 28 miles northeast of Barrie. It is a favorite fishing and summer resort. It has an opera house, collegiate institute and a provincial lunatic asylum is located there. It enjoys a thriving trade in lumber and farm produce; has manufactures of leather, foundry products, lumber, shingles and planing and grist mill products; and has electric light, water and sewerage systems. Pop. (1921) 8,910.

ORINOCO, ō-ri-nō'kō, Venezuela, one of the three great South American rivers, rising in the Sierra Parima, on the Brazilian frontier, near lat. 3° 40' N., long. 64° W., and after a winding course of over 1,500 miles, during which it forms part of the boundary with Colombia, flowing into the Atlantic through a many-mouthed delta between long. 60° 20' and 62° 30' W., opposite the island of Trinidad. The area of the drainage basin is estimated at 368,600 square miles. Its exact sources were not discovered until 1886. It flows at first west by north, a mountain stream, as far as long.

67° W. A little below Esmeralda, in long. 65° 50' W., it divides and sends off to the south, the Cassiquiare, a natural canal 180 miles long with a rapid trend to the Rio Negro, a tributary of the Amazon. The Orinoco and Amazon are also connected by the Pimichin stream and the Terni branch of the Atabapo, an affluent of the Orinoco. Other important tributaries are the Guaviare, the Meta, Apure, Arauca, Caura and Caroni. Two remarkable rapids occur in the upper parts of the Orinoco, called the Atures and Maypures, the one in lat. 5° 8' N., the other about 36 miles lower down. These rapids consist of a countless number of little cascades succeeding each other like steps, and, where numerous, islands and rocks so restrict the bed of the river that out of a breadth of 8,000 feet there only remains an open channel of 20 feet. From these rapids the river is navigable to its mouth, a distance of about 870 miles.

At 600 miles from the ocean it is from 5,000 to 6,000 yards wide; at Angostura or Ciudad Bolívar, 370 miles from its mouth, 7,500 yards; and in March 65 fathoms deep. About 120 miles from the Atlantic its delta of 8,500 square miles begins. Of upward of 50 mouths which reach the ocean along 165 miles of coast line, only seven are navigable. The waterway principally used by ocean-going vessels, which penetrate up to Ciudad Bolívar (Angostura), is Boca de Navios, varying in width from 3¼ to 23 miles. Most of the larger affluents are also navigable for considerable distances, the Meta, for instance, to within 60 miles of Bogotá. As a rule the river floods the districts adjoining its banks from May to January, the country under water sometimes measuring 100 miles across. The magnificence of the scenery on the banks of the Orinoco is beyond description. Forests of great extent are filled with aromatic trees; birds of beautiful plumage are common, and hordes of monkeys disport themselves among the branches. Beyond these forests enormous plains extend their verdant surfaces farther than the eye can reach. The whole course of the main stream is in Venezuela, except where it forms the boundary between Venezuela and Colombia. Consult Guzman, 'La exploración del Orinoco' (in 'La España moderna,' Madrid 1902); Humboldt, Alexander von, 'Travels in South America' (London 1877); Mozans, H. J., 'Following the Conquistadores: Up the Orinoco and Down the Magdalena' (New York 1910); Triana, S. P., 'Down the Orinoco in a Canoe' (London 1902).

ORIOLE, any of certain passerine birds, distinguished by the predominance of a golden hue in their colors. The orioles of the Old and New Worlds belong to quite distinct families. The American orioles constitute, with the black-birds, the meadow-larks, boblinks and cowbirds, the family *Icteridae*, of which they are often considered to form a subfamily (*Icterinae*) and which is related on the one hand, through the meadow-larks, to the starlings (*Sturnidae*) of Europe and on the other, through the boblink, to the finches (*Fringillidae*). From the other members of the family the orioles may be distinguished by the slender, acute, slightly decurved bill, small, weak feet and the strongly contrasting black with yellow, golden or reddish colors of the males and the

usually plainer females. Practically all of the 40 or so species of American orioles belong to the typical genus *Icterus* whose species abound in tropical America, where they are called troupials, caciques, or banana birds. Within the limits of the United States seven species occur, but three of these are really Mexican birds which wander over our southwestern border and another is a rare straggler from South America. Several of the tropical species are imported as cage-birds. The Baltimore oriole, golden robin or hangnest (*I. galbula*), the male of which is about eight inches long and bears the rich golden and black colors of Lord Baltimore's livery, is one of the best known and most conspicuous migratory birds of the east. It occupies the entire territory east of the Rocky Mountains and northward into Canada and in winter migrates to Central and South America. From the Rocky Mountains to the Pacific it is replaced by the closely related *I. bullocki*. The Baltimore oriole is noted alike for its great beauty, its vivaciousness, its clear, loud whistle constantly repeated in May and June and its skilfully woven, pensile nest, formed of grasses and fibres and suspended from the endmost twigs of high branches, often of elm and sycamore trees.

The orchard oriole (*I. spurius*) has a similar range somewhat curtailed northward and westward. It is a smaller bird and the adult male is black and reddish chestnut, but assumes these colors only when three years old; the young male resembles the female in being olive-green and dull yellow, but in the second year has a black face and throat. In habits it generally resembles the Baltimore oriole, but it is pre-eminently a denizen of orchards and its song, nest and eggs all present specific differences.

The orioles of Europe and of the Old World generally, except Africa, belong to the family *Oriolidae*, which is related to the birds-of-Paradise. The best known species is the golden oriole, which has a stout bill and bright yellow plumage with black wings and tail. Like our orioles it constructs a hanging nest. Certain species of orioles of the genus *Mimeta*, inhabiting islands of the Malay Archipelago, so exactly resemble associated species of friar-bird (*Philemon*) that Wallace considers them to be true mimics. Consult American and European ornithologies generally; Jordan, 'Birds of India' (1862); Knowlton, F. H., 'Birds of the World' (New York 1909); Wallace, 'Tropical Nature' (1878).

ORIÓ, ò-rē-ôn, Philippines, a pueblo of the province of Bataán, Luzon, situated near the west shore of Manila Bay, five miles south of Balango. It is on the principal road of the province. Pop. 10,370.

ORION, ò-rí-ón, (1) in astronomy, one of Ptolemy's constellations and the most marked in the heavens. It is divided by the equator into two nearly equal portions. When the location of its bright stars is known, many of the surrounding ones may readily be found by alignments; (2) in Greek mythology, an heroic youth, son of Hyrieus of Hyria, though other origin has also been attributed to him. Eös became enamored of him. The gods were jealous of her love and Artemis at the command of the gods slew him with her arrows in the island of Ortygia. He was of such gigantic size that

when standing in the middle of the sea the water only reached his shoulders. According to another legend, he died of the sting of a scorpion. Various other legends of the hero are found in Greek mythology.

ORISKANY, ò-ris'kā-nī, Battle of, in American history, an engagement between the British and Indians and the American forces, near Oriskany, N. Y., 10 miles from Fort Stanwix, 6 Aug. 1777. The opposing forces each numbered about 800 men. The Americans, under General Herkimer, started to relieve Fort Stanwix, which was besieged by Saint Leger, Brant and his Indians. At Oriskany he halted and attempted to concert an attack and a sortie. The plan miscarried. Herkimer advanced and was attacked by the Indians and Tories in a deep ravine. The battle raged furiously for hours, despite a terrific thunderstorm and was one of the most cruel and bloody of the Revolutionary War. Each side lost a third of its number. The Americans remained masters of the field, although badly disabled. The sortie from the fort was a success and badly crippled the enemy. General Herkimer was mortally wounded in the battle and died several days later.

ORISKANY STAGE, in geology, the lowest group of the Devonian system, so called from Oriskany Falls, N. Y., northeast of Utica, and apparently the northern limit of the stage in New York, the name being due to the New York Geological Survey. In Maine it is several thousand feet thick, but is much thinner in western New Jersey, eastern Pennsylvania, Maryland, Virginia and West Virginia. It also occurs in Ontario and crops out in southern Illinois.

ORIZABA, ò-rē-sā'bā, Mexico. One of the chief cities of the State of Vera Cruz; situated 81 miles southwest from the port of Vera Cruz and 182 miles southeast from the City of Mexico, on the line of the Mexican railway, at the entrance to the coffee zone. Its elevation is 4,030 feet above sea level and its climate throughout the entire year is delightful. In the immediate vicinity are several cotton mills which combined, employ some thousands of operatives. Within the city limits are located the great Santa Gertrudis jute mills, owned in England, the Moctezuma brewery, cigar factories and a number of other industries and the Mendizabal hospital. In a nearby suburb are stone and marble quarries which annually supply enormous quantities of building material of very superior quality; and to the south, toward Cordoba, which is situated in the centre of the tropical fruit interest and tributary to Orizaba, are great sugar cane plantations and sugar mills. In the vicinity of Orizaba is a wealth of water power which is sufficient for every need, during a part of the year. The most notable structures are the State Normal School, completed at a cost of \$500,000, the City Hall, old Cathedral, cotton mills, jute mills, brewery and Hotel de France. The streets are all paved with stone. The street railway system extends several miles into the country in three directions. The Preparatory College maintains a technical museum and two public libraries—one connected with the Preparatory School and the other with the "Carcel Municipal"—12,000 volumes in all. Pop. about 48,000.



CHESTNUT-SIDED WARBLER (above). BALTIMORE ORIOLE (below).

ORIZABA, Mexico, a volcanic peak, 60 miles west of Vera Cruz, on the boundary between the states of Puebla and Vera Cruz. It was called by the ancient Mexicans Citlatepetl, or Mountain of the Star (from *citlalin*, star and *tepetl*, mountain), probably from the circumstance that "when in a state of eruption the flame at its summit appeared, when seen from a distance, like an immense star on the verge of the horizon," as one historian states: "but more probably because, on the side of the mountain, was a temple in pre-Columbian times, in which the 'sacred fire' was ever kept burning on the open top of the pyramidal structure, in full view of the inhabitants of the surrounding valleys." It has an altitude of 18,200 feet and is the first land visible on approaching the coast in the direction of Vera Cruz. Its most considerable eruptions known to history took place between 1545 and 1566. In common with the other great volcanoes of Mexico, Popocatepetl, Tuxtla and Jorullo, it seems to have lost most of its activity and to be in a state of repose.

ORKNEY (ôr-knî) ISLANDS, Scotland, an archipelago forming a single county, separated from the northern coast of Caithness, by the Pentland Firth, from six to eight miles broad. There are in all 67 islands of considerable size, with a number of smaller dispersed over the archipelago. They extend from lat. 58° 42' to 59° 23' N.; long. 2° 22' and 3° 25' W.; aggregate area, 390 square miles, or 249,565 acres, of which about 107,000 are under culture. Among the larger islands are Pomona or Mainland, Hoy, South and North Ronaldsay, Westray, Sanday, Eday, Stronsay, Ronsay and Shapinsay. Of the whole about 28 are usually inhabited, although five or six do not contain a dozen inhabitants each, the rest being islets too rocky to attract settlers. Hoy is the only island of the group that can be called mountainous and here the highest elevation is but 1,600 feet. With the exception of a granitic district near Stromness, the islands are of old red sandstone formation. The climate is moist, but not cold, being tempered by the Gulf stream that sweeps around the shores. Oats, turnips and hay are the chief crops and 16,000 acres of land are devoted to permanent pasture. The common breeds of sheep, cattle and horses were small, but since the introduction of good stock from the south, have become large and valuable. Rabbits and poultry are numerous. The herring and cod fisheries compensate in some parts the absence or defective development of other resources and large numbers of lobsters are annually sent to London. The principal manufactures are hosiery, made by the females and the building of boats, making of sails, nets and cordage. The chief town is Kirkwall.

As the Orcaes mention is made of the islands by several ancient geographers and classical writers, Ptolemy, Pliny the Elder, Mela, Solinus and others; the prehistoric monuments include the Stenness (q.v.) monoliths, the Maeshowe tumulus and a Pictish fort. It is probable that the Picts possessed the islands until the subversion of the Pictish kingdom in Scotland by Kenneth II. In 1099 they were assigned by King Donald Bane to the king of Norway and remained in possession of the Norwegians until the middle of the 13th cen-

tury, when Magnus, king of Norway, transferred them to Alexander, king of Scotland. In 1911 the population of the Orkney Islands was 25,897.

ORLANDO, Vittorio Emanuele, Italian statesman: b. 1860. A native of Sicily, he was for many years professor of constitutional law at the University of Palermo. In the Boselli administration he was minister of the interior. He was much criticized for the latitude he allowed the neutralist and pacifist agitators. Perceiving the danger of their machinations, he rigorously suppressed the movement. Succeeding Boselli in the premiership in October 1917, he gained prestige by the moral courage he exhibited at the time of the Italian disaster of the Caporetto. He organized national resistance to the Austro-German invasion and in a series of patriotic speeches sustained the spirit of the country. He was principal Italian delegate at the Inter-Allied Peace Conference in Paris.

ORLANDO, ôr-lăn'dô, Fla., city, county-seat of Orange County, on the Seaboard Air Lines, about 100 miles south by west of Saint Augustine. It is in a fruit growing region and its principal industries are connected with the marketing of the fruit of the surrounding country. Pop. (1920) 9,257.

ORLANDO FURIOSO ('THE RAGING ROLAND'), a romantic epic in *ottava rima*, by Lodovico Ariosto, is probably the most brilliant literary achievement of the Renaissance in the 16th century. The masterpiece of the great Ferrarese poet was begun about 1506 and was first printed in 1516. Originally in 40 cantos, constantly revised by the author, in its final form in the edition of 1532, published one year before Ariosto's death, it contains 46 cantos. Taking the popular subject and characters of Boiardo's 'Orlando innamorato' (q.v.), Ariosto completed the unfinished narrative of his predecessor and developed the poetic romance in Italy to its utmost perfection.

Boiardo's romance of chivalry had broken off at the point where the victorious pagan hosts were besieging Charlemagne in Paris. Ariosto conducts his poem to the final discomfiture of the Saracens and the triumph of the Christian world. From the Titanic fury of Orlando's jealous frenzy, the central episode of the poem, to the delightful idyll, the love of Angelica for Medoro, the cause of the hero's madness; from that exquisite extravagance, Astolfo's fantastic journey to the moon in search of his friend's lost senses, to the triumph of Discord in the Moslem camp, the poet, blending earnestness and irony in inimitable fashion, leads his charmed readers from one surprise to another. The desire to flatter his patrons, the militant ecclesiastic, Ippolito d'Este and the cardinal's brother, Alfonso I, Duke of Ferrara, caused Ariosto to emphasize the rôles of Ruggiero and Bradamante, the fabulous ancestors of the house of Este. Thus Boiardo's original protagonists, Orlando, Rinaldo and Angelica descend into secondary importance, while the trials and final union of Ruggiero, the paynim hero, and the virgin warrior, Bradamante, the sister of the Christian paladin, Rinaldo, become in the version of the courtier poet the main theme.

The charm of the narration, the beauty of the introductions, the wonderful variety of events, the magic of the style, captivated the public. Between 1536 and 1560 one editor alone brought out 30 editions of the 'Furioso.' Written for a later and more polished society, this fanciful epic shows a distinct progress in refinement, taste and restraint over Boiardo's romance. The elegant society of the day saw itself mirrored in the courtliness, the chivalric love, the perfect knighthood of the 'Orlando furioso.' Gifted in imagination and aesthetic sense, handling the *ottava rima* with masterly suppleness, harmony and variety of rhythm, Ariosto has produced in his poem, through its elegance, serenity and sheer beauty, the perfect expression of the later Italian Renaissance. Consult Ermini, Filippo, 'L'Orlando furioso' (critical text of the editions of 1516, 1521, 1532, Rome 1909-13); Rajna, Pio, 'Le fonti dell' Orlando furioso' (Florence 1900); Gardner, E. G., 'The king of court poets' (London 1906). The translation by Wm. S. Rose now to be found in Bohn's Library (London 1902-05) is superior to the older renderings of Harington or Hoole.

ALFRED G. PANARONI.

ORLANDO INNAMORATO ('Roland Enamored'), the most famous work of Matteo Maria Boiardo, is an Italian romance of chivalry in *ottava rima*. Begun about 1472, this vast narrative poem was interrupted at the end of the second book by the war between the Venetians and the Duke of Ferrara (1482). In the last 10 years of his busy life as a state official, Boiardo had added nine cantos to his third book, when the descent of Charles VIII of France into Italy and the death of the poet in the same year (1494) left his task unfinished. The incomplete work contains in all 69 cantos. Written for the brilliant court of Ferrara, whose sovereign, Ercole I, was Boiardo's patron, the 'Orlando innamorato' welded in admirable fashion the epics of Charlemagne and the romances of the Arthurian tradition. Borrowing from the Carolingian poems the ever-popular heroes of chivalry and from the Breton cycle the Oriental magic, the monstrous giants, the love potions and the supernatural characteristics of the Arthurian legends, Boiardo infused a new element by making love the central theme, a procedure that appealed immediately to the courtly and more cultured nobility of the Renaissance. Thus it is the love of Orlando and Rinaldo for the beautiful Princess Angelica of Cathay which is the main-spring of this lengthy epic. Added interest in the theme was found in the threat of the victorious Turks, who, under Mahomet II, had been menacing Italy at this very time. Pagans and Christians vying in friendly and in mortal rivalry, great infidel hosts attacking Christendom from every direction, marvelous adventures and mysterious expeditions to every clime, all the multitudinous episodes of the mediæval folklore are consummately united. The complicated plot is skilfully constructed, the story is developed with mastery, the characters, though external, are fresh and real. The success of Ariosto's 'Orlando furioso' (q.v.), the evident defects in style—a ruggedness of versification, an excess of Lombard dialecticisms, a sobriety of language, quickly attracted the re-

forming hands of Tuscan purists, whose *rifacimenti*, while polishing and embellishing the form, marred the epic simplicity and directness of the original. The most famous of these revisions, that of Francesco Berni (1542), for three centuries completely eclipsed Boiardo's version. It was only in the 19th century that the original text was reconstituted and that the author recovered his true position as the worthy predecessor to Ariosto. Consult Panizzi, Antonio, 'Orlando innamorato, Orlando furioso,' with an essay on the romantic narrative poetry of the Italians (London 1830-34); 'Studi su M. M. Boiardo' (Bologna 1894); Rose, William Stewart, 'The Orlando Innamorato' (a prose translation from Berni's *rifacimento*, London 1823). A critical edition of the text is by F. Foffano (Bologna 1906-07).

ALFRED G. PANARONI.

ORLÉANS, ôrl'ē-anz (Fr. ôr-lā-ān), the name of several princely houses of France, lords of the county (later the duchy) of Orléans. In 1344 it was an appanage of the cadet branch of the reigning Valois, and under the Bourbons it held a corresponding place. The various families of Orléans may be distinguished as follows: 1st, dating from 1344, containing the single name of Philippe, 4th son of Philip VI. He died in 1375, his 40th year, without legitimate heirs, the duchy therefore reverting to the Crown; 2d, dating from 1391, when Louis, Count of Valois, b. 1372, d. 1407, received the duchy from his brother, Charles VI, and terminated in 1498 by the accession of the then incumbent to the throne as Louis XII; this Louis (q.v.) was son of the poet Charle of Orléans (see Orléans, Charles, Duke of); the 3d, like the first, began and ended with a single duke, Jean Baptiste Gaston (q.v.), brother of Louis XIII, who held it from 1626 to 1660; the 4th important grant of the title was to Philippe, brother of Louis XIV, b. 21 Sept. 1640; d. 9 June 1701, the founder of the House of Orléans-Bourbon, of which only one member has been king of France, namely, Louis Philippe (q.v.). See various names under the heading of Orléans.

ORLÉANS, Charles, Duke of, commonly called CHARLES D'ORLÉANS, French poet and soldier, count of Angoulême: b. Paris, 26 May 1391; d. Amboise, 4 Jan. 1465. He succeeded to the duchy in 1407 on the death of his father, Louis, and like him took a prominent place in French politics, becoming a leader of the party opposing Burgundy and England. Wounded at Agincourt, he was taken captive to England and imprisoned there, probably with little or no severity, being so important a hostage, until 1439. He then married Marie de Clèves, niece of Philippe the Good of Burgundy and thus aroused suspicion against himself at court, where alliances with Burgundy were not looked upon with favor. Charles d'Orléans spent his last years in seclusion from public activity, but was famed as an entertainer and hospitable patron of poets and artists. His poems, including chansons, rondeaux, ballades, etc., some in French, some in Latin, and some in English, written during his captivity, are intensely subjective, entirely free from patriotic feeling or any thought save for his own sorrows, joys and loves. They were edited by d'Hericault (1874).

Consult Beaufils, 'Etude sur la Vie et les Poésies de Charles d'Orléans' (1861).

ORLÉANS, Hélène Louise Elisabeth, DUCHESS OF, wife of the Duke of Orléans, Ferdinand, son of Louis Philippe: b. Ludwigs-lust, 24 Jan. 1814; d. Richmond, England, 18 May 1858. The daughter of Friedrich Ludwig, Grandduke of Mecklenburg-Schwerin, she married 30 May 1837, lost her husband 13 July 1842 and devoted herself to the education of her sons, the Comte de Paris (see PARIS, LOUIS ALBERT PHILIPPE, COMTE DE), and the Duc de Chartres, in whose behalf, in 1848, after the abdication of Louis Philippe, their grandfather, she appealed in vain to the National Assembly. She removed, first to Ems, then to Eisenach and finally to England. She was a woman of many accomplishments. Consult Schubert, 'Biography' (1877).

ORLÉANS, Henri, PRINCE OF, French explorer, eldest son of Robert, Duc de Chartres: b. Ham, near Richmond, Surrey, England, 6 Oct. 1867; d. Saigon, Indo-China, 9 Aug. 1901. At 22 with Bonvalot he traveled through central Asia to Tonquin; received the medal of the French Geographical Society in 1890, having traveled through India, Afghanistan and Japan in the interval; and in the next six years explored Abyssinia (1891), Laos and Siam, Madagascar (1894) and Tibet and Yunnan (1895-96), discovering the sources of the Irawady on this last journey. He gained great popularity in France, notably by his bold colonial policy, which was a constant source of irritation to England; and yet his bid for the favor of the army in his defense of it during the Dreyfus case was unsuccessful, being rather too open. His experiences in Abyssinia led him to criticize harshly the Italian officers in captivity there, and in 1897 he was challenged to a duel and wounded by the Count of Turin. Early in 1901 he left France for Annam, where he died in August. He wrote 'Six Mois aux Indes' (1889); 'De Paris au Tonkin et travers le Thibet inconnu' (1891); 'Une Excursion en Indo-Chine' (1892); 'Autour du Tonkin' (1893); and 'A Madagascar' (1895).

ORLÉANS, Jean Baptiste Gaston, DUKE OF, third son of Henry IV of France, and brother of Louis XIII: b. Fontainebleau, 25 April 1608; d. Blois, 2 Feb. 1660. His character was weak and yielding, and he was continually involved in plots, first against his brother, Louis XIII, and Richelieu, and then against Anne of Austria and Mazarin. In 1626 he was made Duke of Orléans and he married Mary of Bourbon, Duchess of Montpensier. A mere tool of Cardinal Richelieu's enemies at court, he entered a conspiracy against Richelieu's life, which was discovered and crushed. The Duke lived temporarily at peace with Richelieu, only to join Marie de' Medici, his mother, in a new intrigue against the minister in 1631, which resulted in the complete triumph of Richelieu and the flight of the Duke to Lorraine. There in 1631 he married Marguerite, sister of Charles IV, Duke of Lorraine. He returned to France in 1634; plotted to kill Richelieu in 1636, purchasing his own pardon by sacrificing the lives of his accomplices; joined the plot of Cinq Mars in 1642, but again escaped punishment; and after the death of Louis XIII became lieutenant-general of the

realm (1643). But his part in the Fronde, where he was clearly the tool of De Retz, was too flagrant to be passed over, and in 1652 he was banished from court to Blois. Consult his 'Memoirs,' written by Mlle. de Montpensier (q.v.).

ORLÉANS, Louis Albert Philippe, COMTE DE PARIS. See PARIS, LOUIS ALBERT PHILIPPE, COMTE DE.

ORLÉANS, Louis Philippe Joseph, 100-è fè-lèp zhō-zéf, DUKE OF, great-grandson of the Regent of France, Philippe, Duke of Orléans: b. Saint Cloud, 13 April 1747; d. Paris, 6 Nov. 1793. Duke of Montpensier during his grandfather's last years, and from 1752 to 1785, Duke of Chartres, he succeeded his father in the last named year. He married, in 1769, Louise Marie Adélaïde, daughter of the Duke of Penthièvre, showed himself a voluptuary like the Regent and governed by strange whims. The accusation of cowardice brought against him for his part in the battle of Ouessant and the refusal to make him grand-admiral, in spite of his hereditary right to that post, made him a bitter enemy of the court. In 1787 he was a member of the Assembly of Notables and as such declared against the ministerial proposals and was exiled as a result. With the approach of the Revolution he gave up his rank, became a pronounced republican, joined the Jacobins (1789), assumed the name of Citizen Philip Egalité, voted with some degree of moderation in the Constituent Assembly, but in the convention joined the Mountain and voted for the death of the king. This action seems to have opened the eyes of his colleagues to his apparent desire to be made king himself, and 6 April 1793 the arrest of all members of the Orléans family was voted by the Convention. He was accused of high treason but was declared innocent by the tribunal of the Département Bouches du Rhône. Shortly afterward, he was brought before the Revolutionary Tribunal in Paris and, by it, condemned to death and executed the same day (6 Nov. 1793). Consult the exhaustive article by Monin in 'La Grande Encyclopédie'; and the biographies by Tournois (1842-43), Montjoie (1796), Ducoin (1845) and Crétineau-Joly (1862); also Carlyle, 'French Revolution.'

ORLÉANS, Louis Philippe Robert, rō-bār, DUKE OF, son of the Comte de Paris: b. Twickenham, England, 6 Feb. 1869. He was educated in France at Eu and Stanislas College and afterward studied at Sandhurst Military College, England. He was exiled, together with his father, by the law of 23 June 1886, and entering the British army, he served in India for two years. In 1890 to rouse Orleanist sympathy he returned to France and attempted to enter the army as a French citizen. He was sentenced to two years' imprisonment on 6 Feb. 1890, but was pardoned and sent out of France in June of the same year, the government realizing that his punishment might aid the Royalist cause. He traveled extensively in Asia from 1890 to 1895. In 1894 upon the death of his father he became the recognized leader of the Royalists. He married 5 Nov. 1896 Maria Dorothea, archduchess of Austria but separated from her. He led an expedition, in 1905, to explore the northeast coast of Greenland and adjacent sea; and followed this with another in

1907 to the Kara Sea. He made a collection of the letters of several of the Bourbons. Among his published works are 'Un croisière au Spitzberg' (1905); 'A. travers la banquise' (1907); 'La revanche de la banquise' (1909); 'Chasses et Chasseurs arctiques' (1911).

ORLÉANS, Philippe, DUKE OF, son of Louis XIII, styled "Monsieur" during the reign of his brother Louis XIV: b. Saint Germain, 21 Sept. 1640; d. Saint Cloud, 9 June 1701. He was the founder of the existing house of Orléans. Originally Duke of Anjou, in 1660 he succeeded Jean Baptiste Gaston, Duke of Orléans (q.v.), his uncle. In 1661 he married Henrietta, sister of Charles II of England, of whom he was very jealous, even resenting the favor shown her by Louis, who made use of her in effecting his alliance with the English king in 1670. Henrietta died in the same year, possibly poisoned; and in 1671 the Duke married Charlotte Elizabeth, daughter of the Elector Palatine. He fought in the Netherlands against William of Orange with such success that his royal brother relieved him of command, fearing his growing prestige. His two daughters by his first marriage were Marie Louise (1662-89), wife of Charles II of Spain, and Anne Marie (1669-1728), wife of Victor Amadeus of Savoy; by the second marriage he had a son, Philippe (q.v.), and a daughter Elizabeth Charlotte (1676-1744), who married in 1698 Leopold of Lorraine.

ORLÉANS, Philippe, DUKE OF, son of Philippe of Orléans and nephew of Louis XIV: b. Saint Cloud, 2 Aug. 1674; d. Versailles, 2 Dec. 1723. According to the custom established by his father he bore the title of Duc de Chartres as eldest (only) son. He was able but somewhat profligate; married in 1692 at the wish of Louis XIV, Mlle. de Blois, the king's daughter by Mme. de Montespan; quickly made himself famous as a soldier by his exploits at Mons (1691), Steenkirk (1692) and Neerwinden (1693); and like his father was practically removed from the army because of the spite of Louis XIV until his father's death. He was defeated at Turin in 1706 by Prince Eugene, but more than regained his laurels in Spain in 1708, by the brilliant capture of Lerida. His success and the rumor of intrigues with the English to make him king of Spain enforced renewed retirement in 1708. The successive deaths of the Dauphin and the Duke and Duchess of Burgundy and their son in 1711-12 were laid by gossips to his door, but he seems to have been more occupied at this time with alchemy, arts, letters and a life of pleasure than with politics. By right of birth he became (1715) regent during the minority of Louis XV. His policy was bold, quite the reverse in its details from that of Louis XIV. He restored the power of the nobles; withdrew laws against Protestants; aimed at canceling the revocation of the Edict of Nantes; joined the Quadruple Alliance, and in other ways showed himself a friend of England; attempted to reform French finance, but made bad worse by acting on the advice of John Law (q.v.); and even after 1723 when the king came of age retained much actual power for a time through Cardinal Dubois (his old tutor), whom he had made Prime

Minister. On the death of Dubois, he became himself Prime Minister in August 1723 and held office until his death the following December. Consult the biographies by La Motte, Capefigue and Baudrillart; and the histories of the regency by Lemontey, Piossens, Marmontel, Lacretelle and Wiesener; as well as the 'Mémoires' of Saint Simon, Marais and Buvart.

ORLÉANS, France, a city, capital of the department of the Loiret, situated on the right bank of the Loire, 77 miles southwest of Paris. A magnificent bridge of nine arches connects it with the populous faubourg of Saint Marceau. The houses are well built, but the streets in general are narrow and crooked. It has some handsome public squares, a Gothic cathedral; two hôtels-de-ville; the Palais de Justice; the Musée, containing a curious collection of local antiquities; the theatre, and other edifices worthy of notice. The manufactures and trade of the place are considerable, but have lost much of their former importance. There are several worsted and cotton mills, numerous sugar refineries, vinegar works, breweries and manufactures of hosiery, ironmongery, pottery, etc. Orléans was the Gallic Genabum destroyed by Cæsar 52 B.C., and rebuilt as Aurelium, whence the corruption Orléans. Philip of Valois erected Orléans into a duchy and peerage in favor of his son, and Orléans has since continued to give the title of duke to a prince of the royal line of France. Philip the Fair instituted a university here in 1312, which formerly had great celebrity. In 1428 the city sustained a siege against the English, and was relieved by the Maid of Orléans (see JOAN OF ARC), whose statue in bronze stands in one of the public squares. It was taken and retaken more than once in the Franco-German War in the latter part of 1870. Pop. about 75,000.

ORLÉANS, Isle of, Canada, in the Saint Lawrence River below Quebec at the head of the estuary 650 miles from the ocean. It is dependent to Montgomery County, is about 22 miles long and has an area of 70 square miles. On account of its numerous grave vines Jacques Cartier first named it the Isle of Bacchus, in 1535. The soil is fertile, well-wooded, and fruit culture is the chief industry. The villages along its shores are popular picnic and summer resorts, and include Beaulieu, Saint Pierre, Sainte Famille, Saint François, Saint Jean, Saint Laurent, d'Orléans being usually affixed to particularize them. General Wolfe encamped here in 1759 before the siege of Quebec.

ORLEANS, TERRITORY OF, in American history, a name formerly applied to a section of the United States. When the large tract of northwest territory was purchased from France by the United States in 1804, under the name of Louisiana, the district was divided by Congress into territories, called the District of Louisiana and the Territory of Orleans, the latter being the present area of the State of Louisiana. In February 1811, an act was passed "to enable the people of the Territory of Orleans to form a constitution and State Government," and on 12 April 1812 another act was passed for the admission of the State of Louisiana into the Union. See LOUISIANA.







